



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

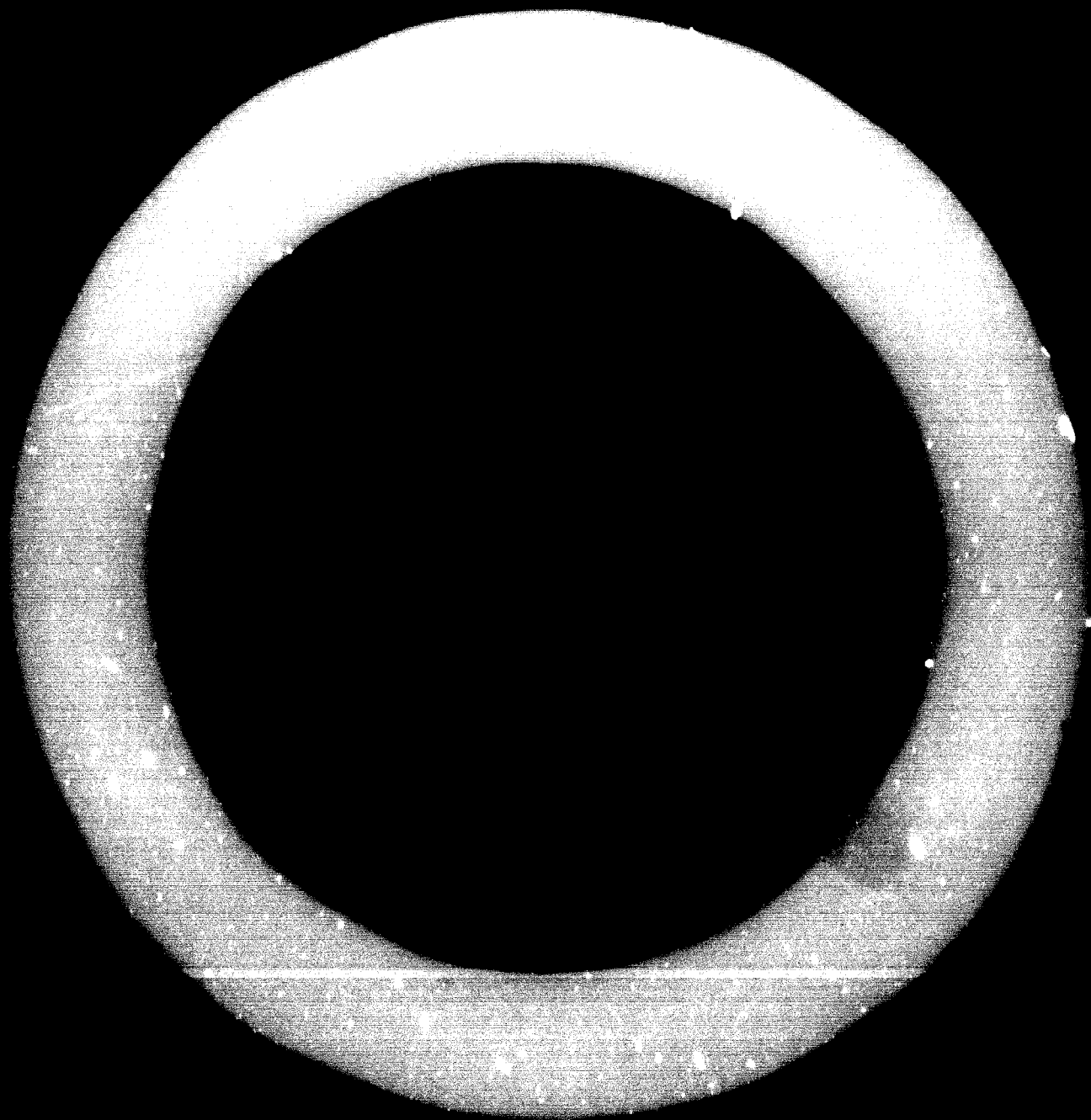
U.N. B.1
UN/CIW
ST/CIW/3

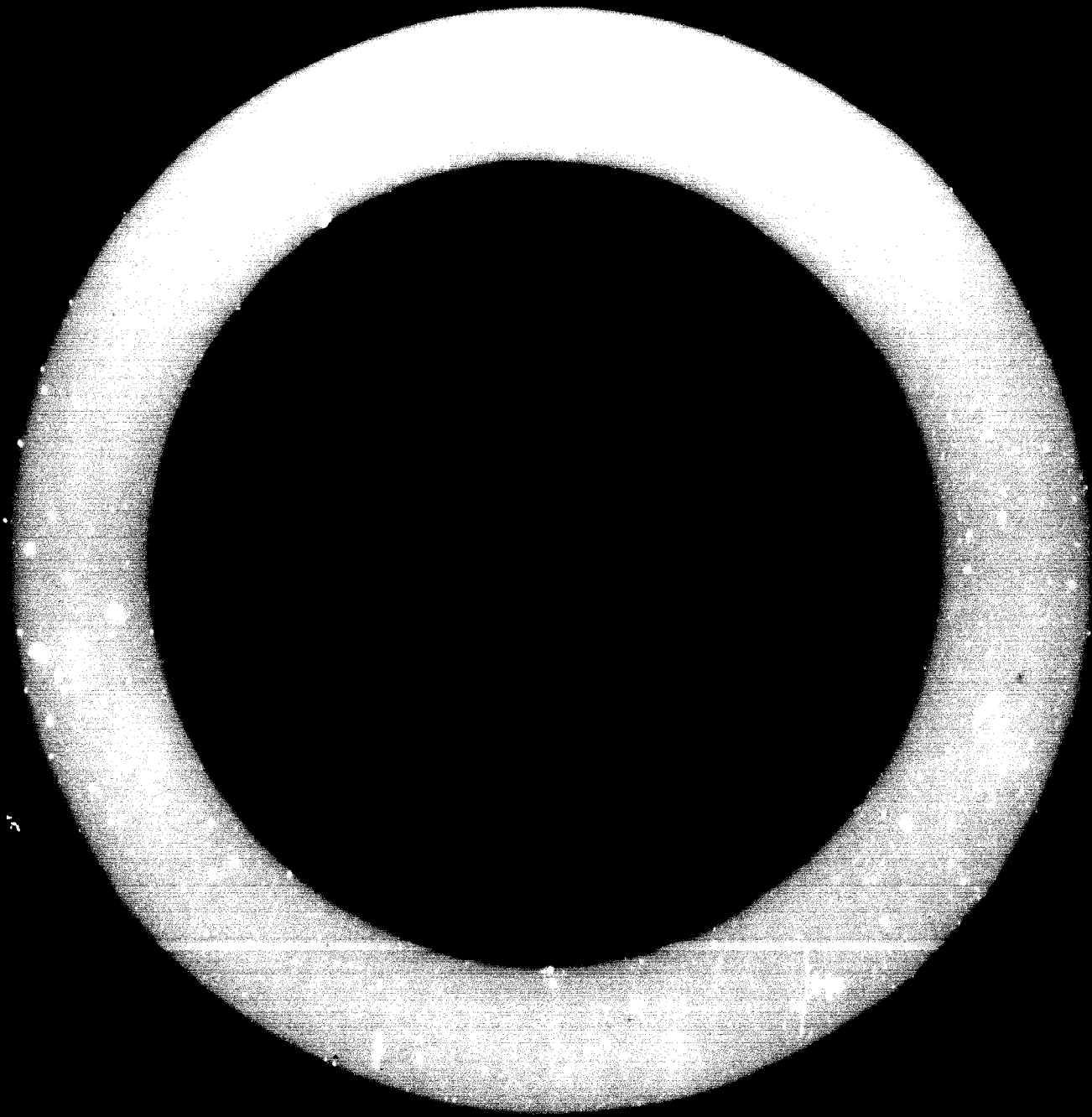
D03784

**BASIC
PRINCIPLES
AND EXPERIENCE
OF INDUSTRIAL
DEVELOPMENT
PLANNING
IN THE
SOVIET UNION**



UNITED NATIONS





Department of Economic and Social Affairs

**BASIC PRINCIPLES
AND EXPERIENCE
OF INDUSTRIAL
DEVELOPMENT PLANNING
IN THE SOVIET UNION**



UNITED NATIONS

New York, 1965

1502

All material in this publication may be freely quoted or reprinted, but acknowledgement is requested, together with a copy of the publication containing the quotation or reprint.

ST/CID/3

UNITED NATIONS PUBLICATION
Sales No. G.12.1

Price: \$U.S. 2.50
(or equivalent in other currencies)

Basic Principles and Experience of Industrial Development Planning in the Soviet Union was written by Mr. N.A. Lubimtsev, in his capacity as United Nations consultant to the Centre for Industrial Development of the Department of Economic and Social Affairs. Opinions expressed in this study are those of the author and do not necessarily reflect the views of the United Nations Secretariat.

The study has been edited in accordance with United Nations practices and requirements. Throughout, the following symbols have been used:

- A full stop (.) to indicate decimals
- A comma (,) to distinguish thousands and millions
- A slash (/) to indicate a crop year or financial year, e.g., 1960/61.

Use of a hyphen (-) between dates representing years, e.g., 1961-1963, signifies the full period involved, including the beginning and end years.

Reference to "tons" indicates metric tons.

The term "billion" signifies a thousand million.

The term "trillion" signifies a million million.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country or territory or of its authorities, or concerning the delimitation of its frontiers.

TABLE OF CONTENTS

| <u>Chapter</u> | <u>Page</u> |
|--|-------------|
| 1. ORGANIZATION AND SYSTEM | 1 |
| Development of planning in the Soviet Union | 1 |
| The organization of planning in the Soviet Union | 12 |
| The unified economic development plan and its sections | 18 |
| 2. THE PLANNING OF INDUSTRIAL PRODUCTION AND GEOLOGICAL SURVEYS | 53 |
| 3. INVESTMENT PLANNING | 91 |
| 4. THE PLANNING OF LABOUR, MANPOWER AND WAGES | 111 |
| 5. THE PLANNING OF PRODUCTION COSTS AND PRICES | 120 |
| 6. PLANNING THE SUPPLY OF MATERIALS AND MACHINERY | 130 |

Chapter 1

ORGANIZATION AND SYSTEM

Development of planning in the Soviet Union

The abolition of private ownership of the means of production and their transfer to public ownership created the necessary conditions in the Union of Soviet Socialist Republics for applying the principles of economic planning - the most advanced method of directing and controlling social production. The development of social production takes place in a planned and proportional manner, on the basis of objective economic laws. Economic crises caused by anarchy in production are completely out of the question in a socialist planned economy. Planning ensures that all branches and sectors of social production are interlinked and proportionally developed as a single economic complex and makes it possible to formulate scientifically based forecasts of economic development.

However, proportionality in the development of the national economy is not an end in itself, but a means of ensuring relationships in the development of the different branches and sectors of social production that will create conditions conducive to high rates of economic growth and to an increase in the amount of material goods of all kinds available to society. Profiting from the advantages of a planned economy, the Soviet Union has made a leap forward in industrial development of vast historical significance. The economies of the individual national republics belonging to the Union, which in the not too distant past were in a state of extreme economic and cultural backwardness, have grown particularly fast.

In 1913, Tsarist Russia's per capita output of ferrous metals was between one-tenth and one-twelfth of the United States' output, its output of coal one-twenty-fifth, of oil one-sixth and of electric power one-nineteenth, while the country was only one-fifth as well equipped with modern instruments of production as Germany and one-tenth as well as the United States.

Tsarist Russia imported 85 per cent of its metal-cutting lathes, 60 per cent of its harvesters, four-fifths of its lead and four-fifths of its mineral fertilizers. It also imported even the simplest kinds of agricultural implements. Its extreme economic backwardness was later aggravated by the general ruin created by the imperialist and civil wars. For example, in 1913 per capita output in the United States was thirteen to fourteen times higher than in Russia; by 1921 it was approximately thirty-eight times higher.

Thanks to the advantages of the socialist economic system, the Soviet Union was able within a comparatively short period of time not only to overcome the backwardness of centuries but to achieve a high rate of economic and cultural development. Since the Revolution, over 37,000 large state industrial enterprises have been built or rebuilt and put into operation.

In industrial output the Soviet Union has risen to first place in Europe and second place in the world. It now produces almost one-fifth of the entire world industrial output and more than the United Kingdom, France, Italy, Canada, Japan, Belgium and the Netherlands put together.

In 1961 the USSR produced 75.5 million tons of steel, 5.1 million tons of sheet metal, 36 billion kilowatt-hours of electricity, 17,000 metal-cutting lathes, 57.5 million tons of cement, 41 million cubic metres of prefabricated reinforced concrete units, 4.2 billion square metres of cotton cloth, 456 million pairs of leather footwear, 6.5 million television and radio sets, and much else.

All branches of industry are now represented in the Soviet Union, and all types of equipment produced.

Between 1917 and 1961 industrial output increased more than forty-four times, output of the means of production increasing ninety-nine times and output in the mechanical engineering and metal working industries more than three hundred times.

Tsarist Russia's economy was fifty to a hundred years behind that of the leading capitalist countries. Thus, in 1913 industrial output in Tsarist Russia was 13 per cent of that of the United States, whereas it is now 63 per cent. The USSR is now a country of advanced science and technology, high-powered machine tools, high-precision instruments, automated lines, electronic computers and space ships.

The development of the economies of the various national republics constituting the USSR is particularly significant. While gross industrial output in the USSR as a whole was forty-four times higher in 1961 than in 1913, in the Kazakh SSR it was sixty-five times higher, in the Kirgiz SSR sixty-seven times higher, in the Armenian SSR seventy-five times higher, and so on. The union republics, formerly outlying provinces of Tsarist Russia, have been given full scope for all-round development. This reflects the nationalities' policy followed in the Soviet Union.

The rapid economic development of the Soviet Union is aimed at the achievement of the basic goal of the socialist system: to satisfy the growing material and cultural needs of the people more and more fully by the constant development and improvement of social production.

In pursuit of this basic goal, the economy of the Soviet Union has within a brief space of time undergone a radical transformation. The relationship between the different branches of industry has changed, as can be seen from the particularly rapid advances made in chemicals, mechanical engineering and power, i.e., the branches which ensure the greatest technical progress. Industry, and particularly that part of it which produces the means of production (group A), has the decisive part to play in achieving high rates of growth throughout the economy.

Given technical progress, which requires the speediest possible renewal of the productive apparatus of society and the earliest possible application to production of the latest achievements of science and technology, the output of the means of production (subdivision I) must grow faster than the output of consumer goods (subdivision II). This is a general law of expanded reproduction in conditions of technical progress and machine technology. In the United States, for instance, according to the published data, during the twenty-year period from 1937 to 1956, when industrial production as a whole increased by 131 per cent, output of the means of production rose by 157 per cent and output of consumer goods by 103 per cent.

As the rate of economic growth rises, the gap between the growth rates of subdivisions I and II must increase. At the same time, the higher the level and degree of development of branches in subdivision I, the greater the possibility of equalizing the rates of growth of both subdivisions. The USSR's experience confirms these characteristics of the relationship between rates of growth in subdivisions I and II. While the annual average rate of growth of the output of means of production was almost 70 per cent higher than the rate of growth of the output of consumer goods over the period 1929-1940, it will be only 20 per cent higher, according to the economic development plans, over the period 1961-1980.

The ratio between the growth of the two subdivisions is the most important relationship in socialist production.

The planned development of production must ensure the creation of the maximum national income with the minimum expenditure of resources and labour. This is one of the most important manifestations of the general law of socialist economics - the achievement of the greatest possible results in the interests of society with the least possible expenditure.

This optimum development of the planned socialist economy is achieved through the accurate scientific determination of what is needed for the proportional growth of all subdivisions and sectors of social production.

In modern society, with its highly developed productive forces, proportionality is achieved by means of extremely complicated links between the various branches of production, the nature and extent of which are determined under socialism by the national economic plan. In point of fact, the actual content of the economic plan is the quantitative and qualitative changes in the development of the economy - expressed as individual indicators - which it is proposed to make during the plan period, with an analysis of the ways and means by which these changes can be brought about. Thus, national economic planning covers all aspects of the process of expanded socialist reproduction as a process consciously regulated by society. In working out economic plans, the socialist state's premises are the known requirements of society to be satisfied and the actual possibilities created before the plan period and those to be created during the plan period. By fixing targets in the national economic plan for the output of means of production and consumer goods, by deciding the distribution of workers among the various branches of social production, by establishing standards for the social productivity of labour and the degree of satisfaction of private and public needs, the State determines in advance the proportions and relationships that are to apply in the development of both productive and non-productive spheres and in the different social sectors.

The proportion between the production of means of production and the production of consumer goods is the most important, but not the only one. Given the process of expanded reproduction, the task of planning is to ensure correct, scientifically based relationships in the growth of the various branches of material production (industry, agriculture, transport, communications, building, etc.) and to fix such synthetic proportions as the ratio between consumption and accumulation, production and accumulation, etc.

The planned development of the socialist economy is its advantage, allowing broad scope for the all-round development of productive forces. Planning provides every opportunity for the fullest and most rational use of labour resources and the material factors of social production and makes it possible to concentrate effort in

the development of the national economy of the USSR. It is well known that the capitalist countries, where the economy is based on private ownership of the means of production, are the element of the national and capitalist economic development. The development of the national economy of the USSR, the large-scale industrialization, the result of the first world war.

In a socialist society, based on socialist ownership, the economy is a single system. Acting on behalf of society as a whole, the State deliberately and systematically maintains given proportions in the development of the economy and organizes and regulates production and distribution, since its economic functions are its main ones. But the system, methods and organization of economic planning applied in the USSR have varied in accordance with the main political and economic tasks of each particular period.

During the period immediately following the Great October Socialist Revolution, planning displayed various special characteristics resulting from the fact that structurally the economy of the Soviet Union consisted of a number of socio-economic sectors - a socialist sector, a small-scale goods production sector, a private capitalist sector, a state capitalist sector (mostly concessions), and vestiges of a natural economy.

In December 1917, the Supreme Economic Council (VSNKh) was set up with the task of formulating general principles and a plan for regulating the country's economic life. Corresponding economic councils, attached to the local authorities, were also set up in provinces and districts. The VSNKh and the local economic councils were in essence the country's first planning organs.

By the middle of 1918 the first plans for the development of the most important branches of industry had been prepared, but their implementation was interrupted by the outbreak of civil war and foreign intervention.

The State Commission for the Electrification of Russia (GOELRO) drew up in 1920 the first long-term economic plan, covering a period of ten to fifteen years. It was not just an electrification plan, but a plan for the technical transformation of backward agrarian Russia into an advanced industrial power. The GOELRO plan provided for the construction of thirty power stations with a total capacity of 1.5 million kilowatts, the electrification of between 20,000 and 30,000 kilometres of railway, the electrification of agriculture, a change in the structure of the fuel balance through the increased use of mineral fuel, and so on.

Once the civil war was over (1921), the reconstruction of the economy, which had been devastated by the first imperialist war and the civil war, was begun and proceeded at a rapid pace. The share of the socialist sector in the country's economy increased and capitalist elements were more and more squeezed out. In agriculture suitable conditions were created for setting the system of small separate peasant holdings on the path of socialist reconstruction.

The private capitalist and small-scale goods production sectors of the economy came within the sphere of influence of planning activities, although they were not given plan targets. Control was imposed over the production and sale of industrial goods by private enterprises, and their prices were also controlled.

The first - second the New Economic Policy, and the third - fourth the recovery period. In the first period, the main element was the trusts. In the second period, the trusts combined industrial undertakings on a sectoral or territorial basis. In the third period, the trusts combined industrial undertakings on a sectoral or territorial basis. In the fourth period, the trusts combined industrial undertakings on a sectoral or territorial basis.

Along with the State General Planning Commission, regional planning commissions were established under the regional authorities to coordinate the general economic targets of the State with local targets. These commissions subsequently became planning organs under the regional executive committees. Planning organs were also set up in the union republics.

During the same period a system of industrial management was being introduced in which the main element was the trusts. The trusts combined industrial undertakings on a sectoral or territorial basis.

The trust system was accompanied by centralized direction of industry as a whole, the general state plan and the unit accounting system providing the basis for its development.

The capitalist elements in the country were contained and squeezed out by legislative measures and by taxation and credit and price policies.

There was no point in setting plan targets for 24 million small peasant farms. During the recovery period the development of agriculture also was systematically regulated by means of a taxation and pricing system and by the planned distribution of machinery, fertilizers and mass consumer goods. The Soviet State set up a network of machine hire centres for agriculture. All trade in agricultural machinery and equipment was concentrated in the hands of the State. Almost the entire commodity output of agriculture was bought up by the State and the co-operatives. Control of grain and industrial crop prices helped to speed the growth of agricultural output.

From the very beginning of the New Economic Policy, private trade was controlled by the State. During the recovery period price control was put into effect by fixing compulsory prices for various widely used products (tea, matches, cigarettes, etc.) and by regulating retailers' profit margins.

The years 1925 and 1926 saw the preparation of the first plans for the delivery of manufactured goods to the various economic regions. These plans, which were improved from year to year, played a large part in eliminating private interregional trade.

All large-scale state industry was planned and managed directly by the higher organs of state power, and local industry by specially created administrative organs attached to the local authorities.

The first control figures for the development of the national economy were drawn up in the Gosplan in 1925/26. The elaboration of these figures was a significant achievement in the planning of a socialist economy.

In July 1927, the preliminary directives and basic limits were worked out for the preparation of operational economic plans and the budget. The control figures for 1927/28 provided not only general guidance but also specific directives for the

national economy. For the first time, central figures were drawn up for cultural reconstruction and the training of skilled workers. The central figures already came close to being a complete operational economic plan.

The central figures for 1927 were drawn up by republics too, it is true, but they formed a somewhat abbreviated programme.

The 1927 central figures constituted a complete operational economic plan, including the major production targets for the entire economy: the plan for the national sector plans and the financing programme.

In April and May 1928, the State Planning Commission, in co-operation with the specialized economic People's Commissariats created at that time, formulated the basic methodological instructions for the preparation of the five-year plan. At the same time, a working draft of a possible plan and programme indications for the construction and reconstruction of the main sectors of the economy were prepared, guidance was given regarding the economic development prospects of the republics, territories (krais) and regions (oblasts), and provision was made for a division of labour among the economic regions.

The USSR Gosplan worked out a uniform system of indicators for the five-year plan and a scheme of tables for all sections of the plan. For example, the methodological instructions for industry contained a classification of branches by means of production and consumer goods producing groups (groups A and B); a precise nomenclature of the most important industrial products was drawn up and uniform indicators of output were established in value terms (in 1926-1927 prices and prices of the year concerned) and in physical terms (tons of metal or coal, metres of cloth, etc.). At the same time a broad system of indicators was evolved for the long-term industrial plan. A consolidated table of these indicators covered all the elements and conditions of production. This was the first time that indicators were prepared in such detail for each branch with a breakdown for union, republican and local industry and for the means of production and consumer goods producing branches. This system of indicators made it possible to show with sufficient detail and accuracy the scope and physical results of the plan.

The first five-year plan of gigantic operations clearly demonstrated that the principle of planning had become firmly established in the economic construction of the USSR. Whereas the GOELRO plan fixed summary targets for seventeen industries, the first five-year plan laid down specific targets for fifty industries.

One of the most important merits of the first five-year plan was the working out of a firm time-table. The plan specified the extent and rate of development of each sector, thereby ensuring balanced development of the national economy and co-ordination of the various aspects of social reproduction (production and distribution, exchange and consumption).

To strengthen the system of unit accounting and ensure currency control, the credit and tax system was reorganized. As a result of the credit reform introduced early in 1930, paper and commercial credit was abolished and replaced by a system under which the State Bank extended credit to all enterprises and

economic organizations on the basis of their plans. In the future, the plan became the sole centre for short-term credit relations and settlements.

A tax reform introduced in 1926 replaced the very heavy party-collective taxes and excise and other duties in the socialist sector. It was levied on a single tax on turnover. This reform simplified accounting and the utilization of the country's financial resources.

In 1931 the Government amended the credit reform, abolishing the system of "automatic crediting", i.e., indiscriminate crediting by plan, and introducing the system of affording credit for the separate transactions of enterprises and economic organizations against actual plan fulfilment. The principle was established that transactions within the socialist sector between suppliers and buyers should be on a contract basis.

The preparation of annual plans began in 1930. The USSR Gosplan examined the control figures of the People's Commissariats and union republics, drafted a plan for 1931 and submitted it for approval to the Central Committee of the Party and to the Government.

The 1931 plan for industrial development gave the first presentation of technical and production indicators and of organizational measures designed to ensure the fulfilment of plan targets in every branch of industry. The plan presented detailed data on new and reconstructed enterprises and set out qualitative indicators. In the agricultural sphere it laid down a specific production programme for the state and collective farms and the machine and tractor stations, and measures relating to the private rural sector. For the first time an annual plan was prepared for the organization of the power and equipment infra-structure of socialized agriculture. The labour plan included an annual plan for the distribution of manpower and the training of skilled personnel.

The material and financial factors in the 1931 plan were co-ordinated with the material balances (metal, fuel, building materials, feed grains, etc.). The area breakdown of the plan was worked out in greater detail. This breakdown not only covered capital investments but also set targets for the volume of production in heavy and light industry (in physical terms), for the construction of regional and local power plants for the supply of tractors and for social and cultural construction.

The second five-year plan, covering the period 1932-1937, was a concrete and broadly elaborated programme for the economic development of the USSR. It gave precise indications for the siting and construction of over 1,000 heavy industry enterprises, including power plants, engineering works, petroleum industry enterprises, open-hearth and blast furnace installations, rolling mills, coal and ore pits, non-ferrous metallurgy complexes, cement factories, etc. The construction programme further provided for some 250 light industry enterprises, some 300 food industry enterprises and some 150 timber industry enterprises. The investment plan also contained a detailed programme of construction in the field of transport and of municipal and social and cultural development. It included a precise listing of the construction projects and set target dates for the entry into service of the completed units.

...of the country, the different territories and territories - coordinated. In ...-coordinated, the ... of it was ... use ... efficiency. Balanced ... distribution of ... building materials, ... the training and distribution of ... it. This ... to give priority to the ... of the ... and ... to the ... - the ... of the entire country.

During the second five-year plan considerable progress was made in improving the technical and economic basis of plans. In particular, the expert estimates and ... as a basis for planning during the period of economic ... and to some extent under the first five-year plan were progressive ... by technical norms.

In 1955-1956 a major review of technical norms in industry was undertaken which brought to light substantial under-utilization of machinery and equipment, raw materials, commodities and fuel.

As a result of the abolition in 1935 of the controlled distribution to the public of basic foodstuffs and manufactures, important changes were made in the methods of planning retail commodity circulation. Greater weight was given to the balance of personal monetary income and expenditure as a factor in planning commodity output, the volume of commodity circulation and the level of retail prices, and consumer demand was studied more thoroughly.

Of great significance in the planning of retail commodity and monetary circulation was the establishment of uniform retail prices for commodities sold through the state and co-operative trading system. The uniformity of state prices - at which an ever-increasing quantity of commodities was sold - exerted a regulating influence on collective farm market prices, contributing to their sharp decline.

In view of the rapid growth of the towns during these years, the planning authorities began to prepare general plans for rebuilding the country's largest cities.

The third five-year plan (1938-1942) marked a new step forward in the development of planning, particularly in the soundness of the technical and economic foundations on which the targets were based and in the use of balances to co-ordinate the different parts of the plans.

A number of new problems were put forward to be dealt with in the planning of capital construction and the siting of enterprises. Great importance was attached to the comprehensive development of the main economic regions. It was planned that the production of several important types of mass-consumer goods (fuel, building materials, foodstuffs) should be organized in the main economic regions in sufficient volume to satisfy the needs of the economy and public demand. In order to bring industry closer to areas of consumption and sources of raw materials, there was to be extensive construction of small and medium-size enterprises and of "back-up" enterprises producing the same goods for separate parts of the country.

It is to be noted that the great strain on the economy of the USSR during the war was not only due to the enormous losses of material resources to the German invader, but also to the enormous expenditure on the war effort itself, particularly in the fields of transport, light industry, agriculture and education.

In August 1941, the USSR Government ratified the state plan for the fourth quarter of 1941 and for 1942 for production and distribution.

The USSR Government also ratified the mobilization plan, designed to gear the entire economy to the material needs of the army. This plan provided for an increase in the production of military equipment by comparison with the pre-war plans, an increase in the output of essential types of engineering plant required for the manufacture of military equipment, and an increase in the output of special types of fuel, various other materials, and a special range of industrial commodities and foodstuffs. With these ends in view a capital construction plan was also drawn up, providing for the construction of enterprises designed to step up war production.

The conversion of the entire economy to a war footing, although a highly complex operation, proved possible precisely because it was carried out in a planned economy, and that notwithstanding the substantial losses inflicted by the German fascist occupation of most of the south, west and north-west of the USSR and the destruction of a great number of industrial enterprises. These losses have been reliably assessed at 679 billion roubles, while the number of industrial enterprises destroyed was about 32,000.

During the war period, the USSR Gosplan was instructed by the Government to draw up long-term plans for the restoration and development of the main branches of heavy industry (ferrous and non-ferrous metallurgy, coal, oil, electric power, etc.). Plans were also prepared for the economic rehabilitation of areas liberated from German occupation.

After the victorious conclusion of the war, the fourth (first post-war) five-year plan was drawn up for 1946-1950, and was followed by five-year plans for 1951-1955 and 1956-1960. The procedure for the elaboration and approval of state plans was changed. During the war and in the first few post-war years the basic type of current economic plan was the quarterly plan with month-by-month breakdown, but in 1947 annual plans with quarterly breakdowns were introduced, and monthly plans were approved by the ministries and union republics. This relieved the USSR Gosplan of all operational planning tasks and enabled it to concentrate on formulating annual and long-term plans and verifying their fulfilment.

The excessive itemizing of targets was eliminated in the elaboration of the 1959-1965 plan. The system of indicators used in the long-term plan for these years covers only the most important and nationally significant targets - those determining the rates of development of the economy as a whole and of its various sectors.

The target fulfilment figures for the 1959-1962 period of the seven-year plan, according to official statistics published in the Soviet Press (January 1962), show that the industrial production plan for 1962 was over-fulfilled, since the

growth in gross output for the four-year period amounted to 45 per cent instead of 30 per cent as laid down in the plan. The targets for all the main types of industrial output were fulfilled.

In 1962, construction work began on about 300 new major state industrial enterprises and on a large number of new workshops in existing enterprises. The volume of capital investment reached 30.5 billion roubles, representing a 2 per cent increase over 1961.

Over the first four years of the seven-year plan, the volume of capital investment under the state plan amounted to 107 billion roubles, a figure almost 6 billion roubles higher than that provided for in the seven-year plan.

The national income of the USSR in 1962 amounted to 161.5 billion roubles, an increase of 6 per cent, or some 9 billion roubles, over 1961 in terms of comparable prices. The real per capita income of the working population as a whole rose by 18 per cent during the first four years of the seven-year plan, and by 3 per cent during 1963.

Over 81 million square metres of housing or over 2 million new well-appointed apartments were built and brought into occupancy in towns and workers' settlements and some 450,000 dwelling houses were built in rural localities.

The Twenty-second Congress of the Communist Party of the Soviet Union, held in 1961, decided to adopt a long-term plan for the economic development of the USSR over the next twenty years, i.e., 1961-1980, economic calculations having demonstrated that given the existing level of economic development of the social economy it would be possible over that period to lay the material and technical foundations for the transition from socialism to communism and thus to provide conditions of material and cultural abundance for the entire population. As it emerges from this twenty-year period, Soviet society should come close to realizing the principle of distribution according to needs, and the gradual transition to sole public ownership of all property and the elimination of social inequalities should be well advanced.

The achievement of the main economic goal - to lay the material and technical foundation for communism - will make it possible:

- to build up productive forces of unparalleled magnitude, surpass the technical level of the most highly developed countries and give the USSR world leadership in per capita output;
- to secure the highest labour productivity in the world;
- to ensure the highest level of living for the entire population and to pave the way for the future realization of the great principle "from each according to his ability, to each according to his need";
- to bring about the gradual transformation of socialist into communist productive relations, to create a classless society and to eliminate all social, economic and cultural distinctions between town and country and, later, between intellectual and physical work.

Over the twenty-year period, the gross social product will approximately quintuple. Between 1960 and 1980 the volume of industrial production will increase by 530-540 per cent, grain production by 120-140 per cent, and animal husbandry by 150-210 per cent.

This colossal expansion of production will be achieved by constructing new industrial enterprises and improving the operation of existing ones, and by extending the role of those new branches of industry which ensure the greatest possible technical progress. Capital investment in these two decades will amount to 2 trillion roubles, six times the total amount of capital investment throughout the Soviet era. The number of economically active persons will increase by 40 per cent. The fixed productive capital of the USSR will be six times greater than it is now.

Over the twenty-year period the average annual increase in industrial output will be at least 9-10 per cent. This means that growth rates in the socialist economy will continue in the future to be substantially higher than in the capitalist countries.

Electric power production will develop at accelerated rates, reaching about 900 billion to 1 trillion kilowatt-hours per year by the end of the first decade and 2.7-3 trillion by the end of the second.

During the first decade the productivity of labour in Soviet industry will approximately double, and at the end of the twenty years it will have increased 300-320 per cent. Because of the shortening of the workday, the rise in output per working hour will be even greater.

Over the twenty-year period, extensive integrated automation of production will be carried out in the USSR, with a progressive transition to fully automated shops and enterprises. To secure the fulfilment of announced plans in this sphere, the total output of the machine building and metal working industries will be increased 10-11 times over the twenty-year period. The contribution of machine building to gross industrial output will rise from 21.9 per cent in 1960 to 33-37 per cent in 1980.

There will be a particularly sharp increase in the production of equipment and machinery for automation, electronic and radio equipment and electrical appliances, and of forging and pressing plant and loading and unloading machinery. Some 2,800 new machine building and metal working plants will be erected, mainly in the eastern regions of the country, and 1,900 existing plants will be rebuilt.

A vital condition for the building of communism is the development, side by side with a powerful industry, of a flourishing, fully diversified and highly productive agriculture. Labour productivity in agriculture is to increase by 400-500 per cent.

Organization of planning in the Soviet Union

The structure of the organs of administration and planning in the USSR has been modified, improved and defined by the political and economic conditions prevailing in the country at each stage of its history. That is how the structure of state administration and planning reached its present form.

The highest legislative organ in the USSR is the Supreme Soviet, and the highest executive organ is the Council of Ministers of the USSR. The Supreme Soviet of the USSR examines and approves the national economic plan as submitted by the Council of Ministers of the USSR, and after the plan has been approved it becomes law. The Supreme Soviet of the USSR also approves legislative acts regulating economic activity in the country and determines the system of organs of state administration and planning. The Council of Ministers of the USSR, as the executive authority, organizes the implementation of the national economic plan and the state budget, and controls and directs all economic activity in the country.

In union and autonomous republics economic activity and planning are directed by the councils of ministers and in territories, regions and districts by the local soviets and their executive committees. The practical work of drawing up plans is carried out by planning organs which are the working arms of the corresponding executive organs of state power.

As a further improvement in the system of planning and direction of the national economy, some changes were made at the end of 1962 and the beginning of 1963 in the organizational system of administrative and planning organs, of which a description follows.

All-state organs

The highest state organ in the country for the direction of industry and construction is the Supreme Economic Council of the USSR, which is accountable for its activities to the Council of Ministers of the USSR.

Responsibility for planning the economic development of the State as a whole rests with a single planning organ, the State Planning Committee of the USSR (the USSR Gosplan), while the implementation of national economic plans is directed by the National Economic Council of the USSR and the State Construction Committee of the USSR (USSR Gosstroj), which are accountable for their activities to the Supreme Economic Council of the USSR.

The USSR Gosplan, the National Economic Council of the USSR and the USSR Gosstroj are union-republican organs; this means that the corresponding institutions of the union republics, i.e., the republican Gosplans, sovnarkhozy and construction committees are accountable to them. Thus, the republican Gosplans, sovnarkhozy and construction committees are accountable for their activities not only to the councils of ministers of the union republics but also to the USSR Gosplan, the National Economic Council of the USSR and the USSR Gosstroj. This dual accountability of republican economic organs ensures that the operational problems of production are quickly solved without encroaching on the rights of the union republics to direct the economy under their jurisdiction. Economic planning organs also include the state committees of the USSR on co-ordination of scientific research, labour and wages, aviation technology, defence technology, radio-electronics, electronic technology, shipbuilding, the peaceful uses of atomic energy, etc.

In addition, state production committees of the USSR have been formed in medium machine building, transport construction, power and electrification, geology, and construction in the union republics of Central Asia. These committees directly administer all the economic activity of the enterprises under their jurisdiction.

The central organs of the USSR also include state committees, accountable to the USSR Gosplan, the National Economic Council of the USSR and the USSR Gostroi, or such individual sectors of the national economy as trade, the fishing industry, processing of agricultural products, the chemical industry, ferrous and non-ferrous metallurgy, fuel, the building materials industry, automation and machine building, electronics, the timber and paper industry, light industry, the food industry, and vocational and technical training.

Republican organs

The republican organs directly engaged in the planning and management of industry and construction comprise the following: the state planning commissions of the councils of ministers of union republics (the union republic Gosplans), the planning commissions of autonomous republics and of regional (territorial), town and district executive committees of working people's deputies, the all-republic sovnarkhozy and the sovnarkhozy of the economic administration areas. The republican organs also include certain committees (on construction, co-ordination of scientific research, etc.) and ministries. All state economic organs, as well as enterprises whether state-wide or local, have planning sections or departments whose direct task is to draw up plans for the development of the branch of activity or enterprise concerned.

The organization of the national economy in the USSR is based on the principle of democratic centralism. This means that the local authorities are entitled to administer directly industrial enterprises and construction projects located within the union republics or economic administration areas.

The USSR Gosplan, as the country's central planning organ, draws up, in accordance with government and party directives, plans for the development of the national economy of the USSR on the basis of the plans of the union republics. The all-state plans for the development of the national economy provide for the balanced development of the country's economy, together with the accelerated expansion of the economically most progressive and promising branches of industry and agriculture; the proper geographical distribution of productive forces throughout the country; the application of the achievements of science and technology and the most rational and effective use of material, manpower, financial and natural resources; the general growth of labour productivity, the reduction in cost and improvement in quality of production, and the reduction of building costs.

In order that national economic plans may be based on scientific forecasting and may provide the means of performing the most important economic and political tasks, the following procedure has been laid down for their preparation.

In the first stage of planning, the USSR Gosplan, on the basis of state directives and in collaboration with the union republics, the National Economic Council of the USSR, the USSR Gosstroj, the committees for branches of industry and the all-state ministries and departments, lays down the main guidelines for the development of the national economy in the period covered by the plan. This entails specifying the goals for the development of individual branches of the national economy and setting the targets for volume of output, capital construction labour productivity, production costs and other major indicators of the national economic plan. The most important measures to ensure the attainment of the prescribed goals are specified at the same time.

On the basis of the main guidelines laid down for the development of the national economy, enterprises, construction units, sovnarkhozy, and thereafter the union republics, work out their draft plans in the prescribed manner. The state committees for branches of industry examine the draft plans submitted by the republics for the development of their respective branches, to see whether they provide for the comprehensive development of the branch, the full use of available capacity, faster technical progress, the refinement of production technology, specialization and co-operative organization and application of the new achievements of science and technology. On the basis of the union republics' plans the state committees for branches of industry draw up a unified, interrelated plan for the country-wide development of each branch, giving priority to the development of the most effective forms of production and technological processes and aiming at a general increase in labour productivity and a reduction in industrial production costs. The plan for the development of scientific research and for the application of the most important achievements of science and technology to the national economy is an integral part of the state plan; it is therefore co-ordinated with the production and capital construction sections of the plan for all sectors of the national economy. These plans are prepared by the state branch committees and the USSR State Committee on Co-ordination of Scientific Research in collaboration with the Academy of Sciences of the USSR and other scientific research organizations.

The USSR Gosplan is responsible not only for drawing up national economic plans but also for supervising their implementation and seeing to it that productive capacity and fixed capital are brought into operation on schedule and that new types of industrial production are introduced.

The union republics bear full responsibility for the formulation of plans (the task of the Gosplan) and for their realization (the task of the sovnarkhoz). It is essential to the established planning procedure that the plans drawn up directly by enterprises and construction units should form the basis for the preparation of the plan at sovnarkhoz and union republic level. In working out the republican plans, the union republic Gosplans correlate and co-ordinate material, manpower and financial resources so as to ensure that the plan targets are attained.

The basic function of the National Economic Council of the USSR is to implement the plans for the economic development of the USSR, seeing to it that productive capacity and material, manpower and financial resources are put to the most rational and efficient use, that labour productivity is increased, production costs brought down and production quality improved, and latent economic resources discovered and put to use.

The task of the State Construction Committee of the USSR (USSR Kontrol) is to improve the direction of capital construction, to improve the quality and reduce the cost of construction work, to make more efficient use of the resources allotted to capital construction, to ensure that new productive capacity comes into operation on schedule, and to pursue a uniform technical policy in construction, architecture and the production of building materials.

For the direction of other sectors of the national economy (transport, communications and the like), all-state ministries of merchant marine, railways, communications, etc., have been established alongside the planning organs as part of the structure of state administration. Thus, the direction of industry is carried on by the councils of ministers of the union republics through the sovnarkhozy, with the exception of certain branches which are under the jurisdiction of state production committees and ministries of the USSR.

The Gosplans of the union republics prepare plans for all branches of industry under the jurisdiction of the republics concerned and draw up schemes for the development of individual branches and for the integrated economic development of areas within a republic, with a view to the fuller and more rational use of natural resources and manpower.

The preparation of integrated plans for industrial development in the republics facilitates the discovery and establishment of the most rational links between republics, between economic administration areas of the country, and, within each area, between industry and agricultural production and between industry and transport.

The Gosplans of the autonomous republics and the regional (territorial) planning commissions plan not only for the branches which are under their jurisdiction but for all branches of industry located in the area concerned. In view of the large scale of production and construction and the vast territory of the USSR, a decision was taken in 1962 to introduce a new regional structure for purposes of co-ordination, planning and integrated development of the national economy. The major economic region embraces contiguous economic administration areas in which a community of economic interests has emerged.

Forty-seven such regions have been established: Upper Volga, Volgu-Vyatka, East-Siberian, Far Eastern, West-Siberian, West Ural, Komi, Krasnoyarsk, Kuzbas, Leningrad, Moscow City, Moscow, Murmansk, Lower Volga, Volga, Oka, North-eastern, North-western, North Caucasian, Middle Volga, Middle Ural, Khabarovsk, Central-Chernozem, South Ural, Donets, Kiev, Ivov, Podolsk, Dnieper, Kharkov, Black Sea, Byelorussian, Central Asian, Alma Ata, East Kazakhstan, West Kazakhstan, Karaganda, Semipalatinsk, Virgin Land, South Kazakhstan, Georgian Azerbaijan, Lithuanian, Moldavian, Latvian, Armenian and Estonian.

The sovnarkhozy directly administer industry in the territory under their jurisdiction, and their structure accordingly includes the appropriate functional subdivisions (a planning-economic section, a technical section, a production section, a labour and wages section, a skilled workers and training institutions section, a financial section, a capital construction section, an administrative-economic section and a central accounts section). The number of branch departments and sections depends on the volume of production.

The sovnarkhozy possess technical-economic councils composed of scientists, specialists, inventors, front-rank workers and representatives of Party, trade union, Young Communist and other social and economic organizations.

The technical-economic councils consider questions relating to the development of industry and the improvement of production, specialization, co-operative organization, rationalization, the organization of labour and production, and wages at enterprises and construction units.

The sovnarkhozy hold full authority to direct the productive, technical and financial operations of the enterprises under their jurisdiction. On the basis of the enterprises' plans, the sovnarkhozy draw up plans for production and capital construction, the introduction of new techniques and equipment, scientific research and design work, co-operation and specialization in production, carriage of freight by rail, water and other means, labour utilization and industrial production costs, and the supply of materials and equipment. The sovnarkhozy are also competent to deal with matters relating to safety techniques and to the improvement of the housing and standard of living of manual and non-manual workers and engineers at enterprises and construction units.

Important functions performed by the sovnarkhozy in planning the supply of materials and equipment include the formulation and implementation of plans for deliveries of raw materials (including agricultural raw materials for industrial processing), other materials, fuel and equipment, with the right to redistribute these resources among enterprises; the formulation of norms for the consumption and accumulation of material resources in production and construction; the preparation of draft standards and technical conditions; the formulation of specifications and technological instructions, and the fulfilment of contractual obligations.

The sovnarkhozy decide all financial and credit questions, draw up provision prices for industrial products and submit them for approval in accordance with the procedure laid down. They are responsible for taking measures to mechanize and automate industrial processes, to promote the integrated mechanization of all operations, to apply the achievements of science and technology, to disseminate the experience of front-rank progressive enterprises and individual front-rank workers, to reduce production costs, to improve the quality and increase the range of output, etc. Together with the trade unions, the sovnarkhozy take the lead in organizing socialist emulation among enterprises in attaining the best possible results from the work done, and consider all questions relating to labour and wages, living conditions and cultural amenities for manual and non-manual workers.

In their production and distribution plans the sovnarkhozy are primarily concerned to ensure the production and delivery of industrial goods in accordance with the state targets set by the national economic plan (the delivery of products to meet all-state, inter-republican and export requirements), co-operatively organized deliveries, and deliveries to meet the needs of their own economic regions. The sovnarkhozy also deal with major economic problems affecting the economy of the entire State, direct the formulation of current and long-term plans and approve the plans of enterprises.

With the establishment of twenty-four sovnarkhozy in the territory of the RSFSR, seven in the Ukrainian SSR and seven in the Kazakh SSR it was found necessary to set up republican national economic councils to co-ordinate and direct the activities of the sovnarkhozy within the republics concerned. The republican sovnarkhozy are accountable for their activities to the councils of ministers of the union republics and to the National Economic Council of the USSR.

The managerial structure of industrial enterprises in the USSR depends on their productive capacity and the nature of their output. The general characteristic of the system of management is that it combines the principle of sole personal responsibility with wide participation in management by manual workers, non-manual workers, engineers and the trade union, party and other social organizations of the enterprise.

The enterprise is organized more or less as follows: the director of the enterprise; the chief engineer (who is usually the first deputy director); the deputy director, and the sections or departments (planning-economic, technical, technical control, labour and skilled labour, accounts, supply and distribution, economic, housing and services, etc.). Depending on the scale of production, some enterprises are also organized in a series of workshops.

The planning or planning-production departments of the enterprises - or, at the shop level, the planning offices or individual economists - perform the basic task of drawing up the plans for the enterprise.

Manual and non-manual workers, engineers, all departments of the works management and shops and representatives of the social organizations of the enterprise participate extensively in the preparation of the plans. The sovnarkhozy fix the following basic plan indicators: gross and commodity output in money and physical terms, and targets for the use of raw materials, fuel, electric power and industrial equipment; for the growth of labour productivity; for the wage fund and the employment of manual and non-manual workers; for estimated production costs, and for the income and expenditure balance of the enterprise. Every enterprise works out a technical, output and financial plan in terms of a wider range of indicators for a one-year period sub-divided into quarters. This plan consists of the following basic parts:

1. A production programme in physical terms (range and mix), gross and commodity output, co-operation with other enterprises, utilization of productive capacity, etc;
2. A comprehensive plan for the introduction of new equipment and techniques: improvement of production technology, design of new types of goods, mechanization and automation of production processes, modernization of existing equipment, improvement in the range and quality of output, application of inventions and refinements and organization of rationalization work;
3. A plan for the supply of materials and equipment, specifying the requirements of raw and other materials, semi-manufactures, fuel, electric power, components, appliances or units and assembling tools, and capital construction equipment, and indicating how those requirements are to be met:

4. A labour and wages plan, which specifies the number of personnel in each category, the wage fund, labour productivity, and measures for the initial and advanced training of manual and non-manual workers and engineers;

5. A production cost plan, covering estimated expenditure on production, the level of expenditure per ruble of commodity output and the reduction of production costs;

6. A financial plan, which determines income and expenditure, estimated quotas of working capital, the use of credit, etc.

The indicators of the technical, output and financial plan are supplemented by a section on capital construction where any such construction is to be carried out during the period covered by the plan. The technical, output and financial plan is a programme covering all the economic and financial activity of an industrial enterprise.

On the basis of the technical, output and financial plan, indicators for the work of the shops and bays are drawn up, working graphs of performance and output are kept and the attainment of targets is accounted for.

A new status is now being worked out for enterprises and sovnarkhozy with the aim of increasing their power of independent decision on all basic issues of economic and industrial activity.

In some economic administration areas, what are termed "production groups" have been set up and are in operation. These are groups of enterprises belonging to the same branch or associated on the combination principle in a group of all the enterprises involved in turning out a particular product - the auxiliary enterprises which produce semi-finished goods or components, and the main enterprise which turns them into the finished product.

The unified economic development plan and its sections

Long-term economic development planning makes it possible to establish the main trends and general scale of production, and the basic pattern of economic development.

In planning practice two types of long-term plans are used:

(a) general plans, covering a fifteen to twenty-year period of development of the country as a whole, individual regions or branches of production;

(b) shorter long-term plans, covering a period of five to seven years.

The choice of a five-year period for long-term planning is based on the fact that five years is the period needed for constructing and putting into operation large industrial enterprises, hydroelectric stations, canals, irrigation systems and reclamation systems and railways, for training specialists and for carrying out other important economic tasks. Five-year plans are based on general principles and represent concrete programmes of economic development.

However, five to seven years are not enough time to deal with the major, crucial problems of economic development, of a thoroughly planned economy, of re-equipment of branches of the economy. For that, long-term plans covering a longer period are necessary. Such a plan is the plan for the economic development of the USSR over a general period of considerable length, 1961-1990, during which the material and technical basis of communist society is to be created.

Long-term plans contain the most general indicators of economic development, which are then corrected and made more precise and specific in the current plans. The latter plans also indicate the precise agents responsible for fulfilling the plan targets in the light of the real political and economic conditions existing at the beginning of the plan period. They also take into account the additional resources that emerge as the longer plan is implemented.

Such adjustment may be illustrated by the changes that have been made in the targets of the seven-year plan (1959-1965). Originally it called for the smelting of 36-91 million tons of steel but the target was later raised to 95-97 million tons. At first, machine building output was fixed at 49 billion roubles, later the target was raised to 56-57 billion roubles.

Long-term plans contain a smaller range of indicators than annual plans. In a long-term plan consolidated indicators and general balance figures are important. Current plans contain detailed indicators, based on a complex system of balances and technical calculations. The targets of current plans are broken down according to regions.

Up to 1947 quarterly and monthly plans were prepared and approved for the whole of the economy; since then the need for such detail has disappeared.

There is another practice which serves to link long-term and current planning: in the preparation of plans for the current year the most important indicators of economic development are worked out at the same time for the year following the next five-year period so that there is a continuously operational five-year plan.

Thus, continuity in planning is ensured by preparing:

- a general long-term plan broken down into five-year periods;
- a five-year (or seven-year) long-term plan broken down into single years;
- the most important indicators of economic development for the last year of the next five-year period;
- annual plans and control figures for the year following that of each annual plan.

...the most important indicators for each year of the five-year period.

The most important indicators for the final year of the next five-year period, the five-year total, are those relating to absolute and relative rates of growth of the main branches of the economy: targets for capital construction, installation of capacity, introduction of new products which require a long period of pre-production designing and technical planning, scientific research, and the training of skilled workers.

In the field of capital construction, since 1961, itemized lists of the most important construction projects, projects using imported equipment assemblies and newly begun projects costing 2.5 million roubles or more are approved for the whole period of construction with a year-by-year breakdown of capital investment, volume of construction and assembly work, and of the targets for the installation of capacity or completion of fixed assets.

So far as the planning of industrial output is concerned, there is centralized fixing of targets for the union republics and the manufacturing plants with respect to output of equipment, component assemblies and complex units for the whole production cycle in line with the planned time limits for manufacture.

The economic plans provide for the introduction of the latest achievements of science and technology, thereby ensuring uninterrupted technological progress and the increasing productivity of social labour.

The most important scientific research projects are planned for the whole period of their implementation, the necessary financial and material resources being apportioned over the years of the project.

The plans are prepared with the co-operation of a large number of experts and scientists. Planning begins with a study of the needs of the economy and the population (for goods and services, education, health services, etc.) and a determination of potential resources, or what is required to satisfy those needs.

The economic plans are mandatory plans. The planned development of the economy is based on co-ordinated, purposeful activity by all economic elements.

Centralized state direction, in combination with the creative initiative of local authorities and staffs of enterprises, makes it possible to lay down in state plans the main guidelines for the economic development of enterprises, districts, regions and republics. These plans take into account further production growth potential with due regard for both state and local interests.

The general state plan for the economic development of the USSR is worked out by sectors of the economy, republics and economic regions. Because of the combination in a single plan of sectoral and territorial planning a scientific and sound pattern of development can be worked out for the country as a whole and for the various economic regions and sectors of the economy.

The fact that the economic development plan is worked out in all the components of the economy, from the individual enterprise up, and, at the country-wide level, in the USSR Plan, imposes a need, first, for concerted efforts by all planning agencies, uniform planning procedures and a thorough checking of all sections of the plan and, secondly, for uniformity and compatibility of all plan indicators, whether expressed in terms of value or in physical terms.

All indicators, both mandatory (i.e., government appointed) and voluntary (indicator estimates) are organized in the plan in a uniform system of tables. This system, the number of plan indicators and the plan items are not fixed for all; they vary with the characteristics and length of the plan period and with the economic goals to be reached during that period. The system of plan indicators expresses in concrete terms the plan targets set by the state and is geared to the existing machinery of economic administration.

The system of plan indicators is constantly being improved and perfected. It is worked out by the USSR Gosplan for every current or long-term plan. The system of indicators of the state-wide plan differs from that of the plans of the union republics, sovnarkhozy or enterprises in amount of detail. This increases as the plan targets come closer to the industrial enterprises directly responsible for fulfilling them. However, the difference in detail at the various levels of the economy does not preclude comparability of the indicators, since they are constructed according to a single methodology providing for their possible combination and ensuring compatibility.

The construction of the plan indicators is based on the principle of a uniform system of planning and accounting, and this serves as a means of verifying fulfilment of the plan. It reflects the inseparable connexion, the unity, between statistics and planning.

Statistics make it possible to evaluate and study the course of economic development and all deviations from the plan, in terms of quantitative and qualitative indicators. The system of statistical indicators corresponds to that of the plan indicators except that the former are somewhat more numerous. Statistics provide the planning organs with their base data on the fulfilment of the plans for preceding periods and furnish material for studying the dynamics and structure of the economy, the emerging pattern of development, etc.

Physical and value indicators, expressing plan targets in quantitative terms, may be divided into two groups: volume indicators and network indicators. Those in the first group describe the volume of output and work, freight haulage, goods turnover, etc. The so-called network indicators deal with primarily non-industrial targets. They include indicators for planning the number of retail trade enterprises, educational establishments, health institutions, art institutes, etc., and show their size or capacity. Qualitative indicators are employed in the plan to express efficiency of utilization of raw materials, fuel, electric power, plant capacity, growth of labour productivity, reduction in cost of production, and profitability of operations.

Indicators relating to volume of production are usually accompanied by specifications of quality and range of output as called for by government standards (GOST's) or by technical requirements.

The purely physical indicators show the characteristics of a product of interest to the consumer and may be expressed in such units of measurement as pieces, weight, length, area, volume (tons, sets, metres, cubic metres, litres, etc.). Such indicators are also used to describe the physical varieties of an identically named product in conventional units of measurement. For example, in the case of coal the conventional qualitative unit of measurement is one having a calorific value of 7,000 calories. Accordingly, in the mining and consumption

... indicators are computed by means of conversion factors and equated to standard units. The output of turbines is measured by their number and capacity in kilowatts; for boilers, output is expressed in terms of total heating surface in square meters.

This method of using standard physical units of measurement makes it possible to measure the output of the various types of industrial products in physical terms, in spite of their variety of characteristics and forms, to aggregate and break down industrial plan targets by most important type of product.

The choice of the standard units of measurement for use as economic plan indicators is of major importance, since they are employed to establish the link between the sectors of the economy in terms of physical goods.

Physical indicators are needed to establish the interrelationships between industries. They are used for correlating outputs of various types of equipment—metal, cement, coal, electric power and other means of production with demand. In the same way, outputs of various types of consumer goods are correlated with the estimated demand for such goods.

However, physical indicators do not suffice to measure all the different kinds of output that make up the physical mass of the social product and the national income. For this purpose it is necessary to use value indicators. Value indicators are also needed because in a socialist economy, which is a commodity economy, the [socialist] law of value operates. That is why the general indicator needed to measure the total output of industry and of the other sectors of the economy must be an indicator of value.

Value indicators are used for gross and commodity output, the relationship between levels and rates of production in the different sectors of the economy, output per worker, the wage fund, costs of production, volume of capital investment, etc.

Quite obviously, the basic economic relationships between the production of the means of production and the production of consumer goods, between the accumulated and the consumed portions of the national income, or between aggregate personal income and retail goods turnover, etc., can only be described by means of value indicators.

*
* * *

The plan indicators and plan forms approved by the USSR Gosplan are compulsory and uniform for all planning organs in the country. They are so constructed as to ensure compatibility of indicators when the plan is broken down either by sectors of the economy or by geographical areas. All the plan indicators are grouped by plan sections. For example, the economic plan for 1963 has the following sections:

- (a) consolidated section of the plan (principal composite indicators);
- (b) sections covering specific subjects and sectors:

- (1) industry
- (2) scientific research of major importance and application of scientific and technological advances in the national economy
- (3) specialization in industry and construction
- (4) agriculture and forestry
- (5) capital construction
- (6) transport and communications
- (7) geological exploration
- (8) manpower and skilled personnel
- (9) production and distribution costs
- (10) goods turnover
- (11) balance of personal cash incomes and expenditures
- (12) culture
- (13) public health;

(c) geographical section (by union republics and economic regions).

Another integral part of economic planning is the preparation of a finance plan (state budget, credit and cash plans of the State Bank, etc.). Other plans prepared at the same time as the general state economic plan are the plan for supply of materials and machinery, which comprises the balances of the most important products and the plans for their distribution, and the plan for inter-republican deliveries and deliveries for general state requirements (for the state reserve, for export and for centre ministries and departments).

* The economic development plan also includes an export-import, or foreign trade development, plan.

The consolidated section of the plan consists of the most important general economic indicators of the scale and growth rates of material production, and of the most important factors for its further expansion and a rising standard of living. These include indicators for national income, volume and structure of industrial output in terms of value and in physical terms, volume of capital investment and of construction and assembly projects, installation of new fixed capital, state purchases of the more important agricultural products, volume of transport, goods turnover, and data on expansion of the labour force (manual and non-manual workers) and on the wage fund, the rise in productivity of labour and reduction in production and distribution costs, cultural development, development of higher and secondary specialized education and of public health facilities.

In the "Industry" section, the section of primary importance in the economic plan, are given the following basic indicators: gross output, commodity output in physical units, and technical and economic indicators for basic industries.

In the "Industry" section of the plan for 1963, the technical and economic indicators for leading industries consisted of:

1. Figures for the utilization of productive capacity in the principal industries in "Group A" and "Group B", output indicators for the most important products of the machine building industry, the chemical industry and the building supply industry, for timber and for sawmill products, plywood, wood-pulp, paper, flooring, for leather footwear and leather goods, for the most important products of the food processing industry, etc.;

2. Figures for the output and supply to industry of raw materials, other materials, fuel and electric power.

The figures for the utilization of productive capacity and for the raw materials requirements for the production programme are supported by the relevant balances.

The plan for the development and application of new technology lays down targets for:

- designing and producing prototypes of the latest equipment, instruments and materials;
- important scientific research and experimental work;
- eliminating from the production process materials and equipment that are obsolete at the time the plan is prepared;
- initial serial production of new types of equipment, instruments and materials;
- development and application of important new techniques in building.

The plan expresses the trends of technological progress (electrification, "chemicalization", automation, etc.) and covers complex intra-industry and inter-industry measures as they relate to the economic regions and the union republics.

The targets of the plan for the application of new technology are reflected as necessary in the relevant sections of the production plan, the capital construction plan, the finance plan and the plan for the supply of materials and machinery.

The effectiveness of measures taken under the plan for the development of new technology is seen in the plans relating to labour, installation of new capacity, and costs of production, and in the reduction of the standard rates for consumption of materials, the improvement of equipment utilization, etc.

Since the state economic plan contains only the most important measures for the development and application of new technology, total savings will amount to the sum of the savings realized in the republics, sovnarhoz and enterprises.

The "specialization" plan contains the following sections:

1. expansion of specialized industrial capacity (from a specially approved schedule of products);
2. the plan for increased specialization in construction.

The degree of specialization is defined by indicators establishing the ratio of specialized industrial production to the over-all production of a given product, and, in the case of construction, by the ratio of work done by the specialized organizations to the total volume of contract construction-installation work.

In the plan forms relating to the expansion of specialization and of co-operation between enterprises, the targets are supported by estimates of the economic efficiency of the measures contemplated.

The "agriculture and forestry" section lays down the plan for state purchases of agricultural products and raw materials; it also contains the targets relating to the development of forestry. The targets of the plan for state purchases of agricultural products are supported by calculations of gross agricultural output in comparable and current prices; balances are computed for the production of grain, important vegetables, meat and dairy products, feeds, etc., and indicators are established for the utilization of land, productivity of labour, etc.

The "transport and communications" section lays down indicators for freight traffic by rail, sea and air and for volume of pipeline operations, and establishes targets for communications operations. The indicator estimates presented in support of the plan include balances of railway rolling-stock, maritime and river shipping, motor vehicles and aircraft, freight balances for coal, oil, ore, ferrous metals, timber and other materials by rail, figures for freight traffic by rail, water and mixed rail and water transport, and some other figures. The plans for the development of rail, sea, air and pipeline transport contain a number of technical and economic indicator estimates. The planning of railway transport operations, for example, involves the calculation of the technical speed of freight trains per standard section of track, locomotive-kilometres, average weight of freight trains, goods-wagon turn-around time, etc.

The "capital construction" section contains indicators of capital investment in the economy for the construction of new and the reconstruction of existing enterprises and for the construction of facilities in the non-productive sphere. The main indicators in this section of the plan are:

- (a) capital investment in the construction of productive facilities, and
- (b) capital investment in the construction of non-productive facilities.

Capital investment is approved on a centralized basis in breakdowns by union republics and central ministries and departments, and by major sectors of the economy (ferrous and non-ferrous metallurgy, the chemical, petroleum, gas and coal industries, electric power stations, the machine building, building materials and construction industries, the timber, paper and wood-working industries, light industry, the food processing industry, housing construction, etc.).

In addition to volume of capital investment, figures are approved for volume of construction-installation work, targets for the completion of capital assets, itemized lists of especially important construction projects and projects depending on imported equipment assemblies, targets for increasing productive capacity by new construction or the reconstruction, expansion or re-equipment of existing enterprises.

A programme of contract work, broken down by union republics and all-union ministries and departments, is also approved as part of the plan.

The following data are appended to the capital construction plan: figures for capital investment in construction and assembly work by principal industries, figures showing uncompleted construction work carried over and requirements in equipment, itemized lists of new and continuing projects having an estimated cost of 2.5 million roubles or more, with technical and economic supporting material in the case of the new projects, plans for housing, municipal and hotel construction and health and cultural facilities, itemized lists of exploratory and preliminary construction work for the current and forthcoming periods, etc.

For the section of the plan dealing with geological exploration, the following indicators are approved: volume of such work financed from the budget; volume of work financed under the capital investment plan in exploratory deep drilling for oil and gas; growth of mineral stockpiles, by major types of raw materials and fuel; volume of geological survey work and engineering work. The geological exploration plan is supported by data showing the expansion of mineral reserves, broken down into types and deposits for each union republic and all-union ministry and department.

The section entitled "Manpower and skilled personnel" establishes targets for increasing labour productivity in industry and construction, and targets relating to the size of the labour force, total wages and salaries, inter-republic redistribution of manpower and the job placement of young persons leaving general educational and vocational and technical training schools.

The target for the rise in labour productivity is computed on a per capita basis and covers manual and non-manual workers and engineering and technical staff. The supporting material for the plan includes estimated balances of manpower resources and additional requirements in respect of manual and non-manual workers and specialists, as well as figures relating to skilled workers trained in vocational and technical schools, etc.

The section of the economic plan entitled "Production and distribution of costs" includes a target for reducing costs of production in terms of outlays per rouble of industrial commodity output (in kopecks). The cost figures cover total commodity output. The target is based on a calculation of estimated expenditure on production, broken down by union republics and all-union ministries and departments.

In the case of transport, the targets approved relate to the prime cost of railway, sea and air freightage.

In construction, the target for reducing the prime costs of building and assembly work is established as a percentage of the estimated cost in terms of

the prices prevailing on 1 July 1955. The target for reducing the price of geological exploration is also fixed as a percentage of the estimated cost.

The section of the plan entitled "Goods turnover" includes retail goods turnover targets for the USSR as a whole and targets for the development of goods turnover in each republic. These are based primarily on calculations of:

1. Aggregate purchasing power;
2. Retail trade goods supply requirements;
3. Consumption of major food-stuffs and industrial products;
4. The development of the retail trade system.

The section entitled "Culture and public health" contains only indicator estimates, since the main development plans in this area are approved by the councils of ministers of the union republics.

The geographical breakdown of the plan is a grouping of indicator estimates by union republics and major economic regions.

Among the indicators computed by major economic regions, mention should be made of those for gross industrial output and the main types of output expressed in physical terms, volume of capital investment and of construction and assembly projects, the introduction of new productive capacity and fixed capital, and agricultural output expressed in physical terms.

The economic development plans of the union republics are prepared for all sectors of the economy on the basis of the full range of indicators contained in the all-union economic plan.

Concurrently with the preparation of the economic plan, approval is given to material balances, plans for the distribution of the most important types of output and plans for inter-republican deliveries.

The material balances are drawn up for the most important types of industrial output and agriculture on the basis of a special list of items which is approved in conjunction with the annual economic plan.

The Soviet economic plan includes targets for national (state-owned) and co-operative enterprises. In the case of state enterprises, the plan fixes the volume of production and distribution. In the case of co-operative agricultural enterprises (collective farms), the plan fixes the volume of only that portion of agricultural output which is to be purchased by the State. The volume of purchases of agricultural output is determined in the light not only of existing requirements but also of the potential for meeting those requirements and of the needs of the rural population. The other indicators in the over-all agricultural production plan for the collective farms are all worked out by the farms themselves and are not subject to central approval.

*

* *

The balanced development of the various economic sectors can be assured only if a sufficiently accurate generalization is made of existing requirements and of the needs of satisfaction at the given stage in the country's economic development. This is accomplished by employing the balance method in planning.

The co-ordination of all sections of the economic plan and all plan indicators by means of balanced ratios is possible to establish the essential objective economic ratios for expanded socialist reproduction and to co-ordinate the development of the various economic sectors not only on the national scale but also in the individual economic regions and union republics.

Soviet planning practice calls for the establishment of material (physical) balances expressed in terms of ratios between the various material factors in reproduction, manpower balances, and financial balances expressed in terms of value ratios in the distribution of social product. The plan balance for the entire national economy, which fully co-ordinates the whole system of plan projections, is a synthetic balance embracing all aspects of socialist reproduction. The indicators in the national economic balance are broader than those in the national economic plan since they reflect the process of expanded reproduction in the state and co-operative and collective farm sectors and in the private agricultural plots i.e., in all sectors and spheres of social production.

Only the national economic balance can show the changes taking place in the main ratios of socialist reproduction: the ratios between subdivision I and subdivision II of social production, between the various sectors of the economy, between consumption and accumulation and between material production and the non-productive sector.

Before the work of preparing the plan balance of the national economy gets under way, the performance balance is studied. This performance balance of the national economy shows the results of the reproduction process for the given period, establishes the level of development and social structure of social production and fixes ratios for the production, distribution and use of social product and national income. The main components of the plan balance of the national economy are:

1. The consolidated section, which includes a consolidated table, reproduction balances for the main productive sectors, a balance of fixed assets and a table showing the levels and relative and absolute rates of economic development;
2. The balance of production, distribution and use of social product, together with balances of capital goods and consumer goods;
3. The consolidated balance of production, distribution and final utilization of national income, together with a balance of the accounting relationships between the State, the co-operative sector, the collective farms and the general public and a balance of personal monetary income and expenditure;
4. The manpower balance.

Plan balances of the national economy are of great importance in the preparation of both annual and long-term plans.

which planning bodies have gained experience in preparing (provisional) balances on the basis of the performance during the preceding country.

Provisional balances are a means of establishing initial data for the preparation of projections of the volume of social production and of the levels of consumption and accumulation for the plan period. They are based on the existing level of social production as well as the potential for raising this level by increasing labour productivity, the scale of accumulation and the return on invested funds and by broadening the sphere of application of productive labour. By means of these calculations it is possible to estimate the growth rates of the two subdivisions and main sectors of social production, to make a preliminary estimate of the possible volume of productive and non-productive accumulation and of the consumption fund and to determine how far the anticipated changes are geared to manpower and material resources in economic development during the plan period.

The balance tables contain comparative plan indicators for interrelated economic processes or phenomena, such as production and consumption, productive capacity and volume of production, consumption and accumulation and income and expenditure. Hence, balances are of assistance to economic planners not only in determining quantitative correlations but also in working out the economic links and relationships which are essential to the establishment of scientifically based plan ratios in economic development.

As has already been noted, material balances are an important planning instrument for establishing proper ratios between the various economic sectors and branches of industry.

These balances permit a realistic determination of what can be done to provide industry and construction with the necessary equipment, raw materials, supplies, fuel and electric power and to meet the needs of the consumer.

Material balances are subdivided into:

1. Balances of means of production (tools and subjects of labour);
2. Balances of consumer goods.

The first group includes:

(a) Balances of machinery and equipment (technological equipment for the engineering, metallurgical, chemical, textile, food and all other industries; power equipment - motors, generators, transformers, etc.; transport equipment - motor-cars, locomotives, diesel shunting locomotives, etc., and agricultural machinery - combines, tractors, etc.);

(b) Balances of materials required as subjects of labour in industrial production and construction: metals, coal, oil, chemicals, lumber, ore and other types of raw materials and supplies; electric power; building materials (cement, slate, glass, roofing felt and wall materials), etc.;

(c) Balances of agricultural raw materials for industrial processing (cotton, flax, wool, products of animal origin, etc.).

(2) Balances of agricultural consumer goods (flour, oil, sugar, food products and animal products - including wool, rabbit skins, various skins, etc.).

(3) Balances of agricultural consumer goods (meat, milk products, vegetables, fruits, etc.).

From the balances of tools, in conjunction with the balances of metals, lumber and building materials, it is possible to determine the material structure of the reproduction of fixed assets and the extent to which capital construction is supplied with basic equipment and materials.

Since the material balances indicate the various producers and consumers of particular products, the production and consumption of those products can be broken down geographically. Material balances are accordingly divided into three categories: national economic, district (geographical) and individual.

National economic material balances establish nation-wide correlations between the production and consumption of various types of products. They make it possible to uncover additional reserves and to prevent various disparities and imbalances from developing.

Material balances for the types of products indicated above, and for a wider range of products when necessary, are prepared at the level of republics, administrative economic districts and cities.

The individual balances include those prepared for the purpose of supplementing the national economic material balances with more detailed data, e.g., the balances of metals (by type and section), of coal (by grade and type) and of cement (by type).

The material balances for consumer goods make it possible to establish a correlation between effective demand and the volume of consumer goods to be sold at retail prices.

The balance method is also used extensively in planning the utilization of manpower resources. By means of the manpower balances prepared within the framework of the national economic plan it is possible to co-ordinate the requirements of individual sectors of the national economy and districts of the country with the supply of labour and specialized personnel.

The factors considered in preparing these balances include population growth, demographic factors, social and labour legislation, and many others.

There is no unemployment problem in the USSR. The Soviet economic development plan for 1959-1965 envisages expanding the economically active population by almost 25 million persons.

The size of the labour force is increased mainly through the absorption of young people who graduate from secondary general educational and specialized schools and reach working age, the drawing of non-working people into material production and the reduction of the number of persons employed in the non-productive

... (p. 11, administrative and military personnel). ... (p. 12, ...
... is realized ... (p. 13, ... - ...
... construction - ... (p. 14, ... efficiency and ...)

Financial planning, which entails the preparation of a consolidated financial plan and the State Bank's cash plan, is an integral part of economic development planning.

The income section of the state budget comprises income from the socialist sector of the economy (turnover tax and deductions from profits), tax receipts (personal taxes, a tax on the income of collective farms and co-operatives and a tax on non-commodity transactions) and state social insurance funds. It should be noted that income from the socialist sector of the economy accounts for the greatest part of total budget revenue.

Determination of the volume of turnover tax and profit deduction revenue from socialist enterprises is based on the fulfilment of the plans for production, for increasing labour productivity, for reducing production costs and for sales. Turnover tax revenue is incorporated into the state budget without regard to fulfilment of the cost plan, whereas the volume of profit deduction revenue is directly dependent on the latter's fulfilment.

The system of financial balances makes it possible to co-ordinate the financial interrelationships of productive enterprises and organizations with the state budget. Through the state budget, accumulated funds are used to finance capital construction and the growth of working capital in all economic sectors in accordance with the national economic plan.

The Soviet state budget also covers the financing of socio-cultural measures and the maintenance of the non-productive sector.

Bank credit is of great importance in controlling and influencing the fulfilment of the plan. The Soviet State Bank's credit plans are drawn up at quarterly intervals in the form of plan balances, the income section of which includes the Bank's own funds, balances on current and special current account, and other resources, while the expenditure section lists all credits by recipient (union republic, all-union ministry or department, etc.) and by type (credits for use in building up seasonal stocks, credits in respect of goods for which invoices are in process of being met, etc.).

The State Bank's cash plan, which provides the basis for regulating the level of monetary circulation in the country, makes it possible to co-ordinate cash receipts and cash outlays by the balance method.

To ensure over-all co-ordination of all financial planning and the provision of funds for the fulfilment of the national economic plan, a consolidated financial plan is drawn up which covers all national revenue and expenditure.

Financial plans and balances, which are prepared at all levels of the economy, are of great importance from an organizational standpoint and constitute a means of controlling economic activity at all levels.

The balance method is being employed more and more widely in Soviet planning. In 1957-1958, for example, a national economic balance for the period 1959-1965

and the 1951-52 and 1952-53, and subsequently to undertake the preparation of a provisional national economic balance for the period 1951-1952.

In 1950, the Central Statistical Board of the USSR prepared an inter-branch balance of production and distribution of output for 1950, in monetary terms for fifty-three branches and in physical terms for seventy-three branches of industry (in a breakdown by 157 types of products).

The inter-branch balance permitted closer study of the distribution pattern for the output of the various branches and of the part they played in expanded reproduction; this was of great importance in fixing plan ratios for economic development. The inter-branch performance balance made it possible to undertake a detailed analysis of the material structure of both the consumption fund and the accumulation fund.

With the preparation of the inter-branch performance balance in monetary and physical terms, the various inter-branch and intra-branch relationships and the level of their development could be evaluated in detail.

Chapter 2

THE PLANNING OF INDUSTRIAL PRODUCTION AND GEOLOGICAL SURVEYS

Industry occupies the main place in the national economic plan, in accordance with its leading role in the development of the economy as a whole. Particular importance is attached to heavy industry, which produces the machinery and equipment, the raw materials and other supplies and the fuel and power required by industry itself and by all other sectors of the economy. Heavy industry is at the same time the basis for technical progress. In supplying the economy with the means of production, heavy industry determines the scale and rate of growth of social production as a whole.

The basic task of industrial production planning is to satisfy society's need for industrial goods as fully as possible, given the degree of development of productive forces. The development of productive forces is achieved in its turn through a constant and rapid expansion of output based on the development and introduction of new techniques and advanced methods of organizing production and labour.

The general tasks of industrial production planning are given concrete form in the economic plans and are determined by the particular features of the planning period, the known needs of the economy and the possibilities of fulfilling them in practice.

One of the main tasks in economic planning is to ensure the right proportions between branches in industry and also between industry and other sectors of the economy.

In drawing up the industrial production plan the prime consideration is the need to achieve all-round growth in the output of the most advanced equipment and different kinds of machinery and instruments and modern kinds of fuel, raw materials and other supplies, including artificial and synthetic materials, and to improve the quality and range of goods. Due allowance is made in preparing the plan for the need to raise labour productivity and lower production costs still further and to replace various types of raw materials and other supplies by more economic and efficient ones.

The plan to increase industrial output calls first and foremost for better use of existing capacity through improvements in production technology, modernization and reconstruction of equipment and mechanization and automation of labour-consuming processes.

Under the system of industrial development planning both long-term and current plans are prepared. Long-term plans are prepared for industry as a whole, for the individual branches and for the individual enterprises. This makes it possible to direct the further development not only of the various industries, but of each enterprise, including the nature of its specialization and its co-operative organization.

In accordance with the general planning calculation, several (annual) industrial production plans are prepared in the light of the main industrial development trends and trends established in the four-year plan, taking into account the need for a valid ratio in the development of the basic branches and the rational distribution of production among the economic regions in order to achieve the most efficient and rational use of material and labour resources and also to attain technical progress.

The basic tasks of industrial development are expressed in the plan by the system of indicators. These serve to establish the targets which determine the levels and the absolute and relative rates of development in the different branches of industry and the degree of efficiency in the use of material, financial and labour resources. The combination of plan indicators, which simultaneously determine the development of the different branches of industry in the various economic regions and union republics, makes it possible to construct the plan on the basis of scientifically valid branch and geographical ratios.

The indicators must meet the requirement that the plan have unity in all the interdependent sectors of the economy and must also define the specific line of development of the individual branches, regions and enterprises. This is because the plan targets are not set in anonymous terms, they do not merely define the levels and ratios that are to apply in the development of industry during the plan period but also specify who are to achieve them (republics, sovnarkhozy and so on) and the target fulfilment dates. The plan indicators set targets for the development of the different branches regardless of the authorities they come under or the geographical distribution of production; because of this, the plan's production structure can be defined and the proper ratios for balance co-ordination of the different branches both at the national level and at the level of the republic and the economic region. Geographically, the production programme of the national economic plan fixes the plan targets for the union republics, which bear the full responsibility for execution of the state plan. The union republics, in their turn, fix targets for the economic administrative regions (sovnarkhozy and local soviets of working people's deputies).

The industrial development plan indicators are divided, depending on their purpose, into indicators subject to approval, which determine what the plan targets are to be, and indicator estimates, on which the indicators to be approved are based. For example, the control figures for 1959-1965 include the following industrial indicators subject to approval: gross output and commodity output; physical output of the most important products; basic targets for the mechanization and automation of manufacturing processes and the introduction of advanced technology; targets for the development of major new types of machinery, mechanical devices, equipment, instruments and materials and for the most important kinds of scientific research and experimental work; volume of capital investment and construction and assembly work; installation of new capital assets and volume of uncompleted construction; introduction of new productive capacity and itemized lists of capital construction projects; targets for labour productivity, size of the labour force and the wage fund and reduction of costs.

Among the indicator estimates of the seven-year plan we may note the following: division of industrial production into groups A and B and estimate of productive capacity utilization; certain technical-economic indicators (volumetric efficiency

of blast furnaces, output of steel per tonne, etc.; number of power stations, number of hours of use of installed power stations, etc.; yield of cotton, yield of sugar from beet, etc.; in addition - the plan for the main branches of industry, balanced estimates of production and consumption for the main types of raw material (iron ores, manganese, coal, coal and zinc concentrates, crude petroleum); proposals for the development of product specialization by factories and works in the machine building industries and plans for the development of spare parts production (in machine building industries); estimated demand for specialists; estimates of net output, capital investment and introduction of new productive capacity for the different economic regions of the USSR; estimated raw and material resources, having regard to established rates of consumption and measures to reduce them.

The national economic plan contains indicators expressing the final results and technical-economic conditions of industrial production.

Thus, in the annual industrial production plan, the main indicators subject to approval are gross output (at constant prices), commodity output (at current selling prices), commodity output of industry in physical terms (including quality indicators), technical and economic standards and indicators for specialization and co-operative organization of production.

Plan indicators for capital construction, introduction of new technology, labour and wages, costs and supplies of materials and machinery to industry are included in the corresponding sections of the national economic plan.

The indicators of gross output and commodity output are the consolidated, synthetic indicators of the production programme, giving the total volume of industrial output.

The use of the gross output indicator in planning makes it possible to measure the physical volume, dynamics and rate of growth of production in industry as a whole, in the different branches and in individual enterprises and, on a geographical basis, in the different republics and economic regions.

The gross output indicator is used to determine the structure of industrial output by branch and region, the division of output between groups A and B, between extracting and processing industries, the ratio between industry and agriculture, etc.

The classification of industries and the assigning of production to groups A and B is made in accordance with standard systems.

Output is classified (into groups A and B) on the basis of its proposed or actual use. This means that all kinds of industrial output intended for use in production are classed in group A and all types intended for non-productive or personal consumption are classed in group B.

Thus, the output of a single product (meat, sugar, fabric, etc.) may be placed in part in group B (the part intended for personal consumption) and in part in group A (the part intended for further processing, as in the case of fabric for clothing, meat for sausage, sugar for confectionery, etc.).

Gross output is planned in terms of comparable prices. This makes it possible to measure the rates of growth of physical industrial output over certain intervals, i.e., to study its dynamics or development over time. In value terms, gross output expresses the total volume of output produced by enterprises operating on an independent balance basis (excluding their internal turnover).

Gross output is determined by the so-called factory method: from the value of the output of finished and semi-finished goods there is deducted the value of output consumed inside enterprises in the course of production (internal turnover). Accordingly, the output of subsidiary plants and workshops at factories, mines, etc., is not included in gross output or commodity output. But goods produced by such plants and workshops that are sold to other consumers are included in these indicators.

There are exceptions to this rule in some branches of industry (fishing, oil refining, timber, power, sugar and others).

Gross output is planned and valued in terms of constant wholesale prices at enterprises (excluding the turnover tax) on 1 July 1955.

In addition to the gross output indicators, indicators for commodity output are included in the plan. These indicators are particularly important because it is commodity output that goes into circulation in the economy in order to satisfy its needs.

Commodity output, like gross output, is planned by the factory method, but instead of comparable prices those prevailing at the time of the preparation of the plan are used. In the returns commodity output is calculated in terms of the prices actually obtaining during the plan period, which may differ from the prices used in preparing the plan. The returns therefore show how far the actual prices differed from those used in calculating the value of the planned commodity output.

It is necessary to value commodity output in current prices so that the production plan can be co-ordinated with production costs and financial indicators, so that value balances and commodity circulation plans can be drawn up, and so on.

The commodity output indicator differs from the gross output indicator by the value of the customer's raw materials and other supplies and by changes in inventories of unfinished goods, which are not included in commodity output.

For some branches of industry the volume of gross and commodity output as determined by the factory method does not reflect the productive activity of enterprises with sufficient accuracy. This is particularly true of enterprises which produce material-intensive goods and goods requiring a high degree of inter-enterprise co-operation.

For enterprises in this category, two other indicators are established in addition to the two already mentioned, namely, an indicator of gross output minus the cost of finished goods, units and parts, semi-finished goods and basic materials which go to make up a composite product and an indicator of the processing cost calculated on the basis of the relevant standards.

These indicators make it possible to evaluate with sufficient accuracy the productive activity of such enterprises, and in particular the fulfilment of the plan with regard to total volume of output, expenditure from the wage fund, and so on.

In addition to value indicators, physical indicators of output are also used in planning.

The needs of the economy are determined, in fact, in terms of specific kinds of industrial output (e.g., machinery and equipment of certain types and designs, metal of specific sorts, grades and sizes, particular kinds of clothing and footwear, etc.). Planning of output in physical terms makes it possible to establish a proper balance between needs and resources.

Production plans in physical terms are prepared by enterprises (for the whole range of goods they produce), by sovnarkhozy (for the main classes of goods produced by enterprises subordinated to them, including goods for delivery to other economic regions on a co-operative basis) and by the union republic Gosplans (for the range of goods specified in the state plan and the plan for inter-republican deliveries and supplies for the needs of the State as a whole).

For the country as a whole, the industrial output plan in physical terms is drawn up in accordance with a "short list" of the main types of output which determine the absolute and relative rates of growth of the economy and the main lines of economic development.

The physical industrial output plan includes all finished goods produced by enterprises operating on an independent balance basis, regardless of the purpose for which the goods are intended.

Industrial output is expressed in physical terms in units depending on the physical characteristics of the product and the purpose for which it is intended. In selecting the unit of measurement, regard is also had to the need for stimulating production of the most useful types of goods and encouraging economy in the use of raw and other materials.

The production programme is drawn up with due allowance for the planning considerations applicable to individual branches of industry. These are as follows.

Ferrous metallurgy

An ore extraction and dressing plan or cast iron, steel or sheet metal output plan is worked out for each enterprise (mine, factory, works pit, blast furnace, steel furnace, group of coke ovens, rolling mill, etc.) separately.

The basic variables are:

- (a) The productivity of the principal units - average daily output of blast or steel furnaces, average hourly output of rolling mills;
- (b) Their running time.

The time required for major repairs to blast furnaces or rolling mills or for cold repairs to steel making units is calculated on the basis of the standard rates set for the enterprise in question.

The iron, manganese and chrome iron ore mining plan specifies the output of marketable ore, the average content of the main component of the ore, the volume of capital operations and preparatory work required (mining, development) and

the total volume of the matrix. The ore output is planned according to requirements for metallurgical undertakings, reserves and export.

The way of calculating the ore output depends on the method of mining used. For underground mining, output is determined by blocks, levels and mines on the basis of data provided by mining geologists and surveyors and of planning schedules and estimates. It is calculated on the basis of geological data on the reserves of ore in each block and level, the capacity of the mine hoisting gear, the possibility of expanding stoping operations during the plan period (according to the amount of ore developed and ready for extraction, the dimensions of the ore areas and the running efficiency achieved, the working systems in use, the ventilation situation, and so on).

The average content of the main ore component is estimated according to the geological nature of the blocks to be worked and the impoverishment percentage established for them, taking into account the actual quality of the ore mined in the previous year.

The volume of capital operations and preparatory work is determined on the basis of the approved development plan, the method of working adopted and the developed and ready ore supply figures fixed for the development in question. A target is set for each level and pit, indicating the section dimensions and length of the workings, the volume of matrix material and the quantity of side recovery ore. The volume of geological survey work is determined on the basis of the mining operations plan.

The total volume of matrix material for the individual enterprise is determined by adding the volume of stoping and drifting operations.

In open-cast mining the output plan is drawn up on the basis of the geological data on ore reserves at the various levels, the order or priority adopted for working the different sections of the deposits, the volume of capital operations and development work, the number of excavators available, the transport and dumping situation and the capacity and maximum period of use of the main gear.

The ore output and matrix removal plan is drawn up for the various levels (benches) of the pit, depending on the stoping and development frontage and the number of excavators installed.

The average content of the main component of the ore mined is determined on the basis of the geological data on the sections of the deposits to be worked and the impoverishment percentage established for them, taking into account the actual quality of the ore mined in the previous year. The total volume of ore and waste taken from a pit is the sum of the amounts mined at the various levels.

The ore output and matrix removal targets must be supported by calculations based on mine level plans showing the volume of mining, development and capital operations and the area to be covered by each excavator.

Iron, manganese and chrome iron ore dressing plans are based on the capacity of the enterprise for processing crude ore, producing concentrate and middlings and extracting the basic component from the processed ore.

Coke output is estimated in terms of the gross quantity of coke with its moisture content of 5 per cent.

The basic variables are the composition and quality of the charge, the capacity of the ovens, the coking period and the yield of coke per ton of charge. In determining coke oven output, a detailed analysis is made of the operation of the ovens over the previous period and allowance is made for any changes planned, particularly in the composition of the charge, the quality of the coke or the oven linings.

The yield of coke and primary chemical products (coal tar, crude benzine and ammonia) from the coking process is planned in terms of the amounts obtained from one ton (dry weight) of coal charge.

Coke gas yield is measured in terms of cubic metres at temperature 20°C and barometric pressure 760 mm. The accuracy of the calculated yield of coking products is checked by drawing up a material balance, which serves as the basis for the coke and coal products industry plan. In this balance the total output must be equal to the dry weight of the coke oven coal charge. The following coking products are included: coke (gross dry weight); coke gas (weight); coal tar (anhydrous); crude benzine (expressed in terms of the distillation products up to 130°C); ammonia (pure); sulphur or sulphuric acid (expressed in terms of sulphur); pyrogenetic water and technological production losses. The pyrogenetic water and technological production losses are usually estimated at not more than 3 per cent of the oven coal charge.

The crude iron output plan covers all crude iron to be produced whether for internal works use or for outside consignment.

Average daily blast furnace output is fixed for the planned range of products expressed in terms of pig-iron, allowing for any changes to be made during the plan period in the operation of the furnaces with regard to:

- (a) The quality of the charge materials and their preparation, including the iron content of the iron ore component of the charge;
- (b) The amount and basicity of the agglomerate in the iron ore component of the charge;
- (c) The quality of the coke as regards its chemical composition and mechanical properties;
- (d) The blast and temperature cycle of the furnaces;
- (e) The types of crude iron produced.

The figures are calculated to allow also for any measures planned to improve production technology (such as the use of natural gas, oxygen-enriched blast and so on), introduce new equipment, eliminate production bottle-necks, reduce furnace down-time, etc.

The volumetric efficiency of blast furnaces is determined by dividing the working volume of the furnaces by the average daily output expressed in terms of pig-iron.

(b) The output of steel making plant is set in terms of pig-iron. It is assumed that the following conversion factors:

| <u>Unit of Pig-iron</u> | <u>Conversion Factor</u> |
|-------------------------|--------------------------|
| Pig-iron | 1. |
| Basic iron | 1.15 |
| Spiegeleisen | 1.8 |
| Ferro-manganese | 2.8 |
| Ferrosilicon | 2.5 |
| Vanadium | 1.35 |
| De-phosphorus | 4.0 |
| By-product | 1.34 |

The output plans also set targets for the processing of slag fusible at high temperatures and for products manufactured from it (granulated slag, foamed slag).

Steel output includes the total gross output of steel (open-hearth, Bessemer, electric) produced in the form of:

- (a) Ingots (including shear drag) for rolling and forging, whether at the works or elsewhere;
- (b) Steel castings, in terms of the weight of steel poured into the moulds (including the gates);
- (c) Charge ingots for re-melting.

In fixing the output of steel making plant, allowance is made for all measures proposed to be taken during the plan period to improve the efficiency of such plant, including measures to:

- (a) Raise the thermal capacity and heat load of the furnaces;
- (b) Increase the weight of the melt and remove bottle-necks;
- (c) Use heat-resistant refractories for furnace roof and checkerwork linings;
- (d) Change the method of teeming the steel and increase the weight of the ingots;
- (e) Automate and mechanize steel making units;
- (f) Use oxygen in the melting process;
- (g) Improve the composition, preparation and quality of the burden materials - pig-iron and scrap steel;
- (h) Organize production by schedule, introduce advanced methods of directing the melting process, reduce down-time, etc.

The planning base of steel making units is determined in accordance with the plan for the twenty-four-hour period, taking into account the planned maintenance work (including capital operations) and in hot-rolled steel, the planned output, which the working space of the furnaces does not allow.

The indicators of the efficiency of steel making units are:

- (a) In the case of open-hearth furnaces, the output of steel per square meter of hearth surface per twenty-four-hour day (obtained by dividing the planned daily output by the hearth area);
- (b) In the case of electric furnaces, the output of steel per twenty-four-hour day per thousand kilowatts of installed transformer capacity;
- (c) In the case of converters, the output of steel per nominal day per ton of converter capacity.

Rolled metal output is taken as the physical weight of usable output produced and placed in storage in response to orders, excluding billets produced by enterprises for re-rolling at their own and other mills.

Average hourly rolling mill output is fixed with due allowance for the range of items produced and the possibility of increasing rolling mill output during the plan period, particularly by the following means:

- (a) Intensification of the technological rolling process by improving the heating of the metal, raising the reduction ratio and rolling speed and other measures;
- (b) Elimination of bottle-necks in rolling mills;
- (c) Increasing the weight of ingots and billets;
- (d) Mechanization of production processes and integrated automation of rolling mills.

Non-ferrous metallurgy

In planning the extraction of non-ferrous and rare metal ores and sands the following indicators are used:

- the quantitative output of minerals (ore, sands and, in dredging and hydraulic operations, matrix material);
- the average annual content of valuable constituents in the ore, sands or matrix material extracted;
- the volume of development and capital (drifting, opening up) work required;
- the total volume of matrix material.

Ore output is planned so as to ensure that dressing mills and metallurgical plants in operation, brought into operation or expanded during the plan period, are

will, supplied with ore, the reserves, in fact that the standard working, equipment and supplies are available to enable the enterprises served by the plan, and on the information in position to operate steadily and without interruption, are drawn up.

The mining plan also depends to some extent on the method of working the deposits (underground or open-cast).

In underground mining, ore output is fixed on the basis of available information on the geological reserves of ore, the throughput capacity of the individual sections and shafts, haulage drifts, hoisting equipment, adit and area of operations, which is determined by the amount of developed and ready ore reserves present and by the working area of the deposit and the parameters of the working methods adopted.

The valuable constituents content of the ore to be extracted is determined on the basis of geological data on the occurrence of the components in question in the blocks to be worked, the ore impoverishment rate established for the deposit and the content of the ore mined over the preceding twelve months.

Plan estimates of ore output and valuable constituents content must be drawn up for each block, level and shaft, and are supported by operating schedules in the form of mine plans indicating the working period for the blocks.

In open-cast mining, the ore (sands) output and volume of stripping operations are determined by the geological reserves present in the deposit and the method adopted in working them, the supplies of excavating, drilling and haulage equipment in hand and received during the plan period, and the capacity and efficiency factors of the main types of gear and haulage facilities.

The basic constituents content of the ore (sands) extracted is estimated on the basis of the geological content of the reserves worked, the established impoverishment rate and the actual content of the constituents in question found in the ore (sands) extracted over the previous twelve months.

Plan estimates for ore and matrix material extraction are worked out by levels (benches), in accordance with the number of excavators installed, the standard daily output per cubic metre of bucket capacity and the number of days per year worked by an excavator. They must be supported by operating schedules in the form of mine plans for each level, indicating the surfaces to be worked by each excavator and the results of geological sampling.

The plan for mining operations by dredging and sluicing is drawn up for each large-capacity excavator separately with particulars of the latter's capacity, operational period (beginning and end of the washing season), the volume of material washed, its content and the quantity of metal obtained. The plan for hydraulic operations at placer deposits is drawn up for each hydraulic installation separately, with particulars of the volume of material washed, its content and the quantity of metal obtained. The estimates for the volume of sluicing and hydraulic operations are supported by operating schedules indicating the order of working the site and the metal content for each block; the factors taken into account include the ratio of washed product to geological content, and data on the state of the site, the stage reached in opening-up operations (clearing

stripings and vegetation, extent of stripping operations, the state of development of the working areas and the geological metal content of the deposits to be worked and developed.

The chief indicators for the non-ferrous and rare metal ores and sands dressing plan are the volume of ore (sand) processing operations in terms of dry weight, and the qualitative indicators for the work of the plants engaged in extracting the valuable constituents from the processed ores (sand) and producing concentrates and middlings of the required quality. The plan for the extraction of metals from enriched ore is worked out for each operating dressing mill on the basis of the best performance figures achieved in the previous year. Factors taken into account include the quality of the ore, its degree of enrichment, the quality of the flotation agents, plans for improving the technology of ore processing (on the basis of experimental and research work) and for replacing obsolete equipment by more modern and efficient varieties and the operational experience of other factories.

In drawing up the dressing mill plan, particular importance must be attached to ensuring integrated utilization of the raw material with a view to achieving maximum possible extraction of all valuable constituents in the ore being processed.

In the dressing mill production plan estimates the following data are given: the types and quantities of ore to be processed; the metal content of each ore; the quantity of metal in the ore; the metal recovery rate; the quantity of metal recovered and the quantity of concentrates and middlings obtained, expressed in terms of a standard grade. In the plan estimates for the production of concentrates at finishing plants, all industrial products intended for processing must be indicated.

The non-ferrous and rare metals production plan drawn up for each metallurgical plant includes the following indicators:

- the quantity of metal-containing raw material to be processed in the plan period;
- qualitative indicators for the various conversion processes;
- the output of finished product.

Raw materials resources are estimated on the basis of anticipated deliveries from the suppliers during the plan period. The volume of secondary materials processing is co-ordinated beforehand with the supply of scrap and rejects.

Works production programmes are worked out on the basis of plant capacity and raw materials supplies, as indicated in the balances of raw and other materials. Plant capacity is determined separately for each process in the light of the best past performance of the plant in terms of output per unit of area (volume) or daily (hourly) output and period of operation.

Works material balances are drawn up separately for each process in accordance with the processing flowsheet.

On the basis of these balances, the general works balance is drawn up in accordance with the same flowsheet.

The production plan estimates for non-ferrous metallurgical plants are drawn up in the form of a summary balance for the most important metals.

The annual output of metal at electrolytic refining plants and shops is fixed for each series of electrolyzers on the basis of the results achieved by the most advanced plants, in accordance with the following formula:

$$M = \frac{S \cdot E \cdot C \cdot H \cdot D \cdot J}{10^6}$$

where M = annual metal output of one series (tons);

S = current (ampères);

E = electrochemical equivalent (grammes/ampère-hours)

C = current efficiency (percentage)

H = number of electrolyzers used;

D = number of working days in the plan year.

The total plant output of metal is defined as the sum of the output of all series of electrolyzers.

Production plans for electrolytic refining plants are worked out with due allowance for each plant's raw materials and electric power supplies situation.

Rolling mills and shop output is planned on the basis of the calculated load on all the main equipment, each rolling mill being taken separately, in the light of range of output actually produced over the preceding twelve months. Equipment load is calculated on the basis of the equipment's rated capacity.

The total volume of non-ferrous rolled metal output includes the output of copper, brass, bronze, cupra nickel, nickel, zinc, lead, aluminium, bimetallic and other types of rolled metal. The planned output of non-ferrous rolled metal must correspond to raw materials resources and to the demand for each type of rolled metal, as indicated by orders received.

Chemical industry

Output targets for existing chemical enterprises are fixed on the assumption of the fullest possible utilization of productive capacity and the availability for the proposed production programme of adequate supplies of raw materials, auxiliary materials and power.

Physical chemical output is planned in terms of a product having the basic content required by existing standards or technical specifications. Where the types of chemicals produced bear the same name but contain differing amounts of the main component (caustic soda, sulphuric acid, etc.), output is planned in terms of a product having a standard content of this component (92 per cent caustic soda, sulphuric acid in monohydrate, etc.).

Mineral fertilizers are planned in terms of the following standard units:

Nitrogen fertilizers: ammonium sulphate of 20.5 per cent nitrogen content;

Phosphatic fertilizers: 18.7 per cent phosphoric anhydride;

Potassium fertilizers: 41.6 per cent potassium oxide;

Phosphorite fertilizers: 19 per cent phosphoric anhydride.

The various types of mineral fertilizers are expressed in terms of the above standard units by application of the following coefficients.

To express nitrogen fertilizers in terms of ammonium sulphate = 1

| | |
|---|------|
| Ammonium nitrate | 1.7 |
| Liquid nitrogen fertilizers (on the basis of 100 per cent ammonium content) | 4.0 |
| Sodium nitrate | 0.76 |
| Calcium nitrate | 0.81 |
| Urea | 2.2 |
| Nitrophoska | 0.73 |
| Nitrophos | 0.88 |
| Sodium-ammonium sulphate | 0.88 |
| Ammonium phosphate from phosphorite meal | 0.52 |
| Ammonium phosphate from apatite concentrate | 0.63 |

To express phosphatic fertilizers in terms of 18.7 per cent P_2O_5

| | |
|--|------|
| Superphosphate granulated from apatite concentrate | 1.04 |
| Ordinary superphosphate and granulated superphosphate from Kara-Tau phosphorite meal | 0.75 |
| Double superphosphate | 2.45 |
| Ammonium phosphate from phosphorite meal | 2.51 |
| Ammonium phosphate from apatite concentrate | 2.67 |
| Defluorinated phosphates | 1.71 |
| Nitrophoska | 0.56 |

To express potassium fertilizers in terms of 41.6 per cent K_2O

| | |
|-------------------------------|------|
| Potassium chlorite | 1.44 |
| Mixed potassium salts | 0.96 |
| Sulphate of potash - magnesia | 0.44 |
| Kainite | 0.24 |
| Potassium sulphate | 1.25 |

Petroleum and gas industry

Petroleum output, including output of gas stable condensate, is estimated separately in gross terms for each oil producing area. Oil producing areas are sub-divided into two categories of fields:

1. Those for which a development programme exists, and
2. Those for which no development programme exists (fields at which drilling has in the main been completed).

The first category also includes new fields for which no development programme has been prepared at the time of drafting the plan. In such cases all the indicators are calculated on the basis of similar fields operating under approved development programmes.

Estimates for fields in the first category are calculated for each field separately; for those in the second category, for all fields as a whole.

Petroleum output is calculated on the basis of the following data:

(a) first category: rated, actual and anticipated figures for each field being developed - total petroleum withdrawals, number of wells being worked, their flow rates, the volume of injection agent pumped and the reservoir pressure at the beginning of the plan period;

(b) second category: the initial daily output at the beginning of the plan period, the number of wells to be brought into operation during the plan period, their average flow rates and depths and the flow variation factor of active wells recorded for the past year, anticipated for the current year and projected for the plan period. Initial daily output is determined in the light of actual output at the time the calculations are made and the possibilities of increasing output before the end of the year by bringing new and idle wells into operation and carrying out geological and organizational measures.

The petroleum output of active wells for the plan period is estimated:

- for fields in the first category: on the basis of the anticipated initial daily output and the volume of daily petroleum withdrawals, allowance being made for the programmes in operation and the state of development of the reservoir;
- for fields in the second category: by multiplying the initial daily output by 30.4 (30.5 for a leap year) and by a reserves-to-output factor corresponding to the flow variation factor adopted for the plan period.

The petroleum output of idle wells scheduled to go into operation during the plan period is estimated by multiplying the average flow of such wells by the number of days worked in the year.

After estimating the petroleum output of active wells in both categories of field and of idle wells to be brought into operation, the next step is to determine the output of new wells in both categories. At the same time, calculations are made of the number of new production wells required and the volume of drilling work entailed (allowance being made for the possible entry into operation of

exploratory wells). The output is planned in the light of the actual development situation existing at the time the calculations are made and of any changes contemplated at the start of the plan period.

In planning the indicators for fields in the first category, account is taken of the fact that the actual state of development of such fields may differ from the programme figures, depending on whether the construction of peripheral flooding wells and the drilling of exploratory wells is behind or ahead of schedule, etc. In the light of such factors, the programme figures are used as a basis for any necessary corrections in the calculations.

The first factor taken into account in determining petroleum output is the possibility of obtaining high-quality grades.

The gross output of natural and associated gas is fixed on the basis of developed and projected gas reserves, possible gas withdrawals, any planned increase in the throughput capacity of gas pipelines, and the number of consumers provided with gas intake lines.

Natural gas output is estimated for each gas well (producing or newly brought into operation after drilling or following a period of inactivity) by multiplying the average daily flow by the number of days worked in the year. Natural gas output may also be estimated by groups of wells or by gas fields.

Output of associated gas is fixed in the light of traprock gas reserves and maximum possibilities of utilizing them. Factors to be borne in mind here are the system of petroleum gas collection adopted and the availability of gas collecting networks, gasoline recovery plants and gas pipelines.

Traprock gas reserves are estimated on the basis of the gas-oil ratio characteristic of the part of the associated gas which separates out from petroleum in the traprock. This ratio is established in the light of measurements over the period preceding the plan period.

Except in the case of fuel oil (black oil), production of petroleum products is fixed in terms of commodity output, with due regard to the need of the economy for petroleum products, to reserves of raw materials available for their production and the quality of such materials, and to existing productive capacity and the possibilities of increasing it. The output of fuel oil (black oil) is fixed in gross terms.

The estimates of resources of raw materials for the petroleum refining industry cover the following:

- for primary processing - crude oils (low-sulphur, sulphur and high-sulphur oils), degasolinated oils and gas-stable condensate;
- for thermal cracking - straight-run black oil, solar gas-oil fractions, heavy catalytic gas oil, asphaltic petroleum and semi-asphaltic petroleum;
- for catalytic cracking - kerosene gas-oil fraction (aviation fuel production), vacuum gas oil (motor fuel production);
- for hydroforming and catalytic reforming - straight-run benzene fraction;

- for the production of oils - solar fractions, black oils, condensates and semi-asphaltic petroleum;
- for the production of lubricating oils - oil distillates, paraffin, ozokerites, ceresins and other petroleum and chemical products;
- for the pyrolysis process - kerosene distillates and pyrolytic raw materials (kerosene gas-oil fraction).

Appropriate balances are drawn up for all types of raw materials.

The petroleum balance for primary processing is drawn up on the basis of data indicating the quantity and grades of petroleum delivered for refining, the quantities of petroleum remaining in the oilfields, transshipment points, pipelines and factories, oilfield requirements of petroleum for internal consumption and standard petroleum losses in the course of de-emulsification, transport to refineries and preparation for refining, and data on petroleum imports and exports and the quantities of petroleum used in the production of various grades of black oils and other dark petroleum products and in filling new pipelines.

Petroleum is distributed to the refineries in accordance with the flowsheet of each refinery, and with a view to ensuring the most effective utilization of refining capacity and the avoidance, so far as possible, of cross-hauls and long-distance hauls of petroleum and petroleum products.

Appropriate raw material balances are also drawn up for all other crude oil refining processes (thermal and catalytic cracking, coking, etc.), e.g., balances of black oils, solar and gas-oil fractions etc.

Oil refinery capacities are determined on the basis of the technical specifications for the following processes: petroleum desalting, dehydration and refining, thermal cracking, catalytic cracking, catalytic reforming and hydroforming, coking, hydrofining and the production of oils, petroleum bitumen, paraffin and oil additives.

The types of refining operations needed over the plan period are determined according to the demand for, and the normal relative output of, light petroleum products, oils and dark petroleum products (black oils and petroleum bitumens).

Where the output of straight-run black oil is larger than necessary for secondary refining at the given enterprise or for consignment to other refineries, the excess black oil is used as fuel (furnace oil).

Where under-utilization of catalytic cracking plants producing aviation fuel occurs, consideration is given to the possibility of using the idle capacity for cracking heavy crude oil to obtain the better grades of motor fuel.

The plan provides for the utilization of light petroleum distillates obtained by straight-run processing and by cracking, coking and other secondary processes, after stabilization and refining, as constituents in the production of finished products. The output of finished petroleum products at a given refinery is determined on the basis of calculations relating to the blending of constituents which are similar in fractional and chemical composition. The blending proportions applied are in accordance with established specifications.

Requirements of ethyl fluid are estimated in the light of the planned output of commercial aviation and motor spirits and their quality and type.

The quantity of dark grades of petroleum products (motor fuel, ship's fuel, heavy lubricating oils, etc.) depends on the available reserves of straight-run black-oil and solar distillate required for their preparation.

The output of heavy furnace oil at a given plant is determined on the basis of available resources of heavy cracking oils and other residues used to produce it by blending. The individual constituents must be blended in proportions ensuring that the quality of the furnace oil produced corresponds to the standards in force.

The output of lubricating oils, greases and special petroleum products is calculated by factories, and in some cases by individual technical units and processing stages. The range of oils manufactured at a given plant is determined by the yield of oil distillates per unit of crude oil for each unit.

Works gas resources are determined for individual units and for factories as a whole on the basis of the planned volumes of thermal and catalytic cracking, coking and pyrolysis operations and other processes used in deep petroleum refining. Resources of gas and of its individual constituents (hydrogen, methane, ethylene, ethane, propylene, propane, butylene, isobutane, normal butane) are fixed in accordance with specifications, allowing for gas losses at petroleum refineries.

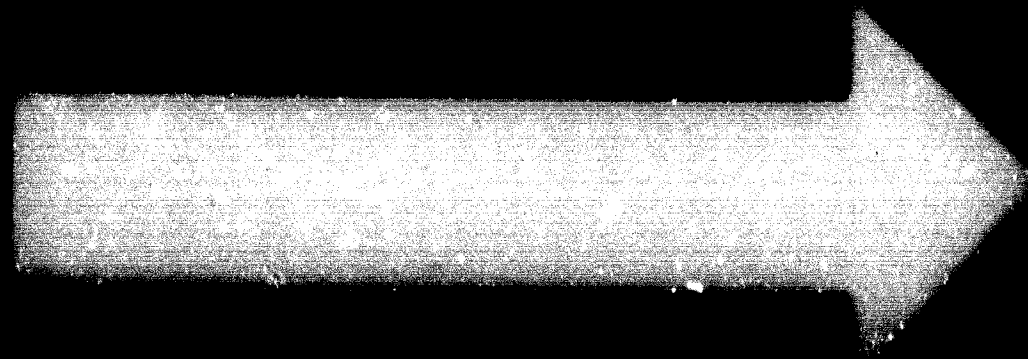
Products manufactured by the processing of solid types of fuel are planned in terms of commodity output. Natural and associated gas, refinery gas and artificial gas are planned in cubic metres at temperature $+20^{\circ}\text{C}$ and barometric pressure 760 mm.

Coal and shale industry

Coal (shale) output of active mines and quarries is planned on the basis of the possible level of utilization of their average annual capacity. The following factors are taken into account in respect of each mine (quarry): the development and utilization of stoping areas over the plan period, the productivity of the seams, the capacity of the hoisting and subsurface haulage gear and shaft top arrangements, and the ventilation situation. Mine capacities are fixed in the technical plans for mine construction, restoration or reconstruction. Where the demand for coal extracted at a given mine or pit is unlimited, the plan provides for the maximum possible utilization of average annual capacity. The total coal output of a trust or combine is taken as the sum of the outputs of individual mines and pits.

Coal output over the plan period is calculated separately for mines and pits already in operation before the start of the last reporting period, brought into operation during the reporting and current period and to be brought into operation during the plan period.

Utilization of average annual capacity and coal output at each group of mines is determined with due allowance for possible changes in geological mining conditions, projected measures to eliminate bottle-necks, the introduction of new techniques and improvements in the technology and organization of production.



17.7.74

2 OF 3

DO

3784



The planned output of a basin or coal-field is the sum of the outputs of all the basins and fields. The planned output of a given type of coal is matched with the demand; when necessary, provision is made for measures to increase the output of existing mines into operation more rapidly, removing bottle-necks, introducing technical improvements, etc., or else the possibility is explored of expanding the coal base from another field or by another type of fuel.

The plan indicators for production at coal dressing plants are as follows: volume of coal processed, concentrate produced, industrial products, screenings and residue (where applicable), and rock and other losses in the dressing process and technical and economic indicators of the work of the plant.

The output of concentrate is planned on the basis of the best figures achieved in previous years, allowing for the quality of the coal being processed in terms of ash content, concentrating capacity and, in some cases, sulphur content, and for any measures projected to improve technical dressing methods.

The production plan for a dressing plant provides for the minimum loss of coal with the waste products of the dressing process and the maximum ash content of waste products. Calculations for dressing plants must be co-ordinated with the raw material base - the mines supplying the coal.

Electric power stations

The plan for electric power production is based on the output required to implement the plans for the development of industrial production and other economic sectors, for the provision of municipal services in the republic concerned, and for inter-republican power transmission (over existing transmission lines or lines to be installed).

The figure fixed for electricity output represents the aggregate of output at all power stations.

Total electricity output is broken down into:

- (a) Output of hydroelectric power stations;
- (b) Output of district power stations and bulk supply stations.

The electricity output of thermal power stations is arrived at by multiplying average annual installed capacity by the number of hours the capacity is used.

The output of electricity at operating hydroelectric power stations is fixed, on the basis of the charts of annual energy output over a number of years, at a level corresponding to 50 per cent of the actual supply or to the annual average for the whole period, whichever is the less. A chart of annual energy output over a period of years is prepared for each hydroelectric power station, taking into account such factors as the variation of flow, the operating system of the reservoirs, the withdrawal of water for irrigation and the release of water for sanitary purposes.

Machine building and metal working

The output of the machine building and metal working industries is determined on the basis of balance estimates of requirements of machinery, equipment and other engineering products for the country's various economic sectors, taking account of exports and imports; on the basis of balance estimates of productive capacity and material and technological resources for the plan period, and with due allowance for the rehabilitation, modernization and improved utilization of available equipment.

Requirements of the various types of engineering products is determined as follows:

(a) Requirements of large-capacity and medium-capacity boilers, turbine-generator units, large transformers, individually produced electrical machinery, servo-mechanisms and appliances, metallurgical, chemical, oil and mining equipment, heavy-duty cranes, technological equipment for the textile, food and pulp and paper industries and for the production of building materials and refractory materials, and similar types of equipment are determined on the basis of the targets for the entry into operation of newly constructed and reconstructed plant under the fixed investment plans and for stockpiling to cover future construction and operating needs;

(b) Requirements of electrical machinery, miscellaneous electrical engineering products and equipment, roller bearings, internal combustion engines, pumps, compressors, appliances and other types of accessory equipment are determined in accordance with the plan targets for the production of machinery and other equipment requiring accessory equipment and with the standard allowances of such accessory equipment, taking into account the operating needs of the various sectors of the economy;

(c) Requirements of trucks, buses, agricultural machinery, tractors, diesel locomotives, railway coaches and wagons and drilling, road building, peat cutting and similar equipment are determined on the basis of the scale of operations specified in the plan for industrial and agricultural production, construction, transport and other economic sectors, and of the utilization norms for machinery of that type. In determining the demand for tractors and trucks, requirements of accessory equipment are also taken into account;

(d) Requirements of construction machinery and equipment, loading and unloading equipment and conveyor equipment are determined in accordance with the planned scale of construction and assembly work and the degree of mechanization in the building trade and with the scale of output and degree of mechanization of similar work in industry and agriculture;

(e) Requirements of plumbing equipment and products are determined in accordance with the scale of construction of housing, public amenities, service and community facilities and industrial plant, the volume of construction and assembly operations, the standard of comfort provided in new housing and the operating needs of existing housing, public facilities and industrial installations.

(f) Requirements of metal cutting lathes, lorges, presses and foundry machinery are determined by the needs of enterprises built or reconstructed

under the fixed investment plans and by the planned output of the machine building and metal working industry and the planned production of rolled metal, forgings, stampings and castings; requirements of wood-working lathes are determined on the basis of the scale of production of lumber, furniture and woodwork, standard house components, etc.;

(g) Requirements of spare parts for tractors, cars, agricultural machinery, excavators, construction machinery and other types of equipment and machinery are calculated in terms of the existing pool of machinery and equipment and in accordance with the standard allowances of spare parts for repair work.

(h) Requirements of metal working tools are determined in accordance with the output of the machine building and metal working industries for the plan period and the current standard allowances of tools, taking into account the re-use of mended tools where economically feasible. The output of the machine building industry, by type, grade, model, unit capacity, productivity, lifting or carrying capacity, size and other characteristics is established by enterprises, sovnarkhozy and the Gosplans of the union republics, within the limits set for the total output of the types of machinery and equipment concerned, in the following manner:

In the case of small runs and single items, including metallurgical generating, electrical engineering and other individually produced equipment, it is established in accordance with projections and estimates prepared on the basis of consumer orders, including carryovers, and with the delivery schedules and terms specified in the contracts with the consumers;

In the case of large runs and mass-produced items, it is established in accordance with the anticipated rise in consumer demand for the product in question and with the requirements of wholesale, retail and export organizations.

The shipbuilding programme specifies the types of vessels to be built, their carrying capacity and the power of their main engines. The following organizational characteristics of the shipbuilding industry are taken into account in drawing up the plans:

- (a) The necessity of designing, building and testing a prototype vessel;
- (b) The fact that production of a given model is limited to a few units, and that the shipbuilding cycle is relatively long;
- (c) The complex and varied range of main and auxiliary machinery, instruments, materials and other items needed in building and outfitting vessels;
- (d) The variation in the degree of mechanization and in the labour factor used in building vessels to the same design, depending on how well the shipyard is equipped;
- (e) The established procedure of planning and financing shipbuilding, according to the degree of mechanization;
- (f) The uneven character of production expenses at different stages in shipbuilding.

The shipbuilding plan is based on the working programme for a vessel, the sequence of operations, the master plan and the plan of operations at each slipway.

The plan of material and equipment supply and of co-operative activities for the shipbuilding industry is prepared on the basis of the schedule of operations which indicate the dates for the delivery of equipment and materials to vessels.

The building materials industry

The output of building materials is planned on the basis of balance estimates of the demand for such materials for capital construction, repairs, export, retail trade, collective farm construction and other economic purposes.

In the preparation of the draft plan, particular attention is given to the need rapidly to develop the production of efficient new building materials and products which can be used to ensure a high degree of prefabrication and to reduce the time and cost and improve the quality of construction.

The output of cement for the plan period is calculated from the production of clinker, taking into account the materials added in grinding. Estimates of clinker output are worked out by enterprises on the basis of technically sound, progressive (i.e., based on best performance) operating norms for the kilns and maximum operating time.

The percentage of materials to be added in grinding the clinker is established for each type of cement. In preparing the cement production plan for each enterprise, the percentage of additives used in the various types and grades of cement is represented by an average figure.

In cases where the amount of additional materials required is such that clinker output exceeds the productive capacity of the grinding mill, the production programme of the works is determined by the capacity of the mill. Over and above cement production, a figure is also set for commodity output of clinker at such works.

The output of slate and of asbestos cement slabs for facing and construction is planned in terms of standard 40 cm x 40 cm tiles, and that of asbestos cement piping in kilometres of standard 200 mm-diameter pipe.

The planned output of sheet goods is converted from physical quantities into numbers of standard (40 cm x 40 cm) tiles, and that of asbestos cement pipe into kilometres of standard-diameter (200 mm) pipe, by means of conversion coefficients.

The output of asbestos cement sheet products (slates, building slabs, etc.) and of asbestos cement piping is calculated on the basis of the productive capacity and number of sheet-moulding and pipe-moulding machines and of their total annual operating time, taking account of the planned range of sheet products and asbestos cement pipe.

The output of roofing felt is planned as a total for all types of raw material. In the plans of the union republics and governments, separate output figures are given for each type of roofing felt and for roofing materials.

The output of prefabricated reinforced concrete slabs is planned in thousands of cubic metres, with wall panels, floor slabs, etc.

plans of the union republics, targets for the production of standardized reinforced concrete are assigned to enterprises not only in cubic metres but also in pieces and in linear and square metres, depending on the type of concrete and parts produced by the enterprise concerned.

The output of standardized reinforced concrete elements and parts is determined on the basis of the approved operating routine in the enterprises, yards, shops and plants concerned and the productive capacity of their basic equipment, according to the way they are tested and the range of goods they produce;

Under the conveyor system of production, it is determined from the total area of moulding trolleys leaving the conveyor per hour, the load carried by the trolley per square metre of area, and the total operating time of the conveyor in hours;

Under the flow system of production, it is determined from the total capacity of the hardening chambers, the progressive daily output per cubic metre of chamber capacity, and the total operating time of the chambers in days;

Under the rolling system of production, it is determined from the progressive daily productive capacity of the rolling mills and the total mill operating time in days;

Under the cassette system of production, it is determined from the progressive daily productive capacity of all cassettes and their total operating time in days;

Under the moulding-stand system of production, it is determined from the total moulding area of the stands, the load carried by these stands in cubic metres per square metre of area, the number of cycles per month completed with the moulds, and the number of months each stand is in operation in the course of a year.

The output of ceramic products is calculated, when batch kilns are used, as the product of the density of the charge, the capacity of the kilns and the number of cycles per month completed at the kiln, taking into account the coefficients approved by the sovnrarkhoz for the yield of acceptable fired goods.

When continuous tunnel kilns are used, output is calculated by multiplying the number of articles in one trolley-load by the number of kiln trolleys leaving the kiln in a day, and applying the coefficients approved by the sovnrarkhoz for the yield of acceptable fired goods.

In the case of the glass industry, the plan establishes the output of window glass, polished plate glass, glass plastics, glass fibre and glass fibre products for thermal insulation. The plans of the union republics also fix the output of all types of glass and glass products enumerated in the plan for inter-republican and all-union deliveries.

The output of plate glass (window glass and industrial glass) in tons is determined on the basis of the specific daily output of molten glass per square metre of furnace area, taking into account the coefficients fixed for the utilization of molten glass, operating time of machinery, and furnace area (in square metres) and number of operating days.



The output of glass in terms of area (square metres) for one piece producing only window glass is determined on the basis of the total tonnage of acceptable output calculated as described above and the average weight per square metre of window glass in the planned range of thicknesses.

The output of glass (reinforced, figures, etc.) produced by the continuous rolling method and the output of silica blocks, fluxes, coloured glass and glass for use in lighting engineering is planned in tons and metres on the basis of the daily productive capacity and operating time of the continuous tank furnaces. In the case of batch-type pot furnaces and tank furnaces producing glass piece goods for use in lighting engineering, output is calculated according to the productive capacity of the furnaces, taking into account the melting and working cycles approved by the competent higher authorities and allowing for technologically unavoidable losses.

The output of glass piece-goods for use in lighting engineering is calculated in tons and then converted into thousands of pieces on the basis of the planned range of items and the average weight per article.

The output of glass fibre and glass wool is calculated from the daily output in kilogrammes of each draw-plate furnace, allowing for technologically unavoidable losses.

The output of foam glass is calculated from the productive capacity of the sintering conveyor furnaces, taking account of the hourly movement of the conveyor and the filling coefficient of the hearth area, expressed as the ratio of the total area of blocks in the charge to the hearth area of the conveyor.

The output of stalinite is determined from the productive capacity of the annealing furnaces, taking account of the planned range of output, the area of the furnace which can be filled with glass, the annealing system employed and the coefficient of acceptable yield.

The output of triplex is calculated from the daily productive capacity of the autoclaves, taking account of the planned range of output, the operating routine of the autoclaves and the coefficient of acceptable yield.

The output of glass blocks is planned on the basis of the daily productive capacity of the automatic machinery, taking into account the yield of acceptable goods and the operating time of the machinery.

The output of glass containers at mechanized factories is calculated from the productive capacity of the glass forming machinery. The output at enterprises producing glass containers from ready-made tubing is established from the productive capacity of the machinery which shapes the containers, taking account of the coefficients of acceptable yield. The output of partly machine-made and hand-made glass containers is calculated on the basis of the average progressive output norms achieved at the enterprises concerned.

The commodity output of polished plate glass is calculated from the productive capacity of the grinding and polishing equipment, taking into account the planned range of production.

The output of assorted types of polished plate glass products (display window glass, silica glass, polished plate glass of different sizes, stalinite, triplex, porthole glass, etc.) planned for various enterprises is reduced to a single type: factory-range polished plate glass. The figures for these products are converted into terms of factory-range polished plate glass by means of conversion coefficients.

The output of the various branches of the non-metallic mining industry must be calculated on the basis of the productive capacity of the basic equipment, i.e.

- for the kaolin industry, on the basis of the productive capacity of the concentrating and dehydrating equipment;
- for the graphite industry, on the basis of the productive capacity of the concentrating and grinding equipment, taking into account the graphite content of the rock;
- for the talc industry, on the basis of the productive capacity of the concentrating and grinding equipment.

The productive capacity of asbestos-concentrating plants is determined on the basis of the output of asbestos-bearing rock from the quarries and the productive capacity of the separating plant at the factories.

The wood-working, wood pulp and paper industry

The output of lumber is determined on the basis of maximum utilization of the productive capacity of sawmills and timber yards, the available and planned supply of timber, measures for increasing the yield of lumber from the timber sawn, and the size of the timber stock which must be carried in order to keep the enterprises in continuous operation.

The output figure must cover all types of lumber produced by a given enterprise from its own timber supply, including lumber intended for processing within the enterprise.

The lumber output figure includes lumber produced both by specialized sawmilling enterprises and by subsidiary enterprises or shops attached to industrial enterprises or to construction enterprises or other non-industrial organizations regularly engaged in lumber production.

The quarterly operating routine of sawmilling enterprises and the time-table for the general overhaul of equipment are planned to fit in with timber delivery rates.

The output of railway sleepers, plywood, standard houses, sets of parts for standard houses with walls made from local building materials, woodwork, furniture, shis, wood-fibre and wood-shaving boards, crates, staves and other wood manufactures is calculated on the basis of maximum utilization of enterprises productive capacity and raw material resources.

The plan provides for the production of wood-fibre and wood-shaving boards only from the wood, non-disposable hardwood, mill waste, sawdust, shavings and wood-chip plant stems.

The production plan for wood pulp and paper mills makes provision for increases in the operating speed of paper-making and cardboard-making machinery and the achievement of higher output from cellulose boilers and pulp mills through intensified production processes and the introduction of new and more productive types of equipment and progressive technology.

The output of paper and cardboard is based on the calculations of the balance of fibrous materials. The balance provides for the utilization of cellulose, wood pulp, rags, mackle-paper and other fibrous materials of the kind used in paper production. Requirements of timber for the production of fibrous materials (cellulose and wood pulp) must be determined with due regard for the need to economize workable timber (shown as such in the balances) as far as possible by using instead mill waste, non-disposable hardwood and raw materials other than wood.

The plan fixing the amount of each type and grade of pulp and paper to be produced must be based on the arrangements for specialization and efficient co-operation between enterprises, taking into account the requirements of the economy in terms of output quality and the demand for new types of pulp and paper products.

Light industry

In fixing the output of light industrial products, the aim is to meet the public demand for fabrics, clothing and footwear and the needs of the economy more and more fully.

In calculating the output of light industry, the following are taken into account:

- (a) Resources of agricultural raw materials and of artificial and synthetic fibres, and measures for reducing waste in the production process;
- (b) The productive capacity of the enterprises concerned, assuming maximum utilization;
- (c) The technical and economic indicators showing the degree of utilization of raw materials and equipment to be achieved through the introduction of new devices and improved technological processes;
- (d) Changes in the range of fabrics, clothing, footwear and other products based on careful study of public demand.

The output of fibre from raw cotton, flax, hemp, jute and kenaf is fixed according to the planned yield in percentage terms; the amount of secured wool is determined by the yield of scoured from greasy wool. Account is also taken of the type and quality distribution of the raw materials and of expert opinion regarding the possibility of increasing the yield of fibre.

Since the agricultural raw material resources for a given calendar year derive from two crops - the previous year's and the current year's - separate calculations are made for fibre output. The output of cotton fibre, for example,

is calculated separately for raw cotton ginned between January and August (cotton from the previous year's crop) and for raw cotton ginned between September and December (cotton from the current year's crop). The output of cotton seed is determined in a similar manner.

The output of fibre, yarn and fabrics is determined by the following formula.

$$\text{Output of fibre in tons} = \frac{M_{SC} \cdot D \cdot A_S \cdot S \cdot A_O \cdot P_{SC}}{1,000}$$

$$\text{Output of yarn in tons x count} = \frac{M_S \cdot D \cdot A_S \cdot S \cdot A_O \cdot P_S}{1,000}$$

$$\text{Output of yarn in tons} = \frac{M_S \cdot P \cdot A_S \cdot S \cdot A_O \cdot P_S}{1,000}$$

$$\text{Output of raw fabric in linear metres} = \frac{M_L \cdot D \cdot A_S \cdot S \cdot A_O \cdot P_L}{1000}$$

$$\text{Output of raw fabric in square metres} = \frac{M_L \cdot D \cdot A_S \cdot S \cdot A_O \cdot P_L \cdot W}{1000}$$

where M_{SC} , M_S and M_L = the average annual amount of equipment (saw gins, spindles (in thousands) or looms) in operation, taking into account equipment already installed at the beginning of the year and equipment brought into operation or dismantled during the year. Equipment brought into operation during the first quarter is regarded as being in operation from March onwards; during the second quarter, from June onwards; during the third quarter, from September onwards, and during the fourth quarter, from December onwards;

D = the number of working days in the year (calendar days, less days off, holidays and days set aside for the overhaul of power plant);

A_S = the machine shift coefficient, which is determined by dividing the average number of spindles (looms, gins) in operation by the maximum shift;

S = the length of the work shift (in hours), taking account of the reduction in working time on days preceding holidays or days off and the reduced working day prescribed for juveniles, nursing mothers and night-shift workers;

A_O = coefficient of utilization of the operating time of equipment, which is determined by the formula

$$A_O = \frac{100 - IT}{100},$$

where H = idle time of equipment in a year, in accordance with technical or technological norms for the equipment, regular overhaul, cleaning, maintenance, etc.

This coefficient is determined in accordance with the rules for the technical operation of equipment;

P_{s_1} , P_s and P_1 = hourly productive capacity of production equipment (i.e., of one saw in kilogrannas of fibre, or 1,000 spindles in kilogrannas \times count, or of one loom in weft threads, respectively).

The technical norms of productive capacity are established on the basis of the maximum possible output of a given type of article per unit of equipment, a properly organized production process and the application of the lessons learned from the experience of front-rank enterprises;

N_0 = the average count of yarn, i.e., the length of one kilogramme of yarn in thousands of metres;

f = the average closeness of weave of raw fabric (the number of weft threads per centimetre); this indicator must correspond to the planned range of fabrics;

W = the average width of raw fabric in metres.

The average count of yarn is determined on the basis of the indicators for the available spinning equipment and the planned range of fabrics and commodity yarn, while the average closeness of weave of fabrics is determined in accordance with their range.

The output of finished cotton, linen, woollen and silk fabrics in linear and square metres is determined from the quantity of raw fabrics and the changes in length and width sustained in finishing. The extent of these changes is determined by the standards for the factory and the range of fabrics (worsted, fine woollens, coarse woollens, pure woollens, half-woollens, real silks and staple-fibre fabrics). The output of staple-fibre fabrics is included in that of silk fabrics.

The output of leather and leather footwear is planned on the basis of raw material resources and plant capacity. The output of leather includes skins and pieces of skin not less than 7 square decimetres in area. In preparing estimates particular importance is attached to the raw material consumption indicators, the principal ones being the following:

For still leather - the average weight of a piece of (green) leather and hide in kilogrannas, the average weight of a dressed leather hide in kilogrannas, the average area of a dressed leather hide in square decimetres; the amount of raw material used per unit of finished goods;

... the average weight of a dressed skin in square feet (excluding the head, tail, neck and pelt hide), the average width of a piece of raw material used per unit of finished goods;

... the average weight of a dressed skin in square feet (excluding the head, tail, neck and pelt hide) and undressed small hides (catskin, muskrat, ermine, first-class elk skin), the average weight or area of a piece of raw material or undressed skin; the amount of raw material used per unit of finished goods;

... leather footwear - the degree of efficiency achieved in the use of leather materials: the yield of useful cut leather, the actual amount of cut leather used per unit of finished goods and the target set for savings in leather during the plan year. The leather footwear output is calculated from data on the capacity of the production lines (conveyors), the shift coefficient [average number of shifts per day per machine], the length of the shifts, the range of output and the method of attaching the soles.

The output of rubber and felt footwear is fixed on the basis of plant capacity, resources of raw materials, consumer demand for these types of footwear and range of output.

The output of rubber soles, artificial leather, synthetic uppers, artificial attachment, shoe cardboard, decorative welts and industrial fabrics ("dermatin" and "granitol" imitation leather, oilcloth, waterproof fabrics) is fixed on the basis of plant capacity, resources of raw materials, the shift coefficient, the length of the shifts and the range of output.

The output of fur products is fixed on the basis of the quantity of raw materials available and productive capacity.

The output of hosiery and knitted underwear and outerwear is based on the capacity of the basic knitting machinery, i.e., automatic circular-knitting machines, Cotton machines, mailleuse (looping wheel) knitting frames, multi-feeder machines, "Vertelok" warp-knitting machines, double row machines, Raschel machines and so on.

The indicators of plant productivity are calculated for automatic circular-knitting machines and warp-knitting machines per machine-hour; for Cotton machines per fabric-hour; for knitting frames, mailleuse machines, interlock machines, etc. per mailleuse-hour or unit hour, depending on the type of equipment.

The output of the garment industry in physical terms has to be co-ordinated with the capacity of the production lines (brigades) working on a two-shift basis. The yearly output of a production line (brigade) may be determined from the following formula:

$$Q = \frac{M \cdot L \cdot S \cdot L}{V}$$

where V = number of workers on a production line (in a brigade);

... the number of workers on a production line:

S = shift coefficient;

L = length of shift (in hours);

A = the plan to produce a unit of public goods (in %).

The garment industry output includes the output of coats, suits, dresses, etc.; all types of men's, women's and children's footwear, handbags, umbrellas, etc.

Food industry

The output of the food industry is fixed on the basis of the abundance of raw materials and productive capacity and with the aim of satisfying the population's need for food products as fully as possible.

The food industry plans provide for measures to:

- (a) Raise the quality and expand the range of output;
- (b) Increase the degree of efficiency in the use of raw materials and reduce the amount consumed for production purposes;
- (c) Achieve fuller use of plant capacity.

The resources of agricultural and other types of food materials are used primarily to prepare the products for which there is the greatest public demand and which are particularly nutritious.

The plan for the catching of fish, whales and marine animals and the output of marine products is prepared on the basis of considerations as to the economy's need for fish products, the most efficient use of fishing vessels and gear and the capacity of fish processing plants. In preparing the fishing plan, account is taken of the stock of fish in open and internal seas, lake and river waters and reservoirs and of estimates by scientific research organizations regarding the amount of fish that may be caught without prejudice to further reproduction.

Separate plans are drawn up for the catching and processing branches of the fishing industry.

The plan for the production of meat and meat products from state resources is drawn up on the basis of the planned quantity of livestock and poultry. For the purpose of determining the output of meat the livestock available for industrial processing is divided up by type - cattle, swine, sheep and goats, poultry and other. The output of meat and the weighted average yield from the processing of livestock of all kinds are determined on the basis of the planned yield of meat from livestock of each type and fatness.

| | Quantity of livestock (tons liveweight) | Average yield (percentage) | Total yield of meat (tons) | Yield of by-products (percentage) | Yield of by-product (tons) |
|-----------------|--|----------------------------------|----------------------------------|---|----------------------------------|
| Cattle | 1,000 | 45 | 540 | 3.3 | 39.6 |
| Swine | 500 | 60 | 480 | 3.0 | 24.0 |
| Sheep and goats | 150 | 41 | 61.5 | 2.8 | 4.2 |
| Poultry | 50 | 86 | 43 | - | - |
| Total | 2,200 | - | 1,124.5 | - | 67.8 |

The average yield of meat in this case amounts to:

$$\frac{1,124.5 \times 100}{2,200} = 51.1 \text{ per cent;}$$

and including by-products:

$$\frac{1,192.3 \times 100}{2,200} = 54.2 \text{ per cent.}$$

In addition to the main types of meat products, the plan provides for the production of other food and industrial products and multi-purpose use of all the products obtained from slaughtering livestock and poultry (blood, offal, hair, bristle, industrial by-products, etc.).

The plan for the production of butter, whole-milk products, cheese and other milk products is drawn up on the basis of the available stocks of milk. Prime importance is attached to the need to make more efficient use of the raw material. For the purpose of determining the output of milk products a balance of raw material (milk) use is drawn up. On the incoming side of the balance are entered all sources from which milk is received and on the outgoing side the consumption of milk in the preparation of different types of products. Milk resources are used primarily for the production of whole-milk products, in which there is the fullest use of all constituents of the milk, and for the manufacture of cheese.

The plan for the output of butter includes clarified butter with a fat content of not less than 95 per cent and cream butter with a fat content of not less than 75 per cent.

The output of natural cheese is planned in terms of the output from the press minus a certain amount allowed for drying during the ripening period.

Apart from the basic types of milk products, the plans provide for the production of other food and industrial products obtained by processing milk, namely, non-fat food products, casein and so on. A balance of the use of non-fat milk and buttermilk has to be drawn up for this purpose.

The output of vegetable oil is planned on the basis of the resources of oil seed and the capacity of oil mills.

Output is calculated separately for the extraction and processing of oil from different types of raw material (sunflower seed, cotton seed, soya, ground-nuts, linseed and so on).

In order to ensure more efficient processing of the raw material, and thus a higher yield of oil, the plans provide for mills and refineries with extraction equipment to be supplied first.

The total output of soap and detergents with a fat base and of deodorized oil, stearin and olein is planned on the basis of the amount of raw material available (waste from the oil and fat industries, fat substitutes, animal fats and vegetable oils) and the demand for these products.

The total output of soap and detergents is planned by weight in terms of soap with a 40 per cent content of saponified fats, but the output of the different varieties by actual weight.

Soap and detergents with a fat base include household and toilet soap whether hard, in paste form or liquid, and soap powders and washing soda, prepared from fat and fat substitutes, containing not less than 10 per cent of fatty acids.

Synthetic detergents are planned separately from other types of detergents on the basis of the amount of materials available and plant capacity. Synthetic detergents include commercial preparations - powders, pastes, liquid and solid synthetic detergents for washing clothes, dishes, implements and equipment and for other domestic and industrial purposes which contain not less than 5 per cent of surfactants.

The output of flour, groats and mixed feeds is fixed on the basis of the available raw materials and the capacity of the enterprises producing these products (including mills coming under local authorities), the kinds of flour and groats needed by the economy and the agricultural demand for mixed feeds.

The production plan for flour and groats mills and enterprises producing mixed feeds makes allowance for inter-republican deliveries of raw materials and finished products, for improvements in quality and range of output, for better use of working time and plant capacity and for elimination of uneconomic transportation of such products and a reduction in the number of long hauls.

The output of bakery products is based mainly on public demand. The production plan provides for improvements in quality and range of output. It should be noted that mechanized bakery enterprises (bread baking plants and mechanized bakeries) are given priority.

The output of confectionery and farinaceous foods is planned in accordance with public demand. The plans make provision for improving the quality and range of output and for eliminating excessively long hauls.

The output of canned goods is fixed on the basis of the available raw materials and the capacity of canning factories. Canned goods include products made of meat, fish, vegetables, fruit, berries, leguminous plants and cereals.

These include: metal containers, and especially foil, tomato products (tomato paste and purée), oil, preservatives and fillers, the colors of the narrow and size of the containers.

The canned goods production plan establishes the following basic categories: fish, meat, milk, and fruit and vegetables. The general category of canned fruit and vegetables is divided into fruit, vegetables, tomatoes and juices, including ketchup, soup, fruit, berry and vegetable juices.

The output of grape wine, champagne and brandy is planned in accordance with the quantity already in hand.

The incoming side of the balance shows the wines, etc., left over from previous years, the quantity received from the previous year's vintage, receipts from other union republics and other sources and the quantity taken from the long-term reserve.

The outgoing side shows the quantities consumed in production, delivered to other republics, placed in the long-term reserve, and used for other productive purposes (manufacture of champagne and sparkling wines, brandies and vacuum must).

The output of wines, etc., depends on the stocks of grapes, the standards fixed for the yield of wine and the quantity of fortifying alcohol added. Output is indicated for three different types of wine - fortified, dry and champagne-type. In fixing output, the capacity of all wine making enterprises, including those which perform the initial operations at state farms, must be taken into account.

The wines are deemed to be ready when they are taken off the yeast (first decanting). The output of wine ready for drinking is calculated from the reserves of processed wines, etc., and the capacity of wine making plants.

It must be borne in mind in this connexion that the reserves of wines, etc. must be sufficient to allow for the regular periods of processing.

The plan for the manufacture of champagne-type wine is determined:

- (a) for tank-fermented wine, by the capacity of the tanks;
- (b) for bottle-fermented wine, by the amount remaining in the three-year reserve.

The manufacture of wine, brandy and other wine products is planned in decalitres and that of champagne-type wine in terms of bottles of 800 cc capacity.

The output of tobacco products is planned separately for each variety, namely, cigarettes with and without mouthpieces, shag (makhorka) cigarettes, pipe tobacco and shag.

Output is determined by the resources of raw tobacco and the orders placed by trading organizations.

The resources of raw tobacco and shag are made up of the stocks of raw material (allowing for losses due to fermentation) and receipts from other sources.

Output of personal and household consumer goods

Personal and household consumer goods include finished goods produced by State and co-operative industrial enterprises and intended primarily to satisfy the household and personal needs of the population. All such goods are included in this category, regardless of whether they are produced by specialized enterprises or by subsidiary sections of mechanical engineering, metallurgical, chemical, timber processing and other industrial plants.

In planning the output of the different types of personal and household consumer goods, the factors taken into account are consumer demand, including the growing demand for goods of higher quality, plant capacity and availability of raw materials.

The total output in physical terms must correspond to the output in money terms.

Indicators of quality are of special importance in the planning of industrial production. The main quality indicators are those describing the grade and model of a product.

An increase in quality of output is of no less significance for the economy than an increase in quantity, since it constitutes an important means of economizing material and labour resources. Plans therefore provide for increases in the proportion of high-quality products to total output, especially in light industry, food processing, plastics and other industries.

Quality requirements for production are laid down in the specifications used at the plant or in the standards established by a special agency of the State - the Committee on Standardization.

The All-union State Standards (GOST) lay down minimum quality requirements which are binding on producers and users alike and which are usually expressed in the form of numerical indicators and technical descriptions to which the product must conform in shape, dimensions and specific properties and features. In-plant specifications are prepared for those products for which there are no approved standards.

The industrial production programme is worked out on the basis of planning norms. Using norms arrived at by scientific methods, it is possible to prepare estimates of the means of production and the manpower resources that will be needed by the economy during the period of the plan, and of the efficiency with which they will be used in production. Planning norms in production are established for:

- (a) use of the means of labour (utilization of equipment);
- (b) use of the objects of labour (consumption of raw and other materials, fuel and electric power);
- (c) working time (expenditure of working time per unit of product output per unit of assigned work).

The setting of correct, progressive norms in planning creates conditions which promote maximum economy of manpower and material resources in production. Realistic progressive norms are established in the light of the norms actually achieved by best-setting enterprises. The plan may set more stringent norms provided that it also sets forward specific measures to offset them by improving production methods, equipment and the organization of plant and labour.

The norms are worked out at the enterprise and approved by the sovnarkhoz. After their technical and economic feasibility has been verified, the norms are consolidated for the sovnarkhoz as a whole and submitted to the republican Gosplan.

The Gosplan of a union republic consolidates the norms of consumption for the republic as a whole, studies the reserves represented by possible economies in material and manpower resources, works out targets relating to the reduction of the norms for the republic and checks on the attainment of those targets in all sectors of the republican economy.

The USSR Gosplan provides systematic guidance in the establishment of norms for the economy, studies the main trends of technological progress which affect the reduction of industrial costs and approves consolidated norms for the most important types of materials and fuel and for electric power.

The norms for consumption of material resources and for expenditure of labour in the production of industrial goods constitute the technical and economic basis of planning. The elaboration and fixing of norms as measurements of planned quantitative expenditures of raw and other materials, fuel and electric power per unit of output are particularly important to the process of working out material balances and relationships within and between sectors of the economy. These planning norms provide a basis for determining the requirements of enterprises, sovnarkhozy, union republics and the economy as a whole for all types of material resources, and for planning their distribution. Norms are also of use in accounting for and checking on the utilization of material resources in production.

In view of the vast dimensions of industrial production, and of the highly complex relationships within and between the various sectors of the economy, it is of the greatest importance in laying the groundwork for the plan projections that correct and technically sound norms should be established at all levels of the economy from the factory to the USSR Gosplan.

The setting of correct norms for the consumption of material and manpower resources in production also promotes the preparation of economically sound plans for reducing production costs.

By analysing and comparing the planning norms and the norms actually reported it is possible to determine where the former have been exceeded and where savings have been achieved, so that the necessary measures can be taken to prevent over-expenditure.

In branches of industry where the value of fixed productive capital is relatively high (metallurgy, forestry, chemicals, oil drilling, fishing and some others), the norms for utilization of equipment are of decisive importance to production. In those branches of industry in which output depends mainly on

utilization of raw materials (non-ferrous metallurgy, oil refining, textiles and processing, etc.), on the other hand, the norms of consumption of materials are highly significant.

The industrial production plan also includes indicators which serve as targets for the development of new equipment and methods and of industrial specialization, co-operation and integration.

Measures to develop and apply new equipment and methods are worked out in order to effect further improvements in production technique, to raise productivity and improve working conditions as a means of increasing output, and to improve the quality and reduce the cost of industrial production.

The plan includes a list of the new, improved goods to be produced (initial serial production) during the period of the plan, and a list of technically obsolete products to be eliminated from production. In addition, the plan lays down the main guide-lines and sets targets for mechanization, automation and the application of advanced equipment and methods. Targets are also set for the most important scientific research and experimental work.

The measures to develop and apply new equipment and methods take into account the most important trends of technological progress in the main branches of industry. Such trends include the electrification of production processes and operations, the "chemicalization" of industrial production, expansion of the peaceful uses of atomic energy, wide application of electronics and remote control, further intensification of production processes and the mechanization of manual operations.

In devising the measures to be included in the economic plan, provision is made for:

- mechanization, beginning with the most labour-intensive and strenuous operations, primary or auxiliary, in all branches of industry;
- the automation of mass production and of other production in which automation is called for by special features of the technological process or is needed to improve working conditions and safety standards;
- the development of new products and new methods of production, making use of the results of scientific research and the latest achievements of Soviet and foreign technology.

Many of the targets for the development and application of new equipment and technology in industry are set in republican plans, but those for solving the main problems of technological progress - the crucial, complex problems - are set in the economic plan for the State as a whole. These highly important and complex problems include:

- the unification and expansion of the existing power grids and their linkage to high-voltage systems; measures to apply new equipment and methods to power-intensive production processes; the electrification of transport and of other sectors of the economy;

- the further development of open-past iron and coal mining, and the extraction of minerals by highly productive methods of underground treatment incorporating the latest ore-concentration techniques;
- in metallurgy, the use of natural gas and oxygen in smelting, adoption of the continuous-pouring method of steel production, etc. Measures are being developed to rationalize the power balance in ferrous metallurgy and coke production, to expand the output of chemicals at coking plants and to utilize metallurgical slag;
- all round utilization of natural resources in the form of ores, non-ferrous and rare metals and chemical deposits, and maximum extraction of widely scattered and rare elements;
- measures for the rational exploitation of oil and gas as raw materials, through the chemical processing of petroleum, by-product gas and natural gas to expand the production of polymers, plastics and artificial fibres; for the application of the latest drilling techniques; for coking heavy oil residues, etc.;
- measures to introduce technically improved methods for the extraction, processing and chemical utilization of all components of the raw materials used in the peat processing, wood-working and textile industries, certain branches of the food processing industry, etc.

The section of the plan dealing with scientific research furnishes specialized scientific research and design organizations, laboratories and experimental enterprises with targets for their high-priority work, which is connected with the attainment of the most important goals of technological progress and is of great significance in developing any branch of industry.

These targets indicate the precise objective of the planned research and the technical and economic results to be expected from its successful completion. Research targets are co-ordinated on a country-wide basis and broken down for assignments to executing agents according to the specialty of each research organization.

The rate of technological progress according to plan is broadly evaluated by means of indicators which measure:

- the rise in the level of mechanization of each branch of industry, in terms of the ratio of volume of work, or expenditure of labour, in mechanized units to the total volume of work or expenditure of labour;
- the rise in the level of automation in each branch of production, in terms of the ratio of volume of work, or expenditure of labour, in automated units or operations to the total volume of work or expenditure of labour;
- the proportion of new products in the total output of a given branch of industry (in physical or value terms).

The ultimate economic effect of the implementation of plans for new equipment and methods is measured in terms of the over-all theoretical annual

saving in money or materials, the absolute or relative release of workers and the improvement in working conditions and industrial safety.

The purpose of measures introducing specialization and co-operation in industry is to concentrate the production of technologically homogeneous articles in a smaller number of enterprises, so that the productivity of labour can be increased, the quality of output improved and the cost of production reduced.

Industrial specialization is one of the forms of social organization of production, based on division of labour. It may take the form of an arrangement for particular industrial goods, components, assemblies, instruments, etc. to be produced at separate enterprises (article or component specialization), or production may be organized according to the nature of the operations involved: iron founding, forging, etc. (production specialization or technological specialization).

Specialization plays a highly significant part in branches of industry which put out a wide range of products.

The manufacture of industrial products at specialized enterprises makes it possible to apply mass-production and assembly-line methods and to use mechanized and automated equipment.

The main indicators of the planned level of industrial specialization are:

(a) the ratio of output from specialized plants in a particular branch of industry to the total output of the product in question: for example, the ratio of output of furniture from specialized factories to the total output of furniture, or the ratio of output of machine tools from specialized plants to the total output of machine tools. Using such indicators, it is possible to evaluate the part played by individual branches of industry in social production;

(b) the ratio of output of the main (typical) product to the total output of the branch of industry or the enterprise. This shows the degree of homogeneity of production within the branch or individual enterprise;

(c) the number of technologically homogeneous groups, kinds or types of products manufactured by the enterprise;

(d) the ratio of output from enterprises specializing in individual components to the total output of the branch of industry or the region;

(e) the proportion of the total value of the output of a product represented by deliveries from co-operating enterprises.

These indicators are computed for the beginning and the end of the plan period.

Before the plan of specialization and co-operation is drawn up, a structural analysis is made of the various branches of industry, and the degree of specialization which is economically and technically desirable is determined for the economic region, the branch of industry and the enterprises.

Specialization is, of course, accompanied by a concentration of production and a rise in the scale of operations. It is true that concentration of production calls for some increase in transport costs, but specialization helps to increase the productivity of labour and to lower production costs, and fosters co-operation in production.

In socialist industry, co-operation in production is one of the forms of production relations between enterprises engaged in the joint manufacture of particular types of goods.

Such co-operation may be established between plants situated in the same region or in different regions, or between plants in the same industry or in different industries. The following are also recognized as distinct forms of co-operation:

1. Article co-operation (the base or headquarters factory puts out the end product, consisting of a set of finished articles received from the other factories);
2. Component co-operation (the headquarters factory receives components and assemblies from other enterprises);
3. Technological co-operation (one enterprise carries out specific operations or manufactures semi-finished products for another).

Above all, co-operation in production affords a means of making fuller use of an enterprise's industrial capacity.

In determining the directions in which specialization is to develop, account is taken of the degree to which regional or republican requirements of industrial products are being met, the technological level of production and the degree of utilization of productive capacity, the efficiency of production relations, the balance of production and consumption of finished products, assemblies, parts, etc. The development of specialized production is based on a wide use of standardized assemblies and parts.

The trend and content of current plans for the development of specialization and co-operation in industry are determined in the light of the long-range plans of economic development.

Current plans for the development of specialization and co-operation in industry provide for:

- the determination of specifications for specialized enterprises in the leading branches of industry;
- the development of capacity for the specialized production of individual parts and assemblies and for the centralized, mechanized production of castings, forgings, welded assemblies, reinforcing units, instruments, etc. (taking into account the regions of consumption);
- the organization, at the regional level, of repair shops (for the repair of factory equipment and of machinery used in building, road making, etc.)

- the expansion of specialized plants for manufacture of special plants for various types of equipment;
- the establishment of new types of plants to manufacture standard elements for automatic production lines, engineering specialties and machinery;
- the establishment of rational forms of production relations - within and between branches of industry, or within and between regions - and rational concentration of the production of specific items.

The specialization and co-operation targets set in the plan are concorded, as to the manpower and cost involved, with the plans for production, fixed investment and equipment and methods.

The economic effectiveness of the measures introduced to develop specialized production is evaluated in terms of anticipated annual saving, recoument period for capital invested in measures to promote specialization, unit cost of production, and output per rouble of fixed assets before and after specialization.

The main economic criterion for determining the appropriate scale of specialized production is the indicator of cost of production before and after specialization, taking into account transport costs, which vary with the radius of co-operation.

The theoretical annual saving, which is obtained by comparing the cost of production before and after specialization, is computed according to the following formula:

$$A_s = [(C_1 + T_1) - (C_2 + T_2)] \cdot O,$$

where A_s = theoretical annual saving through specialization;

C_1 = full factory cost per unit of output before specialization;

C_2 = full factory cost per unit of output after specialization;

T_1 = cost of transport for deliveries to users, divided by unit of output, before specialization;

T_2 = cost of such transport after specialization;

O = annual output after specialization.

To assess the economic effectiveness of different variants of specialization, the capital recoument time (ratio of capital expenditure to total annual saving) is determined for each variant.

The economic effectiveness of planned specialization measures may also be evaluated in terms of other factors: amount of labor and materials put into the manufacture of the product, output per worker, increase in output and improvement in quality of product, etc.

With the specialization and re-orientation plan, targets are worked out for the integration of industrial production, to be brought about by effecting individual branches of industry use natural resources more completely, organizing production plans to take into account stages of processing, from the material to the finished product: by coordinating related enterprises and effecting use of raw materials, fuel and fixed capital, and by linking up enterprises whose peaks of activity fall in different seasons.

The integration of production is advantageous only between plants of same type situated in the same area, where fuller and more efficient use could be made of primary raw materials, intermediate products, secondary power resources, buildings, equipment and staff.

In various branches of industry such integration is an efficient form of organization for production. For example, in the extraction and processing of oil, gas, coal, shale and peat, all products and by-products can be utilized completely by organizing the manufacture of various chemical products on the basis of the major enterprises.

Noteworthy results can be achieved for the economy by combining metal production with coal preparation plants, coking and chemical works, and the production of building materials from slag.

The all-round utilization of non-workable wood and mill waste at wood working shops, pulp and paper mills and wood-chemical enterprises, and of by-products in the chemical, food processing, textile and other branches of industry offers a genuine basis for the integration of production facilities.

The experience of socialist countries has shown that industrial integration produces noteworthy economic results, in the form of a reduction in proportion of capital investment in the construction of new enterprises or the expansion of existing enterprises; decreased expenditure on the extraction, processing and transport of raw materials; the emergence of new types of industrial production; lower production costs; increased productivity of labour, and greater efficiency in the use of fixed and circulating resources.

In drawing up a plan it is important that the potential for further development should be correctly assessed. The principal factors determining the potential for industrial development are natural resources, scientific and technological advances, manpower and material resources, and the optimum utilization of those resources. In the USSR, the basic requirements for a plan are that it should provide full employment for the whole of the employable population and should make full and rational use of raw material resources of the entire production complex.

Consequently, the basic data on which to draw up a production program are:

1. The anticipated level and structure of industrial production for the current year - i.e., the year before the plan year;
2. Estimates of industrial output required and of the raw and other materials, fuel and electric power that will be needed to produce it;
3. Estimates of production capacity.

Through the scientific analysis of the trends of technological progress and the possibilities for exploiting the country's natural wealth and of the interrelationships that have emerged within branches of industry, between related branches and between contiguous economic regions and union republics, it is possible to determine the best course to follow in developing the branches of industry and the economy of the union republics.

On the basis of such an analysis the planners can determine the economic advantages of the various alternatives for the distribution of capital investments for the plan year by industries and geographical areas and decide whether to speed up or slow down the rates of growth of individual industries; they can determine the availability in the areas concerned of the requisite material resources and transport, the relationship between the extractive and manufacturing industries, etc.

Particular attention is given to analysing the existing situation with regard to capital construction and the possibilities for its expansion.

The study of national consumption in the base period enables the planners to indicate ways of increasing such consumption by means both of proportional changes in the production of individual items and of a general increase in their output.

The economic analysis of the base period covers many problems of economic development broken down both by industry and by geographical area, concluding with an assessment of the state of industry and an outline of prospects for its development by the main indicators. This constitutes the basis on which the economic calculations for the plan year are made.

To calculate the volume of industrial production it is essential to have a sound estimate of the economy's requirements of both means of production and consumer goods.

Estimates of demand for means of production are highly complicated, initial drafts being prepared by the planning organs in the light of preliminary findings with respect to each industry's requirements under the long-term development plans, which are made more specific as the plan is worked out and co-ordinated by the system of balances.

Demand for means of production is determined mainly in physical terms by the method of direct calculation, based on the norms for each consuming industry and on the scale of its production or works programme.

For example, the fuel requirements of the cement industry are calculated on the basis of its production programme and the consumption of fuel per ton of cement. Similarly, the fuel requirements of power plants are determined from their electric power output and the norms for the consumption of fuel per kilowatt-hour, etc.

Demand for excavators, trucks, railway wagons and other types of equipment is calculated on the basis of the volume of planned works and the productivity norms for the equipment per unit of time.

Demand for heavy capital equipment - turbines, rolling-mill equipment, steam boilers, diesel engines, generators and electric motors, and special-purpose technological equipment of all kinds - is calculated in accordance with the technical programmes of the enterprises under construction having regard to the deadline set for their entry into operation.

These calculations cover not only the equipment required for new construction but also that required to expand and remodel existing enterprises, replace worn-out equipment and complete units of equipment already produced. Requirements of means of production for stockpiling, reserves and export are also calculated. In some cases requirements of means of production are calculated on the basis of consolidated norms.

The estimate of consumer demand is based on estimates of population size during the plan period, of the structure of the demand and of the volume of the personal consumption fund.

The work of fixing consumption norms is done by the appropriate scientific research institutes (dealing with public health, culture, municipal services, etc.) and planning and trade organizations. The main objective in determining demand is to expand consumption and improve the composition, quality and range of consumer goods. The principal items of personal consumption may be grouped roughly as follows: food products, clothing, articles of everyday use, housing, transport, cultural articles, health services and miscellaneous services. In countries with highly developed productive forces consumer demand is met primarily out of industrial production and only to a minor extent out of agricultural production and cottage industry. Thus, as group "B" industries expand the relative importance of agriculture and cottage industry declines.

The volume of consumer demand is determined by trading organizations for the entire basic range of products, particulars concerning delivery dates, range, styles, grades and prices being subsequently worked out between the supplier-manufacturers and the trading organizations.

The retail trade plan is based on estimates of the personal consumption fund, i.e., that part of personal monetary income used for the acquisition of various goods and in payment for services. The volume of the personal consumption fund is calculated on the basis of the plan balances of personal monetary income and expenditure, which permit the necessary connexion to be established in the plan between the personal consumption fund on the one hand and stocks of available commodities and the volume of paid services provided by municipal domestic and cultural service enterprises, etc., on the other.

These estimates also provide the basis for the goods turnover plan for the USSR as a whole and for each union republic. In the light of ascertained demand the volume of output for individual types of commodities is also laid down. If in the process of working out the plan shortages or surpluses of productive capacities, raw materials or labour resources are discovered, the necessary measures are taken to bring productive capacities into line with demand.

The establishment of production and consumption balances for individual types of goods enables the planners, when bottle-necks or shortages of any particular types of goods are discovered, to apply during the plan year and over longer

visions the measures needed to increase capacity, (if inadequate) to increase output or to expand the output of equipment and installations. It also includes the gradual reduction in the output of articles of which there is a surplus, their replacement by other items, etc.

It should be noted that the classifications used in the national economic plan includes only the main types of consumer goods without details as to their great variety, such details being provided in the union republic, sevmirskhoz and enterprise plans.

The plan targets fixed for enterprises do not exclude the possibility of changes in the range and grades of goods during the year. The procedure for making such changes is specified in the contracts concluded between supplier enterprises and trading organizations.

The calculation of aggregate demand for means of production and consumer goods takes into account export and import deliveries and the formation of the necessary stocks and reserves, the size of which is laid down separately for each industry and enterprise.

Provision is also made for the establishment of proved mineral reserves for the extractive industries.

Since the demand for industrial products is calculated in the light of productive capacity, let us examine the factors on which the plan estimates for the production programme are based.

When calculating the economy's needs for industrial products the planning organs also determine to what extent the volume of production must expand if those needs are to be met. Thus, the planning of demand and the planning of the volume of production are interrelated and are carried out simultaneously.

The installation of new productive capacity and improvements in the use of existing capacity, the expansion of raw material, fuel and power resources, increased labour productivity and the expansion of the labour force are basic factors determining production growth.

Capacity depends also on personnel training and skill and the application of progressive methods of organizing production and labour.

Production capacity is defined as the maximum annual industrial output in the planned range, given fuller use of all production equipment and space under a given work routine.

Estimates of production capacity are based on the full use of all kinds of production equipment in the various industries. The incomplete utilization of capacities may be the result of lack of co-ordination between industries or between various kinds of equipment within a particular industry. Such lack of co-ordination is usually caused by departures from the production or capital construction plan, for as a rule such plans provide for the removal of bottlenecks and the elimination of inter-industry or intra-industry imbalances through the installation of additional production equipment or the establishment of new factory shops or enterprises.

to the production plan, provides the following means of improving and expanding utilization of capacity:

(a) establishment of progressive plans for the use of equipment and for increasing its operating time (if this is possible and necessary);

(b) improvement in the use of basic and auxiliary (limiting) equipment through the introduction of new machinery and progressive technology;

(c) increasing of capacity through new construction or the expansion or remodeling of existing enterprises.

The use of machinery is determined by technical norms and by the operating time of equipment already in service or to be put into service; it should be noted that the better use of equipment in service makes it possible to decrease the amount of capital invested in the creation of new production capacities. However, one of the decisive factors in increasing production capacities is the bringing into operation of new equipment through capital construction.

The production capacity of an enterprise represents the capacity of its main production shops or sections and is calculated as follows:

$$C \text{ (capacity)} = H \text{ (productivity norm per unit of time)} \times t \text{ (period of operation)}.$$

In computing the production capacity of an enterprise (or of a branch of industry), all production equipment allocated to the enterprise, both equipment in service and equipment not currently in service because it is out of order or undergoing repairs or modernization, is taken into account. The operating time of capacity is calculated in accordance with the assigned work routine for each branch of industry. An enterprise's production capacity is computed on the basis of its basic range of production items. Where an enterprise produces a variety of items its capacity is indicated in standard units, i.e., in terms of coefficients which express expenditure in machine-hours or norm-hours for the production of the various items in question. In determining the production capacity of a given sovna khoz or of an industry as a whole, account is taken of the use of total capacity by each enterprise, on the assumption of an improvement in such use as the result of specialization, co-operation and other organizational and technological measures.

In industries with continuous production (metallurgy, chemicals, cement, oil refining, etc.) a calendar year is deemed to consist of 365 days (each of twenty-four hours) minus time for capital repairs and time during which for technological reasons the main equipment is idle.

In branches of industry with interrupted production (machine building, wood-working, etc.), working time is calculated at the rate of 365 days minus holidays and other non-working days and the time required for making capital repairs.

The shift index, the length of shifts and the number of working hours of equipment per twenty-four-hour period are also taken into account.

The production capacity balance is set in accordance with the following:

Production capacity balance = total production capacity - production capacity in service at the beginning of the period - losses in capacity + total increases in capacity resulting from:

1) installation of new capacity of newly constructed enterprises;

2) expansion of existing capacities (through intensification of production, acquisition and introduction of new technical equipment and other measures);

3) destruction of existing capacities and replacement of existing capacities.

The production capacity balance is set in accordance with the following:

Balance of production capacity by sector of production and character of industry as determined by the planning needs

| | Base period | Plan period |
|---|-------------|-------------|
| Capacity in service at beginning of year (period "initial" capacity) | | |
| Losses in capacity | | |
| Total increases in capacity resulting from: | | |
| a) installation of new capacity of newly constructed enterprises | | |
| b) expansion of existing capacities (through intensification of production, acquisition and introduction of new technical equipment and other measures) | | |
| c) destruction of existing capacities and replacement of existing capacities | | |
| Capacity in service at end of year (period "final" capacity) | | |
| Production capacity balance | | |

The degree of utilization of capacities is expressed by the ratio of annual output to production capacity. The figure obtained is called the coefficient of capacity.

Production capacity balances are drawn up by each enterprise, sovnarkhoz and regional obsklan and, for the most important branches of industry, by the USSR obsklan as well. Among the chief means of improving the utilization of industrial production capacities are: perfecting the organization of production and work, increasing the operating time of equipment by reducing both planned and unplanned idle time, achieving more intensive utilization of equipment by introducing progressive norms and perfecting technological processes, expanding and improving production specialization inter-enterprise co-operation, and ensuring a smooth operation of industrial enterprises.

The preparation of plan balances of production capacity enables the planners to use capital investments in the most rational way, directing them primarily into those branches of industry where available capacities do not ensure sufficient output to meet the needs of the national economy.

Planned capital investments in industry make it possible systematically to increase the fixed capital and production capacities of the various branches of industry with a view to the fulfilment of the plan and the creation of the necessary capacity reserve.

However, industrial production planning is based not only on capacities but also on the availability of material and technical resources in raw materials and other supplies, fuel and electric power. Requirements for these resources are generally determined by the method of direct calculation, on the basis of the volume of production and the established norm for the consumption of raw materials, other supplies and fuel per unit of output. In some cases more generalized norms are used.

When the demand for material and technical resources is estimated the need for the formation of reserves of raw materials, other supplies and fuel is taken into account.

The economical use of material resources in production is of the very greatest importance,* for it bears on the reduction of prime costs. Suffice it to say that more than two-thirds of these costs is accounted for by expenditure on raw materials and electric power. Savings are effected mainly by reducing consumption norms, cutting production waste to a minimum, re-using materials, introducing substitutes etc.

Improvement in technology, rational organization of production and labour and increased technical knowledge on the part of the workers also help to reduce the consumption of raw materials and other supplies, fuel and electric power.

The provision of raw materials to group "B" industries depends on the volume of agricultural production.

The industrial output plan is also based on the preparation and analysis of labour force balances in industry, within the framework of the over-all manpower balance of the national economy.

Any discrepancy between the planned and actual production and Germany's demand for the products of particular industries and the capabilities of the plant concerned will be noted.

Moreover it may be necessary to correct the plan, which is done in a special section especially at the end of the month. If the plan is not fulfilled, it is checked, also with the possibility of remedying the situation.

The shortage may also be covered by using stock in hand resources or by adjusting the export-import plan.

In the final evaluation of the soundness of the industrial production plan by industries, sovnarkhozy and republics, prime attention is devoted to verifying the compatibility of the production plan with other sections of the economic plan.

Thus, it is only after repeated checks have been made by means of the balances and any necessary adjustments made in the projections that the industrial production plan can become a part of the general state economic plan.

After the economic plan has been approved a most important stage in the planning process begins - the organization of the plan's execution. As the plan fixes targets for all sectors of the national economy and as these targets find expression in the mutual obligations of the union republics, sovnarkhozy and individual enterprises, the process of plan execution involves a vast amount of organizational work aimed at ensuring the fulfilment of the plan and the co-ordination and regulation of economic activity. At the all-union level this responsibility lies with the Supreme Economic Council, the Gosplan and the National Economic Council, while in the union republics it is borne by the corresponding planning organs and sovnarkhozy.

In USSR planning practice, the task of checking plan execution is the right and a major responsibility of the economic and planning organs. It is the purpose of such supervision not only to disclose individual plan targets which have not been fulfilled but also - and most important - to prevent non-fulfilment of the plan as a whole; the plan is a state directive, it is the duty of every executive agent to take measures to ensure that it is carried out.

The work of checking the execution of the plan is undertaken with a view to facilitating its fulfilment in every way and eliminating all negative factors. In checking the execution of the plan by sovnarkhozy, union republics, all-union departments or branches of industry it is the usual practice to study the proportions which emerge as the implementation of the plan proceeds, to collate the effective balances with the plan balances (material, monetary, and manpower) and to examine the provision of material, manpower and monetary resources for the production and construction programme and the economic links between industries and between areas.

In accordance with the results of the checks carried out, measures are taken by the appropriate planning or economic organs to remove any irregularities which may have come to light, and practical proposals are worked out (organizational and technical measures). Checking operations are carried out with the participation of workers, engineers and representatives of public organizations. Their results

... of the national economic plan, the fulfillment of the plan ... and distribution of ...

The fulfillment of the national economic plan is checked by all sectors ... of the economy, in particular, in the field of operational statistical and ... is compulsory for all state and ... The statistical returns are subdivided ... and ... (daily, weekly, monthly, quarterly or annual), and ... (statistical surveys). The entire national system ... the Central Statistical Board of the USSR Council of Ministers and its republican, regional and urban offices.

Now, the entire national fulfillment effort is checked and supervised by means of ... starting from the enterprise or sovnarkhoz and ... for each republic and for the country as a whole. In this way the State is enabled to analyse the fulfillment of the plan and take the necessary steps to prevent any failures.

The study of plan returns and the systematic checking of plan fulfillment are carried out by the central state authorities or by the republican authorities, depending on the size and importance of the units concerned. In studying the return and exercising their supervisory functions the central state authorities - the Supreme Council of the National Economy of the USSR, the USSR Gosplan, the USSR sovnarkhoz, the state industrial committees and the Central Statistical Board - ensure economic co-ordination in the fulfillment of the plan and avoiding ... at the all-union, industry or union republic levels. They also check the execution of the main state and party directives. The party and state control authorities, too, have an important part to play in organizing the supervision of national economic plan fulfillment.

In addition to the authorities already enumerated as being responsible for supervising the fulfillment of the plan, there are also the financial organs and state banks, which keep watch over turnover tax and profit deduction revenues, the proper utilization of working capital funds, bank credits and funds appropriated for special purposes (capital construction, administrative expenses, etc.), adherence to production cost estimates, etc. Thus, the system of financial control represents another form of state control which promotes strict economy in industry and helps to ensure fulfillment of the national economic plan.

A further prerequisite for the whole system of planning and control is the maintenance of proper accounts in every part of the national economy. For this reason, the statistical, financial and planning organs devise and perfect methods of book-keeping, statistical and operational accounting, and systematically supervise the correct application of them at all enterprises.

The planning organs take particular care to notify plans to the immediate units - the industrial enterprises - in good time, and to apportion plan targets ...

... of course, the all-around control over ... (price, profit, supply ...)

...wards, etc.] ...
...incentives and enterprises are ...
...the award of ...
... (annual ... workers and ...
... industrial enterprises ...
... successful production individual enterprises may be awarded ...
... may also be awarded Red Challenge Banners for outstanding ...
... specific titles as "Communist labour enterprise (or worker)", etc. ...
... by an individual engineer, technician or annual or clerical worker ...
... the award of a testimonial or the honorable title of "leader of a ...
... labour brigade", or by inscription on the "Roll of Honour", while ...
... outstanding workers may be recommended for government awards. All forms of ...
... incentive are decided on by boards of jurors comprising representatives of ...
... union, party and other public and economic organizations.

Various types of material incentive are used to encourage better work. First, the systems of direct (piece-rate and time-rate) and bonus remuneration in force in the USSR have the effect of stimulating efforts to achieve targets for the production of the industrial goods specified in the plan in the required quality and range, to lower costs, raise labour productivity, etc. Managers and engineering and technical personnel are entitled to receive bonuses where their enterprise over-fulfils the plan targets for production and for lowering costs and raising product quality and labour productivity, where it fulfils the plan for the contractual supply of industrial products, etc. These bonuses are paid on the basis of quarterly or monthly results. It should be noted that ceilings ranging from 40 to 60 per cent of the regular wage are placed on bonus payments in the various branches of industry.

In addition to the types of material incentives enumerated, there is also a system of bonuses for the attainment of targets relating to the introduction of new techniques, innovation in the design of machinery, instruments and other articles, the invention of new types of materials, the elaboration of new, improved production processes, etc. The size of these bonuses depends on the economic efficiency of the proposals carried into effect. The bonuses are paid at various intervals, and are awarded not only to those responsible for the proposals themselves, but also to personnel who take an active part in introducing the new techniques. In addition, bonuses are awarded to works personnel for organizing the utilization of left-over materials for the production of industrial mass consumer goods. Moreover, up to 95 per cent of the profits accruing from the sale of products made from left-over materials may be paid into the works fund.

An enterprise's bonus fund is formed from its profits or its savings in ... costs (where the plan does not provide for a profit). The amounts paid into the fund differ from industry to industry, constituting from 1 to 6 per cent of the total planned profit or cost savings.

Up to 40 per cent of the works fund may be used for the payment of bonuses (in accordance with the prescribed procedure), not less than 20 per cent for the expansion and improvement of the consumer goods production, mechanization, automation and the introduction of new techniques, and not less than 10 per cent for ... facilities and amenities (housing, clubs, sports facilities, sanatoriums, etc.).

The geological exploration plans are distributed in the direction of the following main tasks:

Of particular importance for industrial development is the timely execution of some geological exploration work. The national economic plan therefore provides for geological exploration as follows:

(a) Prospecting and exploratory operations on the scale required to expand existing supplies of minerals for enterprises in operation, under construction or on the drawing-board and develop new supplies in good time, and to create the necessary proved reserves of minerals for the further rapid development of the USSR's productive forces;

(b) The extensive development of geological survey and regional geophysical work for the purposes of an integrated geological study of the national territory permitting the more rapid disclosure of potential areas and the organization of prospecting and exploration operations designed to detect new sources of minerals; the work referred to to be developed well in advance of the actual prospecting and exploration operations;

(c) Hydrogeological and geological engineering work with a view to the solution of problems connected with the supply of ground water to industrial enterprises, agricultural installations and inhabited localities, determination of the hydrogeological and mining conditions of deposits undergoing exploration and development for exploitation, the execution of drainage operations and the construction of irrigation works and other industrial facilities.

The geological exploration plans are designed to ensure that the greatest possible progress is made in the economic effectiveness of geological exploration work and that the geographical siting of mineral reserves is improved through the discovery and exploration of new mineral deposits located in the economically most favourable areas and providing mineral raw materials of industrial grade.

The direction and extent of prospecting and exploratory work for each mineral is determined by the economy's long-term need for the type of mineral in question, forecasts of reserves, and the economic conditions of the regions under exploration.

The main indicators for the geological exploration plan are the growth of mineral reserves, other geological targets (prospecting for new deposits, geological surveying, geophysical and hydrogeological research) and the volume of work carried out in monetary terms.

Before any newly discovered mineral deposit is turned over to detailed exploration, plans are made for as much preliminary exploration as is necessary to permit a sound assessment of its industrial importance. Detailed geological exploration is planned only for deposits shown by the results of the preliminary exploration and their economic appraisal on the basis of technical and economic reports to merit industrial exploitation.

The expansion of mineral reserves in the various industrial basins is provided for in the annual plans only in respect of deposits which are considered to be worth industrial exploitation and amenable to geological exploration. The largest of such deposits are included in the annual geological exploration operations included in the national economic plan.

With a view to increasing the effectiveness and reducing the costs of geological exploration work, exploration costs per unit of mineral reserves for a given deposit are included among the indicators for plans of detailed exploration work to be carried out by parties, expeditions and trusts. Peterlinin, inter alia, the plans for geological exploration provides for the interested execution of exploration work. In addition to study of the main mineral, in respect of which targets are set for the growth of reserves or for prospecting operations, provision is also made for appropriate research and appraisal work on other minerals discovered in the given region, basin or deposit.

In the execution of geological exploration work, provision is made not only for exploration properly so-called but also for hydrogeological and geological engineering operations with a view to determining the hydrogeological nature of the deposit undergoing exploration (or the region under study) and the factors affecting the water supply of the future mining enterprise, finding local sources of construction materials and surveying sites for industrial construction, and for other operations required before technical drafting work can be started.

Targets are set in the geological exploration plan for major deposits with the highest potential yield and for the most important geological or economic administration areas.

The geological exploration plan presupposes the broadest possible application of the most up-to-date and effective prospecting and exploration methods, the use of aerial methods in geological surveying and geophysical operations, the application of geochemical, geophysical and other advanced research methods, the extensive introduction of new types of drills and the mechanization of mining operations. The purpose of these measures is to reduce the costs of the various types of operation, expenditure per unit of increase in mineral reserves and expenditure for the discovery of new deposits.

The growth of mineral reserves has to be planned in the light of the following principles.

Mineral reserves are divided, according to their economic importance, into two categories:

(a) Reserves included in the balance, which are economically suitable for exploitation and satisfy the quality requirements laid down for calculating reserves in the ground, and

(b) Reserves not included in the balance, which are not yet economically suitable for exploitation because of the small size or thinness of veins, low content of valuable constituent, particularly complex working conditions or because they necessitate very complex refining processes, but which may in the future time be industrially exploited.

... of the deposit, the nature of the mineralization, the thickness of the veins, the quality of the mineral, and the basic technological properties of the mineral, and the main natural factors which will determine the nature of mining operations.

... of the deposit, the nature of the mineralization, the thickness of the veins, the quality of the mineral, and the basic technological properties of the mineral, and the main natural factors which will determine the nature of mining operations.

Category B. Reserves approved and studied in detail to provide the following information: the main features of the mode of occurrence, form and composition of the ore bodies, the natural types and industrial grades of mineral present and their distribution pattern, and a precise picture of the spatial disposition of the various types, the relative distribution and nature of barren and sub-standard areas inside the ore bodies, without a precise delineation; the quality and basic technological properties of the mineral, and the main natural factors which will determine the nature of mining operations.

The delineation of deposits is established on the basis of test workings, a limited area of extrapolation being permitted where the thickness and quality of the veins is sufficiently consistent.

Category C. Reserves approved and studied in detail to provide general information on the mode of occurrence, form and composition of the ore bodies, the natural types, industrial grades, quality and technological properties of the mineral present and the natural factors which will determine the nature of mining operations.

The delineation of deposits is established on the basis of test workings and the accumulation of geological and geophysical data.

Category D. Reserves which have undergone preliminary appraisal; the mode of occurrence, form and extent of the ore bodies are determined on the basis of geological and geophysical data confined to certain different points or by analogies with other deposits.

The quality of the mineral is determined on the basis of individual samples and specimens or in the light of data relating to adjacent worked areas.

The delineation of these reserves is limited to the area indicated by geological evidence to structural and recent layers.

Note: In addition to categories A, B, C, and D reserves, which are evaluated in respect of individual deposits, the potentialities of ore-bearing veins, fields, and large-scale areas are also necessary in order to make their ultimate contribution to the national mineral resources.

... exploration, ... reserves, ... deposits which are economically and technically suitable for industrial ...

The following, inter alia, constitute the most favorable conditions:

- (a) The mineral occurs at a relatively shallow depth; open-pit or efficient underground mining methods can be used; hydrogeological conditions are satisfactory;
- (b) The deposits are located near mining enterprises already in operation, under construction or at the drafting stage, and near main transport facilities, power transmission lines and consumer areas.

Where a deposit is situated in a remote and inaccessible area, operations are restricted to a general estimate of the scale of the occurrence, possible yields, or whether it can be industrially exploited.

In planning the preliminary exploration of mineral deposits, the objective must be to ensure the least possible expenditure of money and materials, consistent with the work being conducted or such a scale as to provide sufficient data for a technical and economic appraisal of the deposits.

During the first step of exploratory work (preliminary exploration), reserves in categories C₁ and C₂ are normally estimated in general terms. The work should not make provision for detailed exploratory work at deposits which are scheduled for industrial exploitation in the near future.

The provision of industry with proved reserves is planned on the basis of demand from enterprises already in operation, under construction or at the drafting stage, the allowance being made for the potential development of the extractive industry in question over the long term. In view of the fact that the application of new enterprises takes considerable time and that at the time of their commissioning the enterprises may be situated in areas where the reserves are limited, it is necessary to take into account the reserves of the enterprises in operation, and to provide for their reserves in the long term.

The reserves of proved reserves of mineral resources are planned on the basis of the reserves of the enterprises in operation, under construction or at the drafting stage, and the reserves of the enterprises in operation, under construction or at the drafting stage.

... of the ... in the ... of the ... allowing for the ... of their ... and ...

... of the ... for the various minerals is ...

proved reserves. The construction of large modern metallurgical plants calls for heavy capital investment. Consequently, such enterprises must be provided with proved reserves (categories A, B and C₁) of iron and manganese ore, chromite and non-ferrous raw materials for at least forty to fifty years. Small enterprises must be guaranteed at least a ten-year supply from the proved reserves of particular mines or quarries while large enterprises must be guaranteed at least a twenty-to-thirty-year supply. These figures are narrowed down in the light of the planned productive capacity of the given mine and the planned cost of its construction.

In planning geological exploration for iron ore, only those deposits or areas are marked down for exploration where ore requiring no beneficiation (having an iron content of more than 50 per cent) or little beneficiation (having an iron content of more than 35 per cent) can be found.

In planning for manganese ore and chromite, the rule is that effort is concentrated on the exploration of deposits and areas where there are possibilities of finding ore suitable for the production of ferromanganese, ferrochromium, chromium and chromomagnesite bricks.

In planning prospecting and exploration for titanium ore, special attention must be given to the rich ilmenorutile deposits, which are best suited to the production of titanium.

In the case of non-ferrous, rare and precious metals, planning aimed at increasing reserves and providing enterprises with proved reserves is normally carried out in terms of metal (copper, lead, nickel, cobalt, tin, molybdenum, mercury, antimony, gold and silver).

Because of the great variety of technical processes for extracting alumina and aluminium from the various types of ore, aluminium ore reserves are planned and calculated in terms of ore (bauxite, nepheline, alunite, fibrolite, etc.). Reserves of wolfram, beryllium, tantalum, columbium, lithium and zirconium are planned and calculated in terms of oxide: wolfram trioxide, beryllium oxide, tantalum pentoxide, columbium pentoxide, etc.

The periods for which mining enterprises must be guaranteed proved reserves of non-ferrous, rare and precious metals fluctuate widely because of the varying character and scale of such enterprises. However, in planning the growth of mineral reserves for republics or economic administration areas and for specific deposits, the objective to be kept in view is to provide proved balance reserves (categories A, B and C₁) of bauxite, copper, lead and nickel for a term of thirty to forty years, of nepheline ore for a term of not less than fifty years, of wolfram, molybdenum, lead and mercury for a term of not less than twenty to thirty years, and to ensure that all deposits proved reserves of fifteen to twenty

...
the main objective of the geological exploration plan for coal is to determine the reserves of coal in the mining areas and to ensure the growth of proved reserves of coal in the mining areas.

The plan provides for a breakdown of the mining areas into individual fields or districts and to determine their capacity by individual coal-fields or districts. Areas with deposits of lignite, sub-bituminous coal, bituminous coal and anthracite, as well as deposits of rare metals such as beryllium, columbium, tantalum and certain other rare metals.

Goal. The main indicator in the geological exploration plan for coal is to provide for the detailed exploration of mining areas with a view to determining their capacity by individual coal-fields or districts. Areas with deposits of lignite coal and those suited to opencast mining are indicated separately within the general figures.

In the case of steam coal, the plans provide mainly for the exploration of areas suited to opencast mining with a maximum stripping coefficient of 1:10 and a mining depth of not more than 300 metres.

The required volume of category A, B and C₁ balance reserves in the areas under exploration is determined by multiplying the capacity of the areas to be explored during the plan period by the amount of the average reserve of the given district or field per million tons of capacity of its various areas.

In calculating the growth of proved coal reserves, the rule applied is that mines with an annual capacity of 600,000 tons of coal must be guaranteed reserves of thirty to forty years' duration and mines with a capacity of 900,000 tons or more must be guaranteed reserves of fifty to sixty years' duration. For quarries, the reserves required are approximately 30 to 35 per cent less in terms of duration than for mines.

In selecting areas for exploration, factors to be taken into account are the most efficient size of prospective mine sites and quarries and the presence of natural boundaries.

The plan for the growth of proved reserves of oil and natural gas is prepared in the form of a breakdown by categories A, B and C₁, with separate targets for the growth of category A and B reserves. Only extractable resources are taken into account.

Other important indicators in the oil and natural gas geological exploration plan are exploratory deep drilling and geological prospecting for potential new oil and gas areas and structures.

In terms of the objectives sought, exploratory deep drilling is subdivided into three types: supportive, prospecting and exploratory in the true sense.

The plan fixes the number of structures to be explored by means of deep drilling and the number of deposits (fields) to be worked. Geological prospecting includes geotectonic surveying, structure, drilling, geophysical work, etc., as well as other types of investigation.

... of the reserves of mineral raw materials is based on the results of geological and geophysical studies of the deposits and on the results of the drilling and exploration work carried out in the area concerned.

The growth of reserves of mineral and chemical raw materials is planned on the basis of industrial demand for the various types of materials, and in the light of their geological and technological characteristics (chrysothile, talc, sillite and blue asbestos, borates and detalites, muscovite and phlogopite, graphite and crystalline graphite, etc.).

Some widely occurring types of non-metallic raw materials (limestone, chalk, dolomite, bentonite, common salt, etc.) are given integrated study with a view to their possible utilization in various branches of industry. Planning for the growth of reserves of these materials is based on the number of existing and potential consumers in the economic area concerned.

Planning for the growth of mineral reserves is aimed at ensuring the utilization of designed mining capacity for a period of fifteen to thirty years. In the case of building materials and raw materials required for glass making and ceramics, enterprises are required to have proved reserves of fifteen to twenty years' duration or, in the case of some smaller mines and quarries, of up to ten years' duration.

In the case of some non-metallic minerals which are unevenly distributed in complex types of formation, planning for the growth of reserves is based either on category C_1 (mica and blue asbestos) or on categories C_1 and C_2 combined (siliceous raw materials). For these types of minerals, enterprises are provided with a ten- to fifteen-year reserve.

In the case of mined chemical raw materials requiring heavy capital investment for the construction of mining and processing enterprises (potash and magnesium salt, apatite, sodium sulphate, etc.), enterprises must be guaranteed category A, B and C_1 proved reserves sufficient to ensure utilization of their designed capacity for thirty to fifty years.

In the case of deposits of iodobromite, boric and other types of mineral water and sites for drilling, category B and C_1 proved reserves are required to be available for ten to fifteen years.

When an area is to undergo integrated geological study with a view to discovering potential mine sites as quickly as possible and carrying out engineering and exploration for new mineral reserves, the plan provides for the most intensive and most advanced geological work to proceed much more rapidly than in the case of more detailed prospecting and exploration.

The plan provides for the most advanced work in the strict sense and the prospecting work in the broad sense to proceed with it, the total volume of geological

... expressed in monetary terms...
... hydrogeological work...

Main types of hydrogeological work

... of hydrogeological work are the discovery of new sources of water for urban areas, industry and agriculture (irrigation, etc.)...
... study of the ground-water régime, the protection of aquifers...
... and the study of mineral-water sources, karstic phenomena, landslides...

Hydrogeological and geological engineering work carried out in connection with the exploration of mineral deposits or for the purpose of discovering water-bearing horizons for mines, oilfields, etc. is usually included in the geological exploration plan for the minerals in question. It provides data on which the planning organizations can base their programmes for the industrial exploitation of mineral deposits.

Hydrogeological research planning provides for the following main types of work:

- (a) Hydrogeological prospecting and surveying of varying scope with a view to the hydrogeological study of the region;
- (b) Hydrogeological drilling, integrated research and core sampling for the purpose of discovering and exploring sources of ground water suitable for use as a water supply;
- (c) Hydrogeological and geological engineering work in connection with irrigation, drainage and the planning of heavy construction;
- (d) Prospecting for and exploration of mineral and thermal waters;
- (e) Study of ground-water régimes, landslides and karstic processes.

The total volume of geological exploration work expressed in monetary terms is the general indicator for the plan.

The plan provides for all geological survey, hydrogeological, hydrogeological and geological engineering work and mineral prospecting and exploration operations to be financed under the state budget. The only exception is exploratory drilling for oil and gas, which is financed through capital investment.

The plan fixes the volume of geological exploration work in monetary terms by union republics or, where appropriate, ministries, departments, administrations or sovnarkhozy, broken down by regions (Pamir, non-Pamir, etc.) by metals, gold, diamonds, coal and combustible shale, oil and gas, etc., with separate targets for the most important minerals. It also sets specific targets for geological survey, hydrogeological engineering and other work, where necessary, for special and specific groups.

The volume of all types of hydrogeological engineering work... is calculated in current estimated prices...

The total cost of the expedition is estimated to be \$1,000,000. The major portion of this sum is to be provided by the Government, but it is expected that the expedition will be self-sufficient in the field.

The total cost of the expedition is estimated to be \$1,000,000. The major portion of this sum is to be provided by the Government, but it is expected that the expedition will be self-sufficient in the field.

The following types of scientific exploration work included, in addition to the expenditure for field work, expenditure for the following purposes: planning, outfitting, organizational and wind-up operations; the transport of personnel and equipment of expeditions to and from the site of field operations; scientific research, technical research, detailed topographical and geodesic work and cartography; the submission of reports for approval by state or regional minor reserve commissions; the preparation of technical and economic reports and of temporary specifications for laboratory processing, publishing and programme planning work; the construction of temporary buildings and installations; supplementary wages not referable to any specific type of work; service bonuses; bonuses and additional payments under the progressive piece-rate system of wages; additional payments to persons with academic degrees; outlays to cover winter increases in the cost of operations; the payment of compensation for agricultural damage resulting from biological exploration, and the maintenance of a reserve fund to cover unforeseen operations.

INVESTMENT PLANNING

The constant growth and technical development of socialist production is directly dependent on the rate of expanded reproduction of productive capital.

Investment, as the process of creating new productive capital and benefits, establishes the necessary conditions for the continuous expansion of production on the basis of new and improved techniques and fixes the absolute and relative rates of growth of the different branches of the economy.

The way in which investment resources are distributed between the different branches determines the composition of new capital assets and productive capacity.

The country's capital is divided, depending on its use value, into productive capital (means of labour used in production over a long period) and non-productive capital (housing, buildings and equipment of educational institutions, hospitals, theatres, municipal service installations, etc.).

Durable non-productive capital differs from productive capital in purpose and significance. Non-productive capital is not used directly in the production of any use value and therefore does not transfer its value to manufactured goods. As it wears out it is replaced out of accumulated depreciation allowances.

Productive capital consists of means of labour which participate fully in the process of production but do not become physically part of the goods produced, in contrast to circulating capital or objects of labour (raw materials and other supplies), which become completely part of the goods produced, forming their material content. Productive capital transfers its (money) value to the goods produced gradually, little by little, as it wears out, over the period of its use.

Thus, the value of productive capital consists, as it were, of a part which is in the use form of its value and part which is converted from commodity to money form by being transferred in the process of production to the value of the newly created goods.

Under socialism the process of expanding capital and finding its way of using it contributes to the national wealth and creates a material basis for the growth of public and private consumption.

Between 1920 and 1940 the capital assets of the USSR (including land) rose by 512 per cent, productive capital increasing by 315 per cent and non-productive by 395 per cent. Productive capital investment rose by 11 per cent over the same period.

The composition of the total value of newly created productive capital is determined by the composition of the total value of the investments made in the economy. The composition of the total value of the investments is determined by the composition of the total value of the gross regional product. The composition of the total value of the gross regional product is determined by the composition of the total value of the gross regional product.

The composition of the total value of newly created productive capital is determined by the composition of the total value of the investments made in the economy. The composition of the total value of the investments is determined by the composition of the total value of the gross regional product. The composition of the total value of the gross regional product is determined by the composition of the total value of the gross regional product.

The composition of the total value of newly created productive capital is determined by the composition of the total value of the investments made in the economy. The composition of the total value of the investments is determined by the composition of the total value of the gross regional product. The composition of the total value of the gross regional product is determined by the composition of the total value of the gross regional product.

In the construction industries installations account for a larger share of the total value of productive capital than in the manufacturing industries. For example, in the iron and steel industry, machinery and equipment that account for the largest share of the total value of productive capital, whereas in the food industry it is installations. In plants the structure of capital is determined by the structure of the total value of the gross regional product. The composition of the total value of the gross regional product is determined by the composition of the total value of the gross regional product.

The installation of productive capital in a plant is provided in the plan for a certain period of time. In socialist countries the composition of the total value of the gross regional product is determined by the composition of the total value of the gross regional product. The composition of the total value of the gross regional product is determined by the composition of the total value of the gross regional product.

With the development of the economy, the composition of the total value of the gross regional product is determined by the composition of the total value of the gross regional product. The composition of the total value of the gross regional product is determined by the composition of the total value of the gross regional product.

The composition of the total value of newly created productive capital is determined by the composition of the total value of the investments made in the economy. The composition of the total value of the investments is determined by the composition of the total value of the gross regional product. The composition of the total value of the gross regional product is determined by the composition of the total value of the gross regional product.

co-ordinated with plans for geological survey, construction of new enterprises, and with plans for the supply of equipment, material and labor for the construction of these enterprises.

Investment in the USSR is financed mainly from the accumulation of national income and from depreciation allowances (on the value of existing capital assets).

The outlay on the reproduction of fixed capital, or capital investment, is divided into centralized and decentralized investment.

Centralized capital investment is undertaken out of resources which are the property of the nation as a whole. They are distributed between the different sectors of the economy on a planned basis by the State.

Decentralized capital investment is undertaken out of resources accumulated by state enterprises from various incentive funds, allocations from planned profits and excess profits, etc.

In addition, decentralized capital investment includes investment by co-operatives, public organizations and collective farms from their money income and state loans, and investment by manual, non-manual and collective farm workers on the construction of housing from their own resources and state loans.

In national economic plans centralized capital investment is the more important and determines the development of socialist property.

Capital investment by state and co-operative enterprises and organizations in the USSR economy between 1913 and 1961 amounted to 311 billion roubles, and it has grown steadily in recent years, as can be seen from the following figures:

| <u>Year</u> | <u>Capital investment</u> (millions of roubles) |
|----------------|--|
| 1956 | 19,100 |
| 1957 | 21,600 |
| 1958 | 24,500 |
| 1959 | 27,400 |
| 1960 | 30,400 |
| 1961 | 32,500 |
| 1962 | 35,000 |

The investment plans, being an integral part of over-all economic planning, are directly related to both the quantitative and the qualitative aspects of national economic development. Firstly, investment means that through the construction of industrial enterprises new productive capacity is introduced, for use both during the current (annual) period and on a long-term basis. This new capacity, moreover, is more advanced than the old and is based on modern techniques. This means that the introduction of new capacity is accompanied by technical improvements to fixed capital.

The investment plan also provides for the creation of non-productive capacity - housing and municipal services, schools, hospitals, theatres and clubs - and for the construction of buildings and installations for other public and state purposes.

Secondly, the investment plan determines the distribution of productive forces among the different economic-geographic regions and union republics.

Thirdly, the scale of investment predetermines the rate of expanded reproduction of fixed capital.

In order that the control authorities may ensure that the right use is made of capital resources, the following standards are worked out and approved for the different branches of industry:

a) Standard time-limits for the construction of enterprises, including new integrated plant and individual workshops, buildings and installations:

(1) Standard unit capital costs.

The standard time-limits make it possible to fix dates for the installation of new productive capacity and for the occupation of new housing and buildings to be used for cultural and other such purposes. These standards are also used in drawing up time schedules for capital investment and supplies of materials and machinery and in preparing programmes for the organization and execution of projects.

The unit capital cost is the cost of installing new capital at industrial enterprises per unit of new capacity or extra output.

These standards are designed to eliminate non-productive and superfluous investment expenditure.* The unit capital cost standards are also intended to ensure that new enterprises can be constructed on the basis of the most modern techniques and technology, including automation and mechanization of production, while at the same time the best possible conditions are provided for the workers.

The volume of capital investment provided for in the plan determines (in money terms) the total sum to be spent on the creation of fixed capital, on the basis of its estimated cost, including expenditure to provide the "reserve" necessary for investment projects carried forward into future years.

The estimated cost of investment projects has two basic components, the cost of the actual construction and assembly work and the cost of the equipment and other expenditure, including expenditure on design and prospecting operations. Capital expenditure also includes outlays incurred in the construction of new enterprises for the training of skilled personnel, payment of salaries of the managerial staff of the enterprises under construction and demolition of houses and other buildings, if this is required by the project programme.

The cost of geological survey operations, which, economically speaking, are equivalent to research, is not included in the construction cost of new enterprises except in the case of deep test drilling for oil and gas.

The estimated cost of the total volume of investment for the different republics and all-union departments is determined by the approved plan of the proposed annual volume of work. The estimates are prepared by the design organizations on the basis of the approved project decisions and consolidated standards and rates.

The estimated construction cost of enterprises is expressed in terms of the constant comparable prices prevailing since 1 July 1955. Allowance is made in using these prices for corrections made in subsequent years. Unit volumes and standard rates for construction work and general overhead expenses are correspondingly corrected. Within the total volume of capital investment provided for in the plans limits are set for capital investment and construction and assembly operations in particular branches of industry, namely, ferrous and non-ferrous metallurgy, machine building, chemicals, oil, gas, coal, building materials and others.

This distribution of the total capital investment among the different industries ensures that they will develop at the required relative and absolute rates. Furthermore, for the basic branches the plan deals separately with the most important investment projects, which means fixing specific targets for plant installation, with time-limits for construction work and for the introduction of new productive capital and capacity.

In the preparation of the plan great care is taken over the estimates that determine what proportion of total capital investment is to go on construction and assembly operations in the different branches of industry, since this figure, and the structure of capital investment as a whole, is taken as the starting point in determining what equipment, construction materials and labour are needed in order to carry out the planned volume of construction.

It is very important economically to establish the right ratio in capital investment between the cost of constructing completely new industrial enterprises and the cost of expanding or reconstructing existing enterprises. Experience has shown that through reconstruction it is possible to reduce the time-limits for the introduction of new capacity and to increase the efficiency of capital investment. However, investment in reconstruction has this disadvantage that it offers no possibility of correcting the geographical distribution of industries.

The main targets in such fields as the establishment of new raw material, fuel and power resources, the creation of specialized industries and the integrated development of economic regions and union republics are mostly achieved by means of new construction.

Construction operations include all work on the erection of buildings and installations, beginning with the development and planning of the construction site. Assembly operations include all work on the assembling and installation of equipment, including testing operations. Capital investment in equipment is broken down into investment in equipment which requires assembly (milling machines, machine tools, electric motors, bridge cranes, etc.) and investment in equipment which does not (steam locomotives, diesel shunting locomotives, tractors, automobiles, barges, etc.).

To distinguish the cost of construction and assembly operations from the total volume of capital investment is essential not only in order to determine

and other resources are itemized, registered, itemized in order to prepare the program of construction, registered in material and in contract. When investing in machines, equipment, metal, timber, cement and the other part of investment materials, the planners determine whether supplies of these resources can be available for construction and assembly operations at the planned scale and whether they are available to the construction industry. In the light of this determination they take the final decision concerning the volume of capital investment.

Capital investment is divided, depending on the form of ownership involved, into state, co-operative (including collective farm) and individual investment. State capital investment, which accounts for the greater part, is allocated by national republic and by all-union ministry and department. In allocating capital investment funds limits are set on the sums assigned to the various main branches.

The distribution of capital investment between the different branches is of prime importance for determining their absolute and relative rates of development and their economic-geographical location. The planners prepare indicators of the volume of fixed investment and output for the large economic regions; this helps to bring about not only the correct geographical distribution of industry, but also the most efficient regional organization of the national economy.

A distinction is also made, with regard to capital investment, between projects to be completed during the plan period and projects to be completed later. Such planning makes it possible to anticipate and control the volume of uncompleted construction, to allocate the resources necessary for completion of construction work on projects which it is intended to make operational during the plan year and to prevent any extension of the construction time-limits and any "dissipation" of resources.

Experience has shown that by shortening construction time-limits it is possible to reduce the cost of construction and assembly operations through a reduction in overhead expenses and in the running costs of construction machinery and to cut the amount of uncompleted construction considerably.

Resources are concentrated on projects which are to be made operational during the plan year in accordance with the long-term plans for the introduction of new capacity in the following years. For this purpose the planners determine the capital investment required for the information of the so-called investment "reserve". The optimum relationship between capital investment for the completion of investment projects, on the one hand, and that assigned to the establishment of the investment "reserve", on the other, can be determined from experience and on the basis of economic calculations, which in turn must be based on the productive capacity balances and the essential and feasible construction time-limits for the projects being planned for. This relationship is determined more specifically by the itemized lists of investment projects.

The itemized lists include all investment projects, whether carried over from the previous year or started in the plan period. The task of deciding what new investment projects and projects involving the expansion of existing enterprises are to be included in the itemized lists is undertaken initially by the sovnarkhozy and the basplans of the republics and the matter is then sanctioned by the USSR Gosplan. Only those investment projects for which technical

documentation has been prepared to the extent required by the design organizations are included in the itemized lists.

The technical documentation is prepared by the specialized planning and design institutes for the different branches of industry, which are administratively subordinate to the state committees for the different branches of industry (metallurgy, machine building, chemicals, light industry, food and other branches).

On the larger scale, the planning of general construction work is concentrated in the hands of planning and design institutes subordinate to the USSR State Construction Committee. This procedure opens the way to specialization by planning and design organizations.

Before construction operations begin, a general programme is drawn up for the development of industry and the comprehensive economic development of economic regions and union republics, prospecting and geological exploration operations and the preparation of cost estimates.

At every stage of the preparatory work, and also during the first phase of the planning and design operations the planners work out the technical and economic basis of the proposed construction.

The number of stages in the construction plan depends on the cost of the proposed construction and on the degree of complexity or novelty of the production techniques concerned. In the planning and design of complex enterprises, the technical documentation is usually prepared in three phases: first, the project specification and related cost estimates; second, the technical programme and related general estimate; third, the working drawings which will govern actual construction at the site. In the case of enterprises involving less complicated production techniques, and in particular where standard planning and design solutions are employed, the work is carried out in two phases: the project specifications and working drawings only are drawn up, without a technical programme. The project specification comprises a description of the nature of the future enterprise, the conditions of its construction, the types and range of its industrial output, its capacity, and the conditions governing the supply of raw materials, fuel, electric power, water and transport; it also contains calculations relating to the prime cost and sale of output and to co-operation, decisions on the design of buildings and installations, and the completion dates and sequence of construction operations. The technical programme sets forth in detail the supporting data, calculations and technical decisions quoted in the project specification, and includes corrections and changes adopted upon consideration and approval of the specification.

Depending on the cost of an installation and its importance, the cost estimates are approved by the director of the enterprise himself, the sovnarkhoz and the council of ministers of the union republic concerned; in the case of the very largest construction jobs of national importance, these estimates are approved by the Council of Ministers of the USSR.

Under the regulations now in force, project specifications for the construction of enterprises costing at 50 million roubles or above are approved by the Council of Ministers of the USSR, of enterprises costing at 10 to 50 million

enterprises, the councils of ministers of union republics, and of enterprises valued at 100 million roubles by the suyarakhzy and departments of union republics.

The technical decisions and cost estimates arrived at during the planning and design stage are usually checked by experts, the scientific and technical councils of institutes and by the approving authority. The general economic criterion used to ensure the correct choice of construction projects and technical decisions at the planning and design stage is the effectiveness of capital investment.

In arriving at their capital investment decisions, the planning authorities are guided by the long-term plans and the main economic goals of the plan period for the development of individual branches of industry and of the economy in the various union republics and economic regions.

The planning and design organizations draw up not only the specifications for future enterprises but also plans for the organization of construction, which comprise the following:

- (a) Summary construction time-tables (schedules), with each construction complex and main industrial construction project taken separately;
- (b) The extent of basic and preparatory construction and installation work and special operations (including the installation of engineering equipment and structures);
- (c) The quantities of components, parts and materials required;
- (d) The number of skilled workers required during the construction period;
- (e) The quantities of water, electric power, steam, gas, compressed air and oxygen required, and ways of supplying them;
- (f) The number of temporary buildings and installations required;
- (g) The estimated length of the construction period, the degree of mechanization and prefabrication, the labour-intensiveness of construction.

Construction organization plans are geared to the planning of capital investments, the supply of materials and machinery and the preparation of the material basis of construction.

Capital investment earmarked for the development of industry is allocated by branches and union republics and a plan is drawn up for the introduction of fixed assets and productive capacities. To ensure the more economic utilization of capital investment, a decision is taken as to where the construction of new industrial enterprises is expedient and where the reconstruction and expansion of enterprises already in operation. This decision is also based on a comparison of the effectiveness of the capital investments involved.

Capital investment is financed out of the accumulated part of national income which society devotes to the expanded reproduction of fixed assets with a view

increasing material production in the period ahead and step by step increasing its output in order to satisfy more fully the needs of society.

In the USSR, accumulation absorbs quite a large fraction of total national income, estimated at from 25 to 29 per cent of the national income total, and ensures high rates of economic growth.

The choice of the most economical ways of solving economic problems is made with a view to the most effective utilization of the funds allocated for fixed investment.

The utilization of capital investment may be considered effective only when, given relatively lower inputs, it results in the growth of productive capacity and the most rapid possible increase in industrial production, accompanied by a sharp rise in labour productivity and a decline in production costs.

The economic effectiveness of capital investment is calculated when it is necessary:

(a) to direct investment into industries producing substitutable goods (for instance, the various branches - coal, oil or gas - of the fuel industry);

(b) to decide on the advisability of constructing new enterprises or expanding, reconstructing and refitting enterprises already in operation;

(c) to establish the optimum time-limits for the construction and acceptance of new capacity;

(d) to determine the economic advisability of integrated development of natural resources in particular economic regions (minerals, petroleum, gas, coal, timber and other resources), using wastes and by-products;

(e) to determine the economic advisability of specializing or combining certain industries (or individual regions) and their rational disposition;

(f) to determine the cost of developing alternative versions of new techniques.

In a socialist economy, one of the main goals in the development of any production sector is the growth of social labour productivity. By eliminating unemployment, crises and the under-utilization of productive capacity, socialist society opens the way to a maximum increase in the productivity of social labour.

The rise in social labour productivity and the increase in the national income represent an important general yardstick with which to measure the economic effectiveness of capital investment in the construction of new enterprises and the reconstruction or expansion of existing ones.

But the economic effect of capital investment in any particular instance cannot be determined by a single general economic criterion, since it depends on many factors. These factors are considered to be the following:

1. Production costs, or total expenditure on the production of outputs;

3. Unit capital investment, or investment per unit capacity or output in physical terms (alliance being made for expenditure on the organization of supplementary plants);

3. Productivity of labour, or output per unit of working time;

4. Dates for the introduction of new fixed assets (length of construction period);

5. Recoupment periods of capital investment.

The factors determining the effectiveness of capital investment may be expressed in both physical and value (money) terms.

Although no one of the factors which determine the effectiveness of capital investment is altogether satisfactory, taken together or as a group they make it possible to evaluate the productive effect of enterprises under construction and provide a basis for a reasoned decision to proceed in accordance with one or other of the construction variants being compared.

The effectiveness of capital investment in a particular branch or project is determined by comparing the various alternative plans in terms of the recoupment period or of its reciprocal, the coefficient of efficiency of investment.

The recoupment indicator makes it possible to determine over what period of capital investment will pay for itself out of savings in operating costs, i.e., savings in production costs.

Comparison of the calculated coefficients of efficiency with the standard coefficients (established for each branch of industry) shows which construction variant is the most economical.

Recoupment periods and coefficients of efficiency are calculated in accordance with the formulas:

$$(1) \quad \frac{I_1 - I_2}{C_2 - C_1} = T$$

$$(2) \quad \frac{C_2 - C_1}{I_1 - I_2} = E,$$

where I_1, I_2 = capital invested under the variants being compared;

C_1, C_2 = cost of annual production under the respective variants;

T = recoupment period for new capital invested;

E = coefficient of efficiency.

The optimum recoupment periods and coefficients of efficiency for various branches of Soviet industry are considered to be the following:

| <u>Industry</u> | <u>Recoupment period (years)</u> | <u>Coefficient of efficiency</u> |
|---|--|--------------------------------------|
| Metallurgy (ferrous and non-ferrous) | 7 | 0.1 |
| Electric power | 7 - 10 | 0.15 - 0.2 |
| Coal | 5 | 0.2 |
| Petroleum and gas | 5 | 0.2 |
| Timber and wood-working | 5 | 0.2 |
| Chemical | 3 - 5 | 0.35 - 0.2 |
| Machine building | 3 - 5 | 0.35 - 0.2 |
| Light | 3 - 5 | 0.35 - 0.2 |
| Construction and construction materials | 6 | 0.17 |
| Transport | 10 | 0.1 |

In comparing alternatives giving different outputs, the investment required and the annual production cost under the variant giving the smaller output are corrected to a figure corresponding to the larger output.

When there are several alternative plans for the construction of an enterprise, the best is selected by comparing the calculations and determining which variant is the most economical.

By establishing standard recoupment periods and coefficients of efficiency of investment, it is possible when comparing a large number of variants to use the following formulas:

$$I + TC = \min., \text{ or } C + \frac{1}{T}I = \min.,$$

where I = capital investment under each variant considered;

C = total annual cost of production;

T = the standard recoupment period for the industry in question;

$\frac{1}{T}$ = the standard coefficient of efficiency of the industry in question.

The comparison of investment variants in terms of their recoupment periods or coefficients of efficiency does not, of course, exhaust all the factors determining which variant is preferable.

It must be borne in mind that production cost is a synthetic economic indicator reflecting expenditure on raw materials and other supplies, fuel, electric power and wages, and on the administration and plant costs of workshops and factories.

However, to determine the effectiveness of capital investment it is important to estimate not only the end production costs but also the qualitative aspect of the physical inputs per unit of output - unit expenditure on raw material, fuel and electric power, the coefficients of use of productive capacity of equipment and of production areas, etc. Other factors taken into account are the various ways of organizing production (co-operative organization, specialization, combination) and product quality.

... the effectiveness of capital investment is indicated by the growth of net output, calculated in terms of output per worker, since the mere growth of a gross net output does not reveal its qualitative aspect. In addition, it is also important to determine indicators for the increase in the return on capital, or the growth of net output per unit cost of fixed assets. Here allowance is made for the depreciation of all fixed assets, particularly equipment, which becomes obsolete more rapidly than buildings, installations and other types of fixed assets.

Its obsolescence factors are determined by standard rates of depreciation, which are geared to the general state tasks of renewing fixed assets and replacing outdated machinery which is physically still usable with new machinery in order to ensure the growth of social labour productivity. In a socialist economy there are no objective limitations on the scale of such renewal, but in planning practice it is coordinated with the balances of manpower and material resources, which are used to determine the optimum level for the expanded reproduction of fixed assets.

The absolute and relative rates of production specified for individual industries in the national economic plan are directly dependent on the rates of increase and the structure of fixed capital, and hence on the volume of capital investment directed into the development of these industries. The volume of investment in turn depends on the size of the national income and the share of accumulation earmarked for fixed investment.

This interdependence of production and fixed investment is reflected in the plan indicators determining the size of the social product (national income) and its distribution. It is also reflected in the physical indicators of production which govern the supply of the requisite equipment, components, parts, materials, etc., for the projected construction programme.

But since the highest criterion of the effectiveness of capital investment is social labour productivity, it is the quality of the equipment, components, parts and materials used in construction that governs technical progress in both production and construction, a fact which is reflected in the quality indicators of the production plan. Thus, the production plan and the fixed investment plan are both qualitatively and quantitatively interdependent. This means that the national economic plans predetermine not only the quantitative rise in the initial production level but also qualitative or structural changes. And the effectiveness of qualitative or structural changes brought about in industry as a result of capital investment is determined by the extent to which they are influential in raising social labour productivity.

We have already referred to the fact that the major economic problems consist in the geographical disposition of productive forces and the comprehensive development of the various peripheral and economically-geographical regions, and also

economic problems connected with the development of countries, find their solution for the most part in the development of a planned geographical siting of industrial production and the development of research and planning and design operations.

Planning authorities and scientific research and planning institutions work out and systematically refine more and more long-term plans and draw up schemes for the siting of the main enterprises of the economy and the comprehensive development of economic regions and the specialization and co-operative organization of production. In the construction of long-term plans great importance is attached to schemes for the specialization and co-operative organization of enterprises and the integrated siting of groups of enterprises in different industries, schemes for the utilization of geographical and natural resources, the comprehensive development of regions and the construction of special-purpose or large-scale enterprises of national economic importance.

An example illustrating the magnitude of long-term capital works projected on the basis of comprehensive scientific investigation and research is provided by the general long-term plan for the development of the Soviet economy between 1961 and 1980. The plan provides, inter alia, for improving the siting of productive forces by:

- creating large fuel and electric power bases in Siberia, using deposits of cheap opencast coals and the vast hydroelectric resources of the Angara and Enisei Rivers;
- transforming Central Asia into a major centre of electric power production by harnessing its enormous gas and hydroelectric resources;
- creating great new metallurgical bases, with a target of five all-union bases by 1980 - in the Urals, the Ukraine, Siberia and the Far East, Kazakhstan and the central regions of the European part of the USSR;
- organizing large-scale chemical complexes in areas where there are concentrations of cheap natural and petroleum gas, and petrochemical complexes, primarily in the Urals, the Volga basin, the Ukraine, the Northern Caucasus and Central Asia;
- creating powerful machine building bases in areas east of the Urals sufficient to meet the bulk of the machinery and equipment needs of these areas;
- carrying out large-scale hydraulic works to divert great quantities of water from the northern areas of the European part of the USSR to the Volga basin; providing water for central Kazakhstan, the Virgin Lands, the Far East and the Urals; constructing regulating reservoirs in Central Asia, on the Volga, Dnieper, Bug and Inyester Rivers, and developing irrigational and all-union agriculture on a large scale.

The completion of the Greater Volga and the Greater Dnieper rivers will make it possible to change the geography of freight movement. The main part of freight from the Baltic will then be able to pass through the waterway system by-passing Gibraltar and the Mediterranean, while freight from the Far East will go along the Inyester through the Pripyet and Dnipro rivers to the Baltic. In addition to the Bratsk and Kraskyarsky hydroelectric stations, it is proposed to build several more such stations, which will, in addition to the

Major Rivers: the Sayansk, Ust-Ilimsk, Bruchansk, Eniseisk, Osinovsk and Nizhne-Tungussk stations - each with a capacity of over 4 million kilowatts. Two additional power stations, each with a capacity of over 3 million kilowatts, are to be built in the same region, based on the coalfields of the Kansk-Achinsk basin. Large hydroelectric stations are also to be built in Central Asia.

In Kazakhstan, in the Lower Volga region and in the European part of the USSR - the Ukraine, Latvia, Byelorussia, the Caucasus and other areas - it is intended to build large thermal power stations.

This tremendous expansion of power station construction provided for under the long-range plan will raise electric power output to a level nine or ten times as high as the level of actual output in 1960; which means that in 1970 the Soviet output of electric power will be 50 per cent greater than the total present output of all other countries of the world.

Planning for the various economic-geographic regions and union republics is aimed at the more efficient distribution of industry, the integrated development of the regions concerned, specialization of their economies and the achievement of more nearly uniform levels of economic development in the various regions of the USSR. The rational geographical distribution of industrial production, the planned utilization of natural resources, improved interregional division of labour and the proper harmonization of the interests of the USSR as a whole with those of each republic are in fact the main considerations kept in view in deciding the complex issues of specialization and integrated development in the various economic regions or union republics:

State policy with regard to the geographical distribution of productive resources is of great political as well as economic importance. The problem of providing employment for the potentially active population of regions whose industries are still insufficiently developed is dealt with by planning the construction of enterprises in those regions. In the process, consideration is of course given to the question whether favourable natural conditions exist in the region concerned (i.e., whether it offers the cheapest possible sources of raw materials, fuel and power) and whether there is a market for the planned output.

At the same time, the plans provide for limiting new industrial construction in cities with a high concentration of industry. In the western areas of the Soviet Union, where a high level of industrial development has been achieved, the main objective is considered to be technological improvement and specialization in existing enterprises and the creation of more efficient economic links, while in the eastern areas an additional objective aimed at is to draw substantial hitherto unutilized natural resources into the economic process.

In dealing with the problems relating to the distribution of productive resources among the various union republics and economic-geographic regions, the following factors are taken into account:

(a) The need for even distribution of productive resources, given the country's unitary policy, which calls for raising and equalizing the level of economic development of the national republics.

(b) The need to locate enterprises closer to their raw materials, fuel, power sources and to consumers.

(c) The need for the specialization and integrated development of the economies of the various republics and economic co-operation between the latter for an efficient division of labour.

The outline schemes for the development of the various branches of industry and the siting of individual enterprises are drafted with a view to ensuring the efficient utilization of capital investment. The purpose of rational regional and republican planning is to ensure optimum relative rates of development of interdependent economic sectors (e.g., between extractive and manufacturing industry, industry and agriculture, industry and fuel and power production, construction and building materials production, light industry and food industry and the production of agricultural raw materials), and also to ensure the development of transport, housing construction and trade and the establishment of food depots and cultural and public health institutions in line with the planned increase in population.

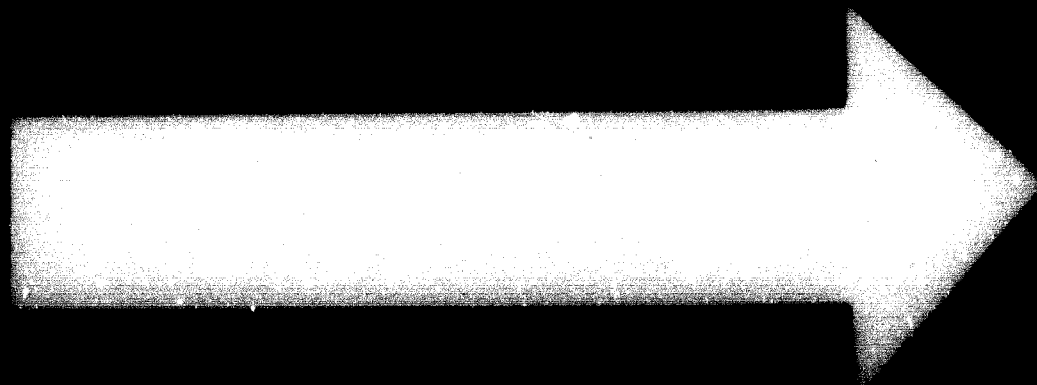
In siting enterprises of national importance (e.g., large metallurgical, oil refining, chemical and cement enterprises), the USSR Gosplan determines - on the basis of a special set of rules governing the ways and means of deciding questions relating to the planning and construction of such enterprises - whether the regions proposed for the projected construction represent a sound choice.

These rules are essentially the following.

The selection of a region and locality for the construction of new industrial enterprises must be based on the interests of the USSR as a whole, with a view to creating the best possible working and living conditions for the people. The following objectives are sought in this connexion:

- to give primary emphasis to absorbing into production the economically most advantageous types of natural resources;
- to ensure the efficient utilization of manpower resources;
- to ensure the specialization and integrated development of the economies of the economic regions;
- to develop the most efficient production links between economic regions and enterprises;
- to avoid any excessive concentration of industry in the large cities.

The most regional site for the construction of an industrial enterprise is normally considered to be that which ensures the minimum aggregate expenditure of social labour on production and transport and the speediest possible organization of production.



17.7.74

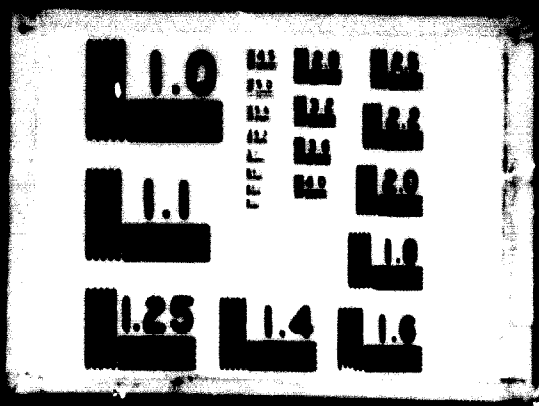
3

OF

3

DO

3784



The main economic indicators applied in dealing with the problem of the geographical siting of enterprises are:

- production costs, including costs of delivery to the consumer;
- Capital investment per unit of capacity of the projected enterprise, allowing for expenditure required for the development of complementary (linked) economic sectors (electric power, water supply, roads and transport, housing construction and, in the case of manufacturing enterprises, fuel and raw materials supplies);
- the efficiency coefficient or recoument period of capital investment.

The selection of regions for the construction of industrial enterprises is made in the outline schemes and technical and economic reports on the development and distribution of industries and in the schemes for the development and distribution of the productive resources of the major economic regions.

In long-range planning for five- to seven-year periods, the region in which an enterprise is to be constructed is selected on the basis of the existing regional planning schemes. In the case of major heavy industrial enterprises which are to be sited in the immediate vicinity of adequately explored mineral deposits, at sites offering the sole local possibility for dam construction, etc., the actual locality is indicated. In cases where there is difficulty in selecting a region for the construction of an industrial enterprise pending more detailed local studies, a decision is made only on the major economic region in which the enterprise is to be constructed.

The selection of a locality (e.g., city, workers' settlement or village) for the construction of an industrial enterprise is made on the basis of technical and economic data assembled prior to the preparation of the design specifications, together with the scheme for the development and distribution of the productive resources of the economic region in question and regional planning data. The technical and economic data are prepared by project and design organizations or scientific research organizations; where necessary, they present various alternative construction localities so that the variants (including a variant providing for the reconversion of a similar type of enterprise), with the indicators of their economic efficiency and desirability, can be compared.

The following factors are taken into account in making the selection:

- the general desirability of siting enterprises in such a way that they form production complexes having a single electric power and construction base and common communications;
- the need to ensure production specialization by the enterprises concerned;
- the conditions for the development and planning of the inhabited areas in which the enterprises are to be constructed;
- the need to satisfy established sanitary, hygienic and civil defence requirements.

With a view to the solution of the problems relating to the siting of industrial enterprises, the following calculations and data are prepared in outline schemes and technical and economic reports:

- (a) Balances of past and long-term future production and consumption (broken down by major economic regions and republics, territories or regions) and the types of articles to be produced by the planned enterprises, together with estimates of the utilization of productive capacity by existing and planned enterprises;
- (b) The sales areas for the output of the planned enterprises;
- (c) Available mineral and raw material reserves, the geological conditions relevant to their extraction, and their quality (broken down by branches of extractive industry);
- (d) Available hydroelectric power resources and their quality (data on possible dam sites (for the construction of hydroelectric stations));
- (e) The designed capacity and specialization of the enterprises concerned and the output of their main types of products;
- (f) The possibilities for integration and for co-operative production arrangements with other industrial enterprises both within and outside the economic administration area concerned;
- (g) Requirements and expenditure of raw materials, electric power, fuel and water and the sources of supply;
- (h) Manpower requirements and the available means of satisfying them;
- (i) The approximate freight turnover and the development of various types of transport in connexion with the construction of the enterprises;
- (j) The approximate cost of construction, allowing for capital investment in complementary and servicing sectors of the economy and in regional engineering works and the construction of housing and community and personal facilities; the construction time-table and the annual distribution of capital investment, unit capital investment and other indicators of the economic efficiency of investment;
- (k) Estimates of output cost at the point of production and in the consumer areas.

In the technical and economic data prepared with a view to the selection of a construction locality, these indicators are defined in more specific terms. This applies especially to those which were presented in tentative form at the preceding stage of planning, i.e., the indicator for production rate and co-operation, with a listing of the co-operating factories; the indicator for the organization of hydroelectric and thermal electric power supply; the indicator for the type of transport selected, with indicators of possible alternatives for comparison, and indicators for the cost, time-table and conditions of construction and the cost of output.

In addition, information is given on industrial sites available for the planned enterprise.

When necessary, the outline schemes, technical and economic reports and technical and economic data also deal with specific problems relating to the given industry or enterprise (e.g., the prevention of air pollution in the area of the enterprise, the purification and disposal of sewage and the protection of natural resources) or region (e.g., problems affecting regions of high seismic activity or remnant regions). In some cases, they deal with problems relating to the development of construction supplies and indicate sources for building materials supplies.

In special cases, the problem of siting enterprises is given preliminary study by government experts. The selection of localities for the construction of industrial enterprises is the responsibility of the republican Gosplans, while the project and design organizations and sovnarkhozy select the construction sites at the localities decided on and prepare relevant technical and economic data in the light of the special characteristics of the industry in question.

In siting extractive enterprises, a rational order of priority for the utilization of proved mineral deposits is determined on the basis of comparative study of the quality and quantity of available natural resources, the economic efficiency of extraction and the possible siting of consumers.

Industrial enterprises whose primary requirement is conveniently situated raw material sources (e.g., metallurgical, chemical and ore dressing plants, cement and cellulose and paper enterprises) are sited with a view to the integrated utilization of raw materials, including the use of industrial waste materials and the creation of industrial combines.

A factor considered in connexion with chemical enterprises is the comparative economic efficiency of obtaining the same product (e.g., ammonia or ethyl alcohol) from various types of raw materials and of obtaining various types of products from the same raw material (e.g., petroleum gases). Due account is also taken of the electric power, steam and water requirements of such enterprises.

Thermal power stations are built mainly in areas offering sources of fuel (coal, fuel oil and gas), the transmission of power to consumers being cheaper than the transport of fuel and power producing plant to the consumer areas.

Power-intensive enterprises (e.g., aluminium, magnesium and electro-chemical enterprises) are usually sited near sources of cheap electric power.

Heavy machine building enterprises producing metallurgical and transport equipment are generally sited near metallurgical centres.

Lathe-building, tool making, agricultural machine building and shipbuilding enterprises are sited in or near consumer areas.

Machine building enterprises which consume relatively little metal and are highly labour intensive are sited in areas where manpower is available.

Dil refineries and enterprises producing all non-perishable goods, such as tyres, industrial rubber products, plastic and other products are sited in the areas of greatest consumption.

Factories producing cotton, linen, wool, silk, knitted and other types of fabric are generally sited in consumer areas and with a view to the availability of cheap thermal electric power.

Many types of food enterprises (e.g., butter and cheese making, fruit and vegetable, sugar, vegetable canning and alcohol enterprises) are sited in the raw materials producing areas.

Siting in consumer areas is regarded as economically most rational in the case of tobacco and perfumery enterprises and other types of food enterprises producing various types of non-perishable goods in which transport expenditure is small in relation to the total cost of production.

In heavy investment areas, provision is made for the establishment of supporting industries which can supply construction projects with building components, products and materials.

Long-range planning for the development of such supporting industries is based on the need for the widest possible use of industrial methods and constant technological progress in construction and for the utilization of the most efficient building components, products and materials.

These components, products and materials include prefabricated, prestressed, reinforced-concrete, thin-walled and large-sized components, wall and floor panels, large wall blocks, partition panels, efficient thermo-insulation materials, autoclave silicate materials and articles, asbestos-cement components, floor and door slabs, factory-produced bathroom and w.c. units, and plastic products.

The demand for building components, products and materials is determined on the basis of the volume of planned construction and of the consolidated norms for consumption of materials per unit of work.

Depending on the pattern of various types of construction, appropriate technical and economic indicators are employed for the consumption of materials on the main structural elements of residential buildings.

In cases where it is difficult to determine the quantities of components, products and materials required for the basic structural elements, consolidated norms or standard rates of consumption are established for these types of materials and products, expressed in terms of the quantity consumed per million roubles' worth of construction and assembly work, per thousand square metres of floor space in housing of each different type, per cubic metre of industrial space, and so on.

As a rule, the plans for supplies of materials for general construction purposes provide for the erection of permanent industrial enterprises for the production of building materials and products, fitted out with modern processing equipment and using local raw materials (sand, clay, limestone, etc.).

enterprises may be set up on an interregional, regional or project basis, depending on the volume of construction and the quantity of building materials and products needed.

Where necessary, mobile (prefabricated, dismantlable) or temporary plants for the production of building materials are set up (for the manufacture of concrete and mortar, wall blocks, etc.).

In addition to erecting specialized enterprises, it is considered advisable to set up building materials combines. It is then possible to reduce the unit capital outlay by comparison with that for the construction of specialized plants by setting up a single heating and power system and common communications and approach roads.

In the case of areas of high housing construction density it is considered advisable to set up house building combines to manufacture large structural elements and assemble them at construction sites.

The arrangements for the supply of materials and machinery for construction purposes must take into account the possibility of using not only local resources of raw materials (stone, limestone, sand, clay, etc.) but also industrial waste products (slag and cinders from power stations, waste from sawmills and wood processing plants, etc.).

In order to achieve the greatest possible economy in construction standardized components and parts are used in the smallest possible range of sizes, which permits maximum specialization by enterprises in the construction materials industry.

In deciding where building materials enterprises are to be erected the planners consider the need to spend as little as possible on the production of these materials and on their transportation from the producing enterprises to the building projects at which they are consumed.

The long-term plans for the supply of materials and machinery for construction purposes are based on technical-economic calculations, which in turn are founded on:

- (a) The volume of capital investment in the various branches and economic regions, together with the approximate pattern of construction and time-limits for the completion of construction and assembly work;
- (b) The balanced demand for components, products and materials (related to the different regions and construction time-limits);
- (c) The existing situation with regard to the supply of materials and machinery for construction purposes and the possibility of increasing the capacity of existing enterprises producing components, products and materials;
- (d) The technical-economic basis and efficiency of planned projects for the construction of enterprises producing components, products and materials.

Chapter 4

THE PLANNING OF LABOUR, MANPOWER AND WAGES

As a source of material wealth, labour is the most important factor in social production. In socialist society labour, freed from exploitation, becomes labour for self and society, and bears a directly social character. Society gives every human being not only the right to work but also the actual opportunity to work and to develop his creative capacities unhindered. The elimination of exploitation and appropriation of labour resulting from the abolition of private ownership of the means of production has cleared the way, in socialist society, for increasing the productivity of social labour in every sphere. Planning the division of labour among the various sectors of the economy makes possible the full utilization of all labour resources in the interests of, and in conformity with, the needs of society. To ensure the attainment of output targets, the plan makes provision for the supply of labour to all sectors of the economy, specifies the numbers of factory and office workers, and the level of wages for the planned volume of production, and sets targets for the growth of labour productivity.

The object of labour planning is to set rationally grounded targets for the growth of labour productivity and ensure correct distribution of manpower and wages among the various branches of social production and economic regions of the country.

While subordinating the growth of labour productivity to the fundamental task of satisfying the material and spiritual needs of the individual and of society as a whole, the socialist state opens up unlimited possibilities for technical progress and on that basis for raising the productivity of social labour.

The rates of growth in the productivity of social labour in the USSR are the highest in the world, while labour productivity in Soviet industry is higher than in United Kingdom or French industry. It should be noted in this connexion that the gap in labour productivity between the Soviet Union and the United States is narrowing every year.

According to figures compiled by the USSR Central Statistical Board, the average annual rate of increase of labour productivity in the USSR between 1913 and 1960 was 5.3 per cent, while in the United States it was 2.3 per cent, i.e., labour productivity grew 2.3 times faster in the USSR than in the United States. However, the level of labour productivity in Soviet industry in 1961 was some 55-60 per cent below the United States level. Soviet economists have calculated that by the end of the seven-year period, i.e., 1965, labour productivity in Soviet industry will be about three-quarters of the present United States figure, or approximately three-fifths of the anticipated United States figure for 1965, allowing for the possible growth of labour productivity in the United States.

Social ownership of the means of production makes it possible not only to determine labour requirements, but also to ensure the employment of the entire potentially active population and the rational distribution and efficient use of labour.

utilization of manpower resources in the USSR as a whole. These most important conditions are fulfilled by drawing up plan and performance balances of manpower resources. For these balances of the country's manpower resources are prepared by the USSR Central Statistical Board twice a year (as at 1 January and 1 July). The consolidated plan balance contains data indicating urban and rural manpower resources during the past year and during the current and plan periods, allowing for changes in the size of the potentially active population resulting from population growth and migration.

Manpower resources are considered to comprise the population of working age - men between the ages of sixteen and fifty-nine and women between sixteen and fifty-four - less inactive or disabled persons and pensioners of working age. They also include persons in the older age groups who were in actual fact employed in the economy during the past year.

The high rates of economic growth maintained in the socialist countries call for an increase not only in the productivity of social labour but also in the number of workers employed in the sphere of material production and services. Thus, the general long-term plan for 1960-1980 provides for an increase of a little over 30 per cent in the Soviet manpower resources while the total number of persons employed in the economy is to rise by approximately 40 per cent - which shows that labour requirements are growing faster than the potentially active population. It must also be borne in mind that the plans provide for a further gradual reduction in the length of the working day. To carry out the plan, therefore, it will be necessary not only to draw additional manpower into the economy but also, and above all, to ensure its rational and efficient utilization.

The successful solution of this problem is a matter of great complexity, and calls for a whole series of measures, e.g.: correct and rational distribution of manpower resources among the various sectors and spheres of activity and maximum utilization of the potentially active population in socially useful labour; ensuring all necessary conditions for the maximization of social labour productivity through the technical improvement of production methods and the more efficient organization of production and labour; raising the general cultural level and technical qualifications of workers in all spheres of social production, etc.

The structural and qualitative changes in industrial and agricultural production techniques contemplated in the USSR's general long-term plan are intended to pave the way to a substantial rise in the productivity of social labour and to bring about a redistribution of workers among the various sectors of the economy. In 1960, for example, for every 100 workers employed in agriculture there were 150 employed in other sectors, whereas by 1980 there will be about 570 persons employed in other sectors to every 100 employed in agriculture or 280 per cent more than at present, while at the same time per capita agricultural output is expected to increase by 170 per cent.

The long-term plan also provides for transferring some workers now employed in administration to the sphere of material production, and for changing the pattern of employment within industry as a whole by reducing the number of workers

in some extractive industries while increasing employment in the chemical, metallurgical and machine building industries.

The average annual rate of growth of labour productivity over the long term has been set at 7-8 per cent, with a rate of growth of the national income of 8.4 per cent. The growth of labour productivity will account for up to 50 per cent of the total increase in national income, which will enable the number of workers employed in the non-productive sphere (education, culture, health services, etc.) to be almost trebled. The rational redistribution of labour also presupposes redistributing workers among the geographical regions of the country in line with changes in the location of industry.

In the current seven-year period (1959-1965), labour productivity is to rise by 45-50 per cent in industry and by 65 per cent in construction. Moreover, 1960 saw the completion of the change-over to a seven-hour working day and a six-day working week for factory and office workers, and to a six-hour working day for workers in key occupations employed underground. The general long-term plan provides for further reduction of the working day and a gradual change-over to a 30-35 hour week for factory and office workers. Reduction of the working day carried no reduction in wages; on the contrary, the wages of lower-paid groups of factory and office workers are being increased.

Labour planning is reflected in every part of the national economic plan, since economy in the use of social labour is a criterion of the economic efficiency of social production. The planned organization of labour makes it possible to determine manpower requirements in every sector of the economy and to provide accordingly for the rational distribution and effective utilization of manpower resources.

With this end in view, the national economic plan includes indicators setting plan targets for the growth of labour productivity, numbers of workers (by categories) and wage levels in the various sectors and spheres of social production.

Of key importance in the labour plan is the indicator of labour productivity growth. The planned growth of labour productivity predetermines both the labour force and the level of wages.

Labour productivity, as provided in the general long-term plan, is the main source for the increase in the whole social product and, consequently, in the accumulated and consumed parts of the national income.

The problem of ensuring economy in the use of social labour, a key economic objective, is dealt with in the national economic plan largely by ensuring uninterrupted progress in industrial technology, which has become possible as a result of the priority placed on developing production of the means of production, including machines and other equipment.

The productivity of labour is determined by the results of the use of living labour and by the output per worker per unit of time. Labour productivity in industry is defined as the possible gross output (constant prices) per unit of

worker, while the labour productivity growth is defined as the percentage arrived at by dividing labour productivity in the plan period by labour productivity in the base period.

In construction work, labour productivity is defined as the volume of construction and installation work performed (at estimated costs) per worker employed in such work, while the growth of labour productivity is calculated in the same way as for industry. In addition, in planning industrial development (by union republics and sovnarkhozy) use is made of an indicator estimate of labour productivity per worker directly engaged in production, this being necessary for determining the labour force and the relationship between the growth of labour productivity and of wages, and for the calculation of labour balances.

In a number of industries (coal, cement, etc.) use is made of indicator estimates of labour productivity specifying physical output per worker.

A further factor taken into account is the hourly productivity of labour - output per man-hour worked. This indicator is a necessary one during the transition to a shorter working day.

In planning the labour force in various industries (machine building, etc.) use is made of indicators of the labour-intensiveness of output - the standard expenditure of time per unit of output and the standard expenditure of time for aggregate output.

In calculating the plan indicator for labour productivity, due allowance is made for qualitative and structural changes to be made in industry during the plan period as compared with the base period, so as to ensure that the plan estimates are fully comparable.

In planning the growth of labour productivity in industry, the following main factors are taken into account:

- the introduction of advanced equipment and technology, automation, mechanization, the intensification of productive processes, the use of new, more productive equipment, new workshops and enterprises;
- the development of specialization and the co-operative linking and combination of enterprises; improvements in the organization of production and labour;
- reduction of the labour-output ratio of manufactured articles by improving designs and introducing economical and advanced types of materials;
- elimination of losses of working time; rational organization of labour in auxiliary work;
- dissemination and introduction of rational and progressive advanced methods of labour and production; improvements in the rate fixing and wages system;
- Improvements in the methods and organization of production management.

In setting targets for the growth of labour productivity in the various industries attention is given to the most important factors in each case, such as the utilization of the most favourable natural conditions, the siting of enterprises close to sources of raw materials and consumer areas, changes in the technical conditions of production, the range of output produced and other factors.

The growth of labour productivity is determined first for each industry, and then for the industry as a whole of each region and republic and of the USSR.

The growth of labour productivity is determined on the basis of the appropriate factors and calculated in percentage terms in accordance with the following formula:

$$\frac{a \cdot 100}{A}$$

where a = relative reduction of the labour force, and

A = labour force in the plan period.

In planning the growth of labour productivity in construction, the point of departure is the volume of construction and installation work, the main sources of such growth being the following:

- greater use of prefabrication methods in building and installation work, use of new, more efficient construction materials, components or units (use of large ferro-concrete components);
- greater mechanization of labour-intensive operations; improved organization of construction operations and labour.

Other factors taken into account are the improvement of workers' skills, the use of advanced construction methods, etc.

The total labour force is determined on the basis of the planned volume of production and labour productivity, or as the ratio of the value of gross output (at constant prices) to the planned output per worker (at the same constant prices).

The plan calculations include estimates of the proportion of factory workers to the total labour force and the relative proportions of factory workers, engineering and technical staff and office personnel in the light of additional needs for engineering and technical staff and office personnel located by the introduction of new industrial enterprises and changes in the structure of production.

Plan estimates of labour productivity are made for each branch of industry, which makes it possible to determine the relative influence of each branch on the trend of labour productivity in industry as a whole. The labour productivity growth plan is initially drawn up by enterprises, sovnarkhozy, union republics and state ministries and departments for each individual industry, and it is then drafted at the USSR level by the USSR Gosplan. In the national economic plan the labour force of factory and office workers is also determined for each of the union republics and USSR ministries and departments.

In determining the plan targets for labour in the national economy, the balance method is used. The balance of manpower and skilled workers breaks down, broadly, into the following elements: a consolidated balance of manpower resources; a balance and plan for the supply of manpower to the economy, and a balance of skilled workers and specialists with higher and secondary qualifications. Balances are compiled both by economic sectors and by geographical areas. The plan labour balances help to reveal any need for additional manpower and qualified specialists which may arise and to identify the sources from which it may be met.

Additional requirements for manpower and qualified specialists are calculated on the basis of the planned volume of production and construction, allowance being made for the proposed increase in labour productivity. Labour requirements are established for the period of maximum seasonal activity in industry and construction. Additional labour requirements are defined as the difference between planned requirements and the actual labour force at the beginning of the plan period, allowance being made for replacement of losses during the plan period (superannuation, training courses, army service, etc.).

The system of balance is also used in determining the distribution of manpower and specialists among the various economic sectors and republics in accordance with the national economic development plan and the relative numbers of workers engaged in material production and in services and administration. Additional requirements for manpower and specialists are met mainly by the recruitment of young people trained in vocational-technical schools, inactive members of the urban population and workers released from agriculture (organized recruitment).

Vocational-technical training in the USSR is carried on in factory and works apprenticeship schools, industrial, railway engineering, mining and construction schools, and agricultural mechanization institutes. In the past few years, an average of 650,000 qualified industrial, construction, transport and agricultural workers have graduated annually from vocational and technical training institutes and schools; the figure for 1961 was 739,000.

In addition to indicators of labour productivity and the labour force, the national economic plan includes indicators for the average wages of factory and office workers. These indicators are determined on the basis of average wages and the number of factory and office workers, and are laid down for the economy as a whole and by economic sectors, union republics and USSR ministries and departments. The annual wage fund is broken down by quarters. The union republics, in their turn, include in their plans indicators for average wages and the wage fund of factory and office workers, broken down by sovnarkhozy, local soviets and republican ministries and departments.

The wage fund represents that part of the country's national income which is distributed in monetary form among the workers of all sectors of the economy in accordance with the quality and quantity of the labour expended by each of them in social production.

The growth of average wages and hence of the wage fund is determined on the basis of the rise in labour productivity.

Wages are the concrete manifestations of the economic law of socialism - the distribution of material goods in accordance with the quality and quantity of labour (in the state sector).

The distribution of material goods in accordance with labour is an incentive to higher labour productivity. It takes place in accordance with the differences between skilled and unskilled, intellectual and physical, industrial and agricultural labour.

Wages represent consumption as a function of work performed. The wage system is therefore so organized as to offer workers the maximum incentive to increase labour productivity and to raise the quantity and quality of social production per unit time to the highest possible level.

It must also be borne in mind that under socialism the distribution of the necessary and the surplus social product is not based on antagonistic contradictions but is effected in the personal and social interests of the producers themselves, a process in which wages simply constitute that part of material wealth which is used only in the form of individual consumption.

The material level of living or real income of the workers is not determined by the amount of their cash wages alone. Reductions in the working day without reduction of wages, lower taxes, low prices and service costs (housing, community services, etc.), free education and health services, preferential treatment at sanatoria and health resorts, guaranteed state social insurance and pensions, etc. - all these are elements which go to determine the level of real wages.

The seven-year plan for the development of the Soviet economy provides for a 0.55 per cent rise in cash wages for every 1 per cent increase in labour productivity. But allowing for the planned reduction of prices for goods and services, rising rates of social consumption and personal benefits paid by the State, a 1 per cent rise in labour productivity will mean a rise of approximately 0.8-0.9 per cent in the real income of factory and office workers.

All material wealth created in a socialist society is used in the form of personal or social consumption in the interests both of the individual worker and of society as a whole. This personal and social interest in increasing material wealth is reflected in constantly growing productivity of social labour, conscientious attitudes to work, the organization of progressive communist forms of work and mass participation in rationalization and invention.

Socialist society makes full use of material incentives to develop in the workers a sense of responsibility for the punctual and efficient performance of work assigned to them. At the same time, in addition to applying public incentives to work and educational methods, it also subjects unconscientious workers to various measures of a coercive nature, on the basis of the principle that work is an obligation of every able-bodied human being.

The distribution of the means of consumption in accordance with labour represents a material incentive to every worker to work to the fullest extent of his strength and capacities, while at the same time encouraging the development of these capacities.

By planning the distribution of the consumer part of the national income in the form of wages, in accordance with the quantity and quality of work performed and by determining the distribution of wages among the various industries and regions, the State ensures the correct apportionment of labour among the various

industries and stimulates the development of key industries and of the economic regions in which they are located.

Maintenance of the planned relationship between the growth of labour productivity and average wages is ensured by the correct utilization of labour and by the application of technically sound labour norms and an appropriate system of rate fixing.

Job timing (fixing the time for a given operation) is aimed at ensuring maximum economy in the use of labour; its effect is the application of a standard system of labour measurement in the various industries and enterprises, and it ensures a due relation between work performance and wages.

The wage system in operation for factory workers, i.e., rate fixing, is designed to tie wages paid to the quality of work performance (in accordance with the importance of the industry concerned, the complexity and precision of the work, working conditions, occupational skill, the cost of living in the various parts of the USSR, etc.), subject to the principle of equal pay for equal work.

The responsibility for fixing correct and optimum output norms and reviewing them is shared by the works management and the trade union. Norms are reviewed when an enterprise carries out organizational and technical improvements which reduce the labour-intensiveness of the product.

In the USSR and other socialist countries the most common form of remuneration at state enterprises is the piece-rate system combined with bonuses for the over-fulfilment of quality and quantity targets. The system of piece-rate and bonus remuneration is designed to offer the greatest possible material incentive to increasing the productivity of social labour. Engineers, technicians and office workers receive fixed salaries according to their posts and bonuses for over-fulfilment of the plan quality and quantity targets. Salaries are fixed in accordance with the economic importance of the industry, the capacity of the enterprise, the complexity of the production process, working conditions and the responsibility of the post.

Wage levels are laid down in the plan by industries, on the basis of differential wage schedules in force, under which rates per unit of working time are established in accordance with the quality, complexity and conditions of each type of work and the cost of living in different parts of the USSR.

Differential wage scales are established so that workers employed on heavy work (underground work, high-temperature and injurious production processes) can be paid at preferential rates. Preferential rates are also provided for workers in the coal mining, ore mining, metallurgical and chemical industries.

In addition, in a number of economic sectors salaries and wage rates are fixed under a system of "zonal differentiation", i.e., in accordance with the geographical location of enterprises (differences in climatic conditions, cost of living, etc.).

In the plan wage fund calculations, allowance is made for payments and various allowances serving as incentives to increased labour productivity, reduction of costs, the introduction of new techniques, etc. It is the planned distribution of the national income as between consumption and accumulation which predetermines the size of the total wage fund for the USSR as a whole, which is spent on the acquisition of commodities and on payments for services. This makes possible and necessary the planned co-ordination of the wage fund with the volume of commodity circulation through the state and co-operative trading system and with the actual physical structure of the consumed part of the national income.

The use of the planned wage fund by enterprises is geared to fulfillment of the plan quality and quantity targets, which is in accordance with the basic socialist principle of distribution according to work. Utilization of wage funds is supervised by the USSR State Bank, which applies financial sanctions to enterprises which fail to meet the plan targets relating to labour productivity, the labour force or the wage fund.

THE PLANNING OF PRODUCTION COSTS AND PRICES

The national economic plan includes indicators specifying not only the volume of material production but also the inputs necessary for the production and sale of the planned output. The recoupment of planned production inputs is expressed in both physical and value terms, in the latter case in the form of an estimate of gross commodity output at enterprise wholesale prices.

The surplus product, or net income of society, is expressed in monetary terms and calculated as the difference between the value of the entire social product and the value of inputs for its production.

The main indicator used to assess the planned and budgeted production inputs is the prime cost of output or work, which expresses in value (money) terms the cost of material inputs, depreciation, labour inputs in the form of wages for work, industrial output and its sale and the administration and servicing of production.

Prime costs reflect in monetary terms the expenditure of that part of social labour which is directly remunerated by an enterprise (works cost) or group of enterprises in any given industry (average industry prime cost).

The indicator of prime cost, as a qualitative, synthetic indicator, reflects the complex of qualitative and quantitative changes which take place in socialist production or its individual branches. The prime cost of the output of Soviet industry or its branches is laid down in the plan as the average weighted prime cost of industrial enterprises.

The prime cost of industrial output constitutes part of its value expressed in monetary terms. However, there is a qualitative as well as a quantitative difference between prime cost and value.

The quantitative difference arises from the fact that accumulation created at an enterprise is not (with the exception of deductions for social insurance) included in the prime cost of output.

The qualitative difference between the prime cost and the value of industrial output lies in the fact that the former is affected by changes in the prices of means of production and also by the inclusion of certain distribution costs, non-productive expenses and losses (fines, penalties, shortfalls, spoilage).

The prime cost of a given enterprise's output is determined by its inputs of materials, labour and cash, given the level of technology and production organization it has achieved. The value of its output, on the other hand, is determined by the expenditure of socially necessary labour incurred. The average prime cost of output in a particular industry is of the same order as the corresponding part of the socially necessary inputs for its production.

We may distinguish the following types of prime costs: (1) production inputs; works costs, which consist of a separate set of costs (salaries of works administrative staff, expenditure for maintenance, protection, depreciation and maintenance of buildings, plant and equipment, taxes, etc.), and total costs, which comprise the works costs plus expenditure for the sale and transport of output and the maintenance of sales offices, and the administration and works costs of trusts and concerns. In many cases total costs also include expenditure for the training of skilled workers and scientific research, and other expenses.

Comparison of prime costs at a particular enterprise with the prime costs of technically more advanced enterprises, and with the prime costs of the given industry as a whole, permits an assessment to be made of the enterprise's technical level and economic efficiency as a productive unit. Prime costs, as a synthetic indicator, reflect such plan indicators as those relating to the growth of labour productivity, improved utilization of raw materials, fuel and electric power, improvement in product quality, advances in production equipment, technology and organization (new machinery, specialization, co-operative linking, combination), etc.

By means of this synthetic plan indicator we can assess the effectiveness of the national economic plan as a whole, inasmuch as the purpose of economic development consists, in the final analysis, not only in the quantitative and qualitative growth of material production but also in ensuring economy in the use of labour and materials. Hence, if it is discovered in drawing up the plan that production over the plan period is wanting in economic efficiency, the plan is reviewed with an eye to cutting prime costs and balancing financial resources for its fulfilment.

One of the main stages in planning prime costs is the compilation of a production input list broken down by industries and enterprises. The list shows all inputs connected with industrial production and associated operations of various kinds, and with the performance of services to outside organizations and enterprises.

The production input list does not include intra-plant turnover, i.e., the transferred costs of self-produced output and its consumption to meet internal production needs. Inputs are classified under a number of economic headings, the list constituting the basis for the planning of circulating capital and control of its utilization in the fulfilment of the plan. The headings are as follows:

1. Basic and supplementary remuneration of factory and office workers, technicians, engineers and service staff and costs of social insurance for factory and office workers;
2. Working productive capital (raw and other materials, fuel, tools, dies, semi-finished products and power supplied from outside);
3. Depreciation of fixed productive capital (machines, equipment, buildings, fixtures, etc.);
4. Other expenditure (not listed under 1 and 3).

The level of inputs enter each heading is fixed on the basis of progressive technical and economic standards, allowance being made for the effectiveness of proposed changes for the improvement of technological processes and of production and labor organization.

In addition to production inputs, the national economic plan also covers distribution costs (procurement, supplies of materials and machinery, wholesale and retail trade), since the final stages of the process of social production are distribution, circulation and consumption.

In the USSR economic plan and the union republican plan, targets are set for production costs in each sector of the economy - industry, agriculture (state farms only), construction, all types of transport (rail, sea, river, road and air) and distribution (procurement and supply organizations, wholesale and retail trade).

The plans provide for an annual reduction in production and distribution costs as a source of growth of the accumulation and consumption funds. According to the control figures for the development of the Soviet economy in 1959-1965, industrial prime costs are to be cut by at least 1.5 per cent. This will account for about three-quarters of the total national saving achieved by reducing the production and distribution costs.

The relative importance of each individual element, or the pattern of inputs within the prime cost, depends primarily on the nature of the productive unit or industry in question. In the extractive industries, the main item of costs is wages, while in the processing industries it is raw and other materials.

By analysing the production inputs pattern in the various industries it can be determined which elements of prime cost can yield the greatest saving, or reduction in prime costs:

1. Working capital inputs (raw materials, auxiliary materials, fuel, electric power) can be reduced by lowering the proportionate input of material factors of production or replacing costly and inefficient elements by cheaper and more efficient ones, subject to maintenance of product quality, by improving the quality of the raw and other material and fuel consumed and by reducing expenditure on transport and warehouse operations;
2. The input of fixed capital per unit of output is reduced by increasing the return on capital, or industrial output per unit cost of fixed capital;
3. Expenditure on wages per unit of industrial output is reduced when the increase in labour productivity exceeds the increase in average wages and salaries, chiefly as the result of technical progress.

Targets for the reduction of prime costs in industry are based on calculations which determine the cost of all inputs for the production of a given item. These calculations are of three kinds: estimated (provisional) calculations, plan calculations and report (past performance) calculations. Estimated calculations are customarily drawn up to provide a basis for the level of expenditure for the construction of new enterprises and the designing of new products, plan calculations to provide a basis for the level of the prime cost of individual kinds or groups of industrial goods, and report calculations to show actual production inputs and to compare them with the planned inputs and with the actual inputs in the base period.

The inputs covered by the calculations are divided into basic expenditures and expenditures for administration and services. This grouping of expenditures is in accordance with the established method of classifying inputs by their component elements. Basic expenditures (the cost of raw materials, other materials, technological fuels and power, and wages of production workers) are generally charged directly to the prime cost of the manufactured product, while administrative and service expenditures are distributed in proportion to basic expenditures or to a part thereof.

The basic costing items or elements of production are grouped roughly as follows:

Raw materials and other materials (minus returnable wastes);

Basic and supplementary wages of production workers;

Outlays for maintenance and operation of equipment;

Workshop overheads;

General factory overheads;

Losses from spoilage (in report calculations);

Total (works cost);

Outlays additional to production costs;

Grand total (full cost).

The plan calculations are based on the norms for materials and labour inputs and the standards and specifications for the calculated industrial output.

It should be noted, as a definite and regular trend in the economics of industrial production, that as a result of technical progress and increased labour productivity, a general reduction in production inputs is accompanied by a proportional increase in the materialized labour input and decrease in the living labour input.

As the components of prime cost are not homogeneous in structure, the planning of prime cost is carried out by industries. The target for the reduction of prime cost in industry is fixed on the basis of the following indicators:

1. The prime cost of basic items of industrial output: coal, metals, electric power, lumber, cement, etc.;
2. The prime cost of all commodity output;
3. Inputs per rouble of commodity output.

At the present time, in the USSR national economic plan the targets for the reduction of prime costs are determined by the indicator of inputs per rouble of commodity output. This indicator expresses the ratio between the prime cost of all commodity output and its value in wholesale prices.

The prime cost indicator is of decisive importance in determining the effectiveness of all organizational and technical measures provided for in the plan (effectiveness of capital investment, new machinery, new types of materials, components, equipment, new technological specifications, etc.), as also in providing an economically sound basis for price, financial and credit plans.

At industrial enterprises prime cost plans are based on plan calculations worked out for all types of planned production.

In the sovmarkhozy prime cost plans are prepared only for the basic, most important types of output. In the union republican plans, prime cost targets are fixed for an even smaller number of types of industrial output. These are predominantly uniform types of output produced in great quantity for consumption throughout the republic concerned or the entire country (iron, coal, petroleum, cement, alcohol, sugar, etc.). However, as the prime costs of individual types of industrial output do not reflect inputs for all commodity output, full cost indicators have been established which cover not only inputs connected with production but also non-production inputs, including expenditures connected with the sale of output.

The full cost indicator for all commodity output provides the basis for the financial plan, since it expresses in absolute terms the volume of production inputs. It does not, however, show to what extent the inputs are efficient or economical. An additional indicator of inputs (in kopecks) per rouble of commodity output is therefore used to assess the degree of efficiency attained in productive activity.

The union republics have the opportunity and the right to change or amend the prime cost plan in the light of changes in the range and selection of industrial output which they may make in the course of plan execution.

Basic factors in determining plan prime cost targets are the actual or estimated prime costs of industrial commodity output in the base or pre-plan period and the technical and economic estimates justifying a possible reduction of inputs in the plan period.

Prime costs for the plan period are determined by direct calculations of estimated production inputs (by items) and of the economic factors justifying changes in prime cost in the base period.

Changes in industrial prime costs for the base period are made on the basis of economic calculations for individual industries and for industry as a whole broken down by basic factors affecting the level of costs.

Such basic factors may be the following: a faster rise in labour productivity than in wages; a reduction in relative standard wage inputs; a reduction in inputs of raw materials, auxiliary materials, fuel and electric power; improved use of basic equipment and production space; reduction of losses from spoilage; elimination of non-productive expenditures; reduction in transport inputs, and a reduction in prices of raw materials, auxiliary materials, fuel and power and in transport rates.

A major factor in the reduction of prime costs is a rise in labour productivity, which diminishes the relative wage input per unit of output. This occurs when the increase in labour productivity outruns the increase in wages.

In a planned economy the question of the expediency of utilizing the capacity of enterprises with various production inputs is decided in the light of the national interest and, above all, of the national economy's demand for a particular product and of the possibility of meeting it. The factors which tend to raise or to lower prime costs, as the case may be, are defined in the plan estimates.

The installation of new production capacities also contribute to the lowering of prime costs, for an increase in the proportion of new capacity generally results in a decrease in production charges. New industrial enterprises, of course, are technologically more advanced than existing enterprises and accordingly have a higher productivity of labour.

Technical progress in industry is reflected in the installation of new capacities or the establishment of industries producing new, more advanced types of materials, the use of which results in lower inputs of materials and labour, (for example, the production and application of synthetic raw materials and supplies, and of economical types of metals, the use of natural gas instead of coal, etc.).

Specialization and co-operative organization in industry also influence the growth of labour productivity, resulting in lower inputs of materials and labour.

The effect of the various factors which reduce the prime cost of industrial output is assessed by means of economic calculations customarily used in planning. It should be noted in this connexion that changes in the general economic conditions prevailing in industry primarily affect cost planning for the long term.

Other possible major factors in reducing material inputs in industry are organizational and technical measures to improve designs, technological routines, specifications, etc., resulting in more economical use of raw materials, supplies fuel and electric power, the reduction of the amount of scrap or the improved use of technically unavoidable scrap, the replacement of inefficient kinds of raw materials by more efficient ones, etc.

In the section relating to the supply of materials and machinery provision is made for measures to reduce standard inputs of working capital, rationalize transport, improve the organization of supply and sales and lower the prices of raw materials, supplies and fuel. The improved use of fixed capital increases its yield, i.e., increases output per unit cost of fixed capital, thus bringing about a reduction in the unit amortization charge. At the same time the improved use of fixed capital has the effect of increasing labour productivity and output, which in the long run reduces the cost per unit of output.

For savings in transport costs the planners look primarily to the elimination of inefficient and long hauls, and to the rational use of all types of transport.

Naturally, fluctuations in the prices of raw materials, supplies and fuel and in rates for electric power and transport also affect prime costs. Decreases

or increases in these costs as the result of price fluctuations are taken into account and subtracted from the total of saving or increase.

In the plan the indicator for inputs in kopecks per rouble of commodity output determines the targets for the absolute reduction of prime cost. For long-term planning, however, it is important to determine the dynamics of prime cost, i.e., the percentage by which it declines, calculated as the difference between the inputs per rouble of commodity output in the base and plan periods, expressed as a percentage of the input in the base period.

As stated above, in all comparative calculations of industrial prime cost the effects of fluctuations in prices and rates are taken into account, as also the structure of industrial production in the plan period as compared with the base period.

In this connexion it should be borne in mind that for a socialist State as a whole fluctuations in the prices of means of production and in rates are of significance only for purposes of calculation in determining the relative amounts of net income to be apportioned among the various branches of the national economy. But when the purchase prices of agricultural raw materials for industry fluctuate the effect is a direct increase in industrial production costs, with a corresponding reapportionment of net income between the State and the collective farms.

In capitalist economies the law of value and the money-exchange relationship are manifested in such economic categories as price, prime cost, profit, finance and credit. Where the means of production are owned by society these categories assume a different character and are placed at the service of expanded socialist reproduction.

The problem of pricing occupies an important place in the economic planning of the socialist countries. In planning, the State establishes prices which are not subject to uncontrolled fluctuations and which are based on the plan interrelationships being established in the national economy. The price of output is generally determined on the basis of average industrial prime costs and the amount of accumulation fixed for the industry concerned, which remains at the disposal of each enterprise and a portion of which is transferred to the State for centralized use.

State prices themselves are a means of actively influencing the establishment of the economic interrelationships required for expanded socialist reproduction. The socialist system of pricing is an integral part of national economic planning and is determined by the volume and structure of production, goods turnover, monetary income and production and distribution costs. Prices, being the monetary expression of value, are determined by the value or input of social labour in production. But since prices also express the correlation between inputs for the production of various types of goods which simultaneously satisfy the same social need, and also the correlation between supply and demand, the price level cannot be determined solely on the basis of production costs. Production costs may accordingly serve only as the price floor, for it is through the medium of prices that the global social product or net social income is realized. But the amount of net social income cannot be the same in all branches of material production because of the differences in the structure of productive capital. A redistribution of net income is therefore effected by means of the turnover tax included in prices.

Owing to the existence of a gap between prices and value in certain branches, the turnover tax, or net social income, is realized in the other branches.

The turnover tax emerges either as a rated increase in the price of the commodity concerned, calculated per unit of output, or as the difference between retail and wholesale prices.

In a socialist society prices fulfil the following basic functions:

1. Maintaining the cycle of the national economy, including the process of realizing the value of output;
2. Stimulating and increasing the production of goods essential to the national economy and regulating consumption of all types of output;
3. Ensuring the distribution and redistribution of the national income;
4. Measuring value in long-run and current planning and in the calculation and assessment of the results of plan fulfilment.

The system of state prices covers the following:

1. State wholesale prices of goods intended for use in production and construction (i.e., of means of production);
2. State retail prices of consumer goods sold in state and co-operative trade;
3. State purchasing prices for agricultural products (including agricultural raw materials);
4. Rates of payment for services to production and consumption (transport, communications, power stations, community and housing services and entertainment enterprises).

In addition to state plan prices there are prices freely established on the collective farm market, where agricultural surpluses at the disposal of collective farms and collective farm workers are sold. Collective farm market prices are, of course, not planned and their level is determined by the supply of and demand for agricultural products.

In order to ensure a uniform state price policy, the USSR Government fixes the level of prices for goods and rates of payment for services and directly approves purchasing prices for agricultural output, differentiated by union republics, and wholesale prices for certain types of industrial output which are of particular importance.

Within the framework of the prices and rates of payment for output fixed by the Government of the USSR, the USSR Gosplan, the USSR ministries and the councils of ministers of the union republics approve specific prices and rates of payment for all types of output and services. Provisional prices for new types of industrial output are fixed by the sovmarkhozy.

The state wholesale and retail price system includes the following:

(a) Enterprise wholesale prices, fixed for a particular type of industrial product, which serve as industry and plan price costs;

(b) Industrial wholesale prices which include turnover tax and other special taxes;

(c) Accounting prices, applied within certain industries when there are significant differences between the average industry prime cost and that of individual industry for certain types of goods.

Although each type of state price independently serves a particular area of circulation, state prices taken together constitute a uniform system of interdependent plan prices. Prices for industrial products consist of the following elements: prime cost, profit, turnover tax and distribution costs. A price represents a socially necessary labour input, average industry prices (average zonal prices (prices current in a particular area) are approved as current prices. The price of a product is fixed having regard to a level of inputs which will ensure the maximum economy of social labour through the introduction of advanced equipment and production technology. The greater part of the profit realized in the price remains at the disposal of the enterprise and only a small part, together with turnover tax, goes into the state budget. This distribution of profits stimulates enterprises to effect the greatest possible economies in production costs so that they may earn greater profits.

The profitability of an enterprise is defined as the ratio of aggregate profit to prime cost of production in the plan period. State wholesale prices are fixed with a view to a level of profitability which will provide the enterprise with a material incentive to over-fulfil plan targets for volume of output, range of output and reduction of prime cost, for when an enterprise's share in profits increases it is able to expand its works fund, used to meet its own production requirements and to provide material incentives for its workers. In planning, the level of profitability is established in a breakdown by industries, depending on their importance and the economic functions to be carried out in the period. Retail prices include retail trade costs and profits and the turnover tax (wholesale prices for heavy industrial goods do not include turnover tax except in the case of prices for electric power and petroleum products).

While wholesale prices are for the most part used for internal circulation between state enterprises and also between state industry and collective farms, retail prices serve the purpose of distributing the part of the national income intended for personal consumption. Retail prices are lowered when prime costs are reduced and the supply of goods increases. The level of retail prices is determined having regard to public demand. Retail prices provide the means of accumulating that part of the value of the social product which is intended for the revenue side of the state budget.

The productive activity of socialist industrial enterprises is based on the use of all the economic levers which serve to stimulate output growth by means of the optimum use of fixed and circulating capital with a view to the attainment of the highest possible volume of production at the lowest production cost. The results of the productive activity of industrial enterprises are expressed economically in profits, the amounts of which are fixed by the plan.

In other words, every enterprise is on a full cost accounting basis and has full responsibility for the economical conduct of its operations. The basic principles of the unit accounting system are the following:

1. That the cost must exceed expenditure;
2. That an enterprise bears material responsibility for and has a material interest in fulfilment of the obligations which it assumes;
3. That the financial health of an enterprise is entirely dependent on the results of its economic and financial activities;
4. That the workers of an enterprise have a material stake in the results of its operations.

The unit accounting system is practicable where there is a technically and economically sound plan, an accurate system of accounting and checking the fulfilment of all the plan targets, and a system of wages and organization of labour which gives every worker at the enterprise a material interest.

The unit accounting system encourages maximum economies both directly in production and in the transport and sale of output. The system's economic levers are prices, profit and credit. Enterprises operating under the unit accounting system have the right to dispose of working capital and cash and marketable goods, to enter into contracts for the procurement of means of production and the sale of finished goods and services, to open and close current accounts at banks and to have their own independent plans and complete systems of accounting and reporting.

Relations between industrial enterprises are determined by a system of economic contracts which establish all the technical and economic conditions of transactions between suppliers and consumers, including material responsibility for breach of contract. The material interest of an enterprise in the results of its work is stimulated by placing at its disposal a considerable percentage of profits earned in accordance with and in excess of its plan, to be used for the further expansion of production and to provide incentives for the workers.

Chapter 6

PLANNING THE SUPPLY OF MATERIALS AND MACHINERY

Continuity of social production presupposes continuous consumption of the means of production. In other words, if enterprises are to be kept in continuous productive operation, they must be regularly supplied with raw and other materials, fuel, equipment, tools, etc. The nature and forms of the machinery of physical supply to social production depend on the social and economic structure of the community concerned. Thus, where the means of production are private property, the only instrument for providing enterprises with the necessary means of production is the market, the competitive buying and selling of goods. The acquisition of the means of production is the private concern of each entrepreneur and takes place as his personal advantage and interests dictate. Since individual producers operate in isolation from one another and their aim is the strictly selfish one of making the largest possible profits, there is no possibility of organizing a planned, efficient distribution of material resources or even, in many cases, of putting them to use at all.

In a socialist economy, the system for providing industry with the means of production is organized on fundamentally different lines: not only the production of material goods but also their distribution, circulation and consumption are planned.

Through economic planning, society's needs can be determined in a scientific manner. Socialist enterprises do not operate in isolation from one another but are a part of the country's over-all economic structure, and the relationships of production and circulation between enterprises are based on state plans.

The section of the economic plan dealing with the supply of materials and machinery calls for the planned distribution of that portion of the social product which, by virtue of its physical nature, is destined for use in material production as the means of production. Planning for the supply of materials and machinery must satisfy the requirements of expanded reproduction, i.e., it must provide for the replacement of fixed assets and working capital expended in the production process, and for the accumulation of fixed assets and the growth of stocks and reserves. Since the various sectors of the national economy share in the process of expanded reproduction in fixed proportions, the plan for the supply of materials and machinery provides for the distribution of material resources among sectors in the quantities necessary to maintain those fixed proportions.

The sections of the national economic plan dealing with production, fixed investment and the supply of materials and machinery are co-ordinated with one another so as to ensure that enterprises and construction projects are supplied with the materials and machinery they require in order to achieve the planned volume of industrial production and capital works, and so as to meet all the other needs of production and construction (the introduction of new equipment and methods, the establishment of experimental plant, repair and operating requirements, the replenishment of stocks, etc.).

Planning the supply of materials and machinery is a matter of determining what means of production the economy requires, correlating needs with resources for each type of production and, on that basis, apportioning material resources according to purpose (industrial operating requirements, construction, stockpiling, export, etc.) and direct consumer (union republics and all-union ministries and departments). This is accomplished by drawing up, for each plan period, a set of material balances and distribution plans based on scientifically sound standards for the input of material resources into production and construction.

Industry and construction must be kept supplied with the means of production if enterprises are to stay in continuous operation and construction is to proceed smoothly. The preparation of economically sound balances and plans for the distribution of materials and machinery according to the special characteristics of each sector and its projected development during the plan period, together with the efficient organization of the entire system of supply and disposal, is therefore regarded as the planning and economic organs' most important task.

The national plan for the supply of materials and machinery provides for the distribution of industrial output and agricultural raw materials according to a basic schedule. The scale and manner of the consumption of the various means of production are determined mainly by the scale and structure of the material production and fixed assets which they are used to reproduce.

The classification laid down for balances and distribution plans in the national plan of material and machinery supply comprises the items of working capital required to maintain the production programme (raw and other materials, fuel and electric power) and fixed assets (equipment, machinery, etc.). The economic plan also includes material balances for the various types of consumer goods used in production or for non-production purposes.

Since their function is to correlate the availability and distribution of the resources needed for each type of production, the material balances determine the most important production relationships in the economy.

The consolidated republican balances are prepared roughly in accordance with the scheme shown in table I.

It will be seen from this rough layout that the two balancing parts of the consolidated balance show, on the one hand, the resources available for a given type of production and, on the other hand, the distribution of those resources. The volume of resources is determined on the basis of the planned volume of production and the resources required. A decision is also taken as to whether the volume of production should be increased or reduced. Where the requirements are found to exceed the projected volume of production, ways and means are explored for increasing it.

By consulting the balances, ways can be found to speed up the turnover of working capital and to increase resources by running down left-over stocks and reserves in the production and circulation sectors to economically sound levels.

Requirements of fixed assets and working capital for the plan period are determined on the basis of the planned volume of production and construction in the various consuming sectors and the established input standards. In this

Table 1

| Item | Plan | Republic | | | Imports | From other sources |
|---|------|----------|---------------|------------------|---------|--------------------|
| | | RSFSR | Ukrainian SSR | Byelorussian SSR | | |
| <u>Total resources, including:</u> | | | | | | |
| Production | | | | | | |
| Imports | | | | | | |
| From other sources | | | | | | |
| Year's end stocks carried forward (by suppliers and consumers) | | | | | | |
| <u>Total distribution, including:</u> | | | | | | |
| Industrial operating requirements and construction, including: | | | | | | |
| RSFSR | | | | | | |
| Ukrainian SSR, etc. | | | | | | |
| Deliveries to the State as a whole including: | | | | | | |
| (a) deliveries to all-union departments | | | | | | |
| (b) deliveries to the market | | | | | | |
| (c) deliveries for export | | | | | | |
| (d) deliveries to state reserve ... | | | | | | |
| (e) deliveries to undistributed reserve... | | | | | | |
| Year's end stocks (held by suppliers and consumers) | | | | | | |

connexion, the distribution of resources for industrial operations and construction is of paramount importance in keeping the whole national economy in balance.

The volume of material resources required for industrial operations is calculated on the basis of the final production programme and the standard inputs of raw and other materials, fuel and electric power.

Requirements of materials and equipment for capital construction are determined either as a direct function of the physical volume of construction and assembly work or on the basis of the standard inputs per million roubles' worth of such work. For this purpose special standards have been worked out in the USSR governing requirements of basic building materials per million roubles' worth of construction and assembly work; these standards vary with the nature of the structure built (e.g., machine building, metallurgical, chemical and other plant) and with the type of building materials used (brick, reinforced concrete, etc.).

Requirements of equipment for the volume of work to be accomplished in the plan period are determined from the specifications attached to the construction projects.

In estimating requirements of equipment, machinery, spare parts and tools, account is taken of what must be produced in order to make up sets of equipment manufactured at co-operating plants and in order to replace worn-out and obsolete equipment and parts. In addition, estimates of the deliveries of assemblies and components, forgings, castings and stampings required between enterprises, and balances of iron and steel casting, forging and stamping are worked out.

In establishing the standards for the input of materials into industrial operations and construction, the main consideration is to effect the greatest possible savings, especially of such resources as ferrous and non-ferrous metals, fuel, electric power and timber, without lowering the quality of the output. The input rates recorded for the base period are accordingly corrected to allow for any reduction in material inputs which can be achieved through improvements in the equipment and technology of production and construction (reductions in the weight of equipment parts and building components, increases in annual output, replacement of one type of raw material or fuel by a more efficient type, refinements in production technology, etc.).

Estimates of the average reduction in standard inputs of raw and other materials, fuel and electric power are prepared as a means of assessing the total saving of resources in industry and construction.

In the light of the corrected standards for the production and construction programme, the final requirements of raw and other materials, fuel and electric power are determined, for republics and all-union departments, roughly in accordance with the following scheme:

1. Stocks carried forward to the beginning of the base year;
2. Plan for the base year;
3. Total requirements for the plan year, including:

- (a) industrial operating requirements;
 - (b) construction requirements;
 - (c) other requirements;
4. Stock carried (in quantity and days);
 5. Extent to which requirements will be met during the plan year (out of left-over stocks plus resources for the plan period).

In the union republics, the consolidated requirements of materials and machinery are determined on the basis of reliable estimates of requirements, sector by sector, submitted by the sovnarkhozy and by enterprises, and are transmitted to the USSR Gosplan.

In drawing up the balances and plans for the distribution of materials and machinery by purpose and by republic, the USSR Gosplan is guided by the need for complete correlation of resources and consumption.

The balances and plans for the distribution of the means of production also provide for the allocation of resources (out of the commodities otherwise available for use in production) for sale to the public through the retail trade system; for export; for the establishment of state reserves and materials, which are essential to the economy mainly as a means of preventing imbalances, and for other state requirements.

In the light of the special characteristics of each branch of industry, norms are laid down for the stocks of raw and other materials and fuel to be maintained for production and disposal: in other words, for the stocks to be held by the consumers and suppliers of these items. The norm for the production stocks of raw and other materials and fuel to be held by the consumers is determined mainly by the daily input and the frequency of deliveries, allowing for possible interruptions (including seasonal interruptions) in supply. It is also affected by the method of supply (direct or ex-dump), the distance supplies must be carried from the supplier to the consumer, the time required for this and other factors.

In planning the supply of materials and machinery, the established procedure is for the USSR Gosplan to distribute materials and equipment according to a basic schedule of major categories. At the succeeding levels of planning (republican Gosplans, sovnarkhozy and enterprises), this schedule is expanded, made specific and itemized or otherwise broken down by type, grade, size, etc.

The USSR Gosplan works out plans of material and machinery supply for the union republics and plans for inter-republican deliveries, deliveries to cover national requirements (for export, the state reserve, etc.), and deliveries to cover the requirements of all-union ministries and departments. The Gosplans of the union republics work out plans for the distribution of output among the various economic administration areas within each union republic, bearing in mind that each plan must be carried out sector by sector.

It should be emphasized that the distribution of materials and machinery does not preclude but, on the contrary, allows for the operation of the law of value and

the interplay of money-goods relationships, and rests on the assumption that salable items of working capital and fixed assets will change hands through commodity circulation. In a socialist society, however, commodity circulation acquires specific new characteristics. Its purpose is to serve the interests of social production, i.e., to keep the country's enterprises supplied with the necessary materials and machinery at the lowest possible overhead cost.

Means of production, like any other commodity, have a specific value and price. Reciprocal deliveries of goods between state enterprises, within the limits laid down in the national economic plan, constitute a process of buying and selling which is organized according to plan and carried out by the enterprises concerned on wholesale trade terms. This process differs significantly from retail trade in consumer goods.

In retail trade, products are sold to the direct consumer, so that they pass from the circulation sector into that of individual consumption, becoming the property of the purchaser. Goods intended for personal consumption are sold, for cash or on credit, on free trade terms.

When goods intended for use in production are sold, they undergo no change in ownership, since they remain in the state sector and the process of circulation merely transfers them from the producing enterprise to the consuming enterprise.

The purchase of producer goods from producing enterprises by consuming enterprises is purely a book-keeping operation affected through the State Bank.

Producer goods undergo a change of ownership on sale only if they are sold to collective farms or for export.

By planning the sale of means of production it is possible to organize the movement of product from producer to consumer in an efficient manner, cutting the time spent in circulation, and thus the overhead cost, to the minimum. It should be noted that overhead costs decline as the forms and procedures of material and machinery supply improve. In 1956, for example, total overhead costs in the Soviet Union amounted to 3.6 per cent of total supply and disposal turnover; by 1959 the figure had dropped to 3.5 per cent (1.8 per cent of supply turnover and 5.6 per cent of disposal turnover).

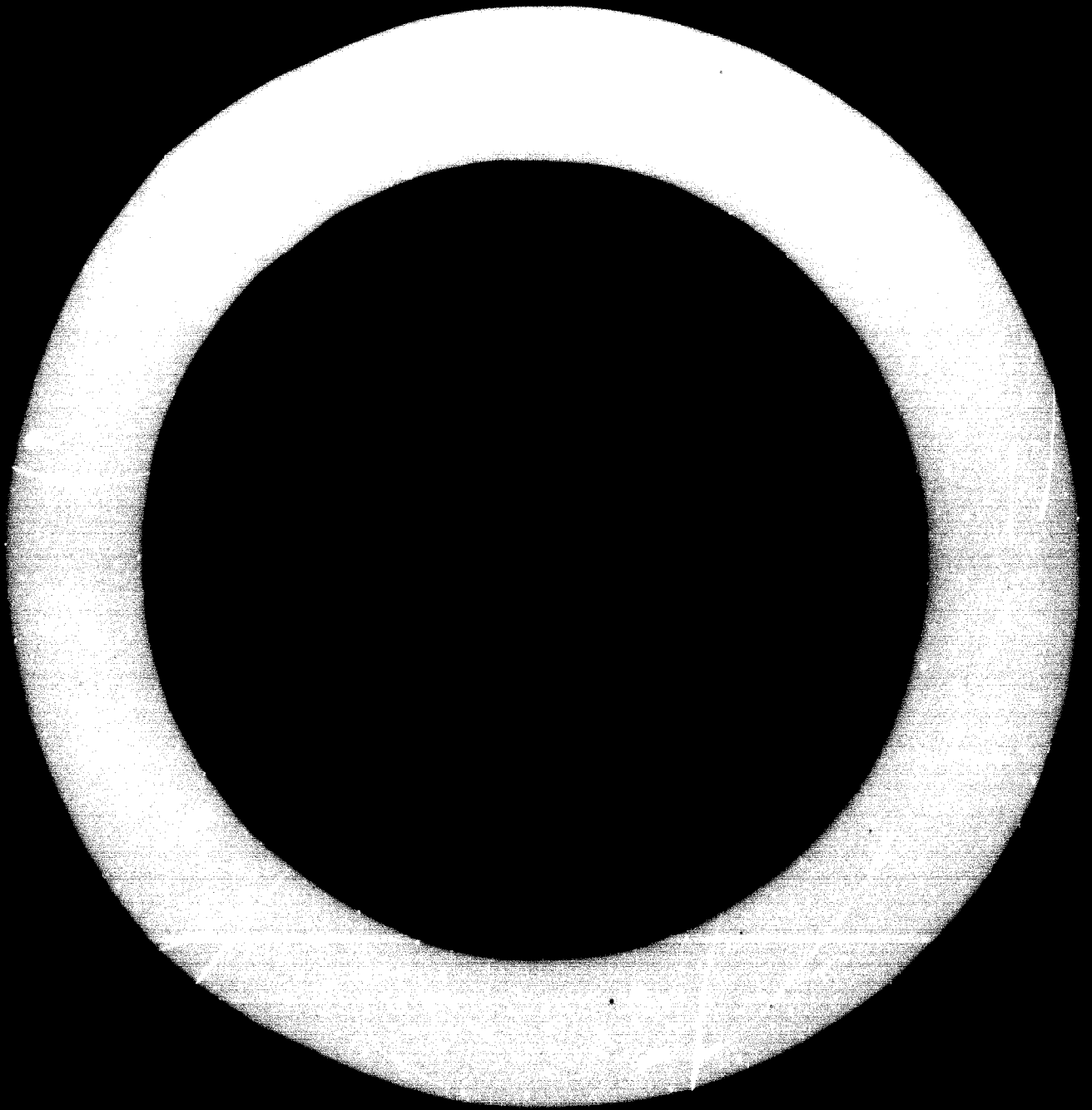
The planned character of sales rules out any market fluctuation or disposal crisis. The purpose of planning the supply of materials and machinery is not only to organize the circulation of producer goods but also to ensure their efficient use in production.

The delivery of means of production by producing enterprises to consuming enterprises is not the exclusive responsibility of the enterprises concerned, but is regulated by the national economic plan. Hence, the reciprocal delivery of commodities as a buying and selling transaction means nothing more or less than reaching the targets set in the state plan. This is the distinguishing characteristic of the commodity circulation of means of production in the state sector of a socialist economy. Thus, the supply of materials and machinery determines and regulates deliveries of means of production in the manner prescribed by the economic development plan and is, at the same time, one of the forms of wholesale trade.

It should be noted that the preparation of material balances and distribution plans represents only the first stage in the process of supplying materials and machinery. The distribution plans embodied in the national economic plan merely provide the disposal organs with the basis for itemizing the whole range of materials and machinery to be delivered and for determining the delivery time-tables, suppliers, prices and other terms of delivery. Deliveries are, as a rule, carried out under economic contracts concluded between the suppliers, disposal organizations and consumers, which stipulate the quantity and quality of the goods, grades, technical specifications, prices, time-tables and other terms of delivery.

Supply and disposal organizations, like all trading enterprises, charge a fee for their services in connexion with sales in an amount determined by the type of goods turnover involved.

Supply and disposal are organized as follows: the USSR Gosplan has balance sections which draw up material balances and distribution plans for the most important types of products. The National Economic Council of the USSR has material and machinery supply administrations, as well as administrations responsible for inter-republican deliveries of different types of products (metals, coal, machinery and equipment, lumber, building materials, etc.). According to the scale of their economy, the republics have supply and disposal organs, with their own network of offices and depots, responsible for the sale of the finished goods produced in each union republic and for keeping the consumers supplied. The economic administration areas - or, more specifically, the sovnarkhozy - also have supply organs, which are responsible for keeping industrial enterprises supplied with materials and machinery of all kinds.



HOW TO OBTAIN UNITED NATIONS PUBLICATIONS

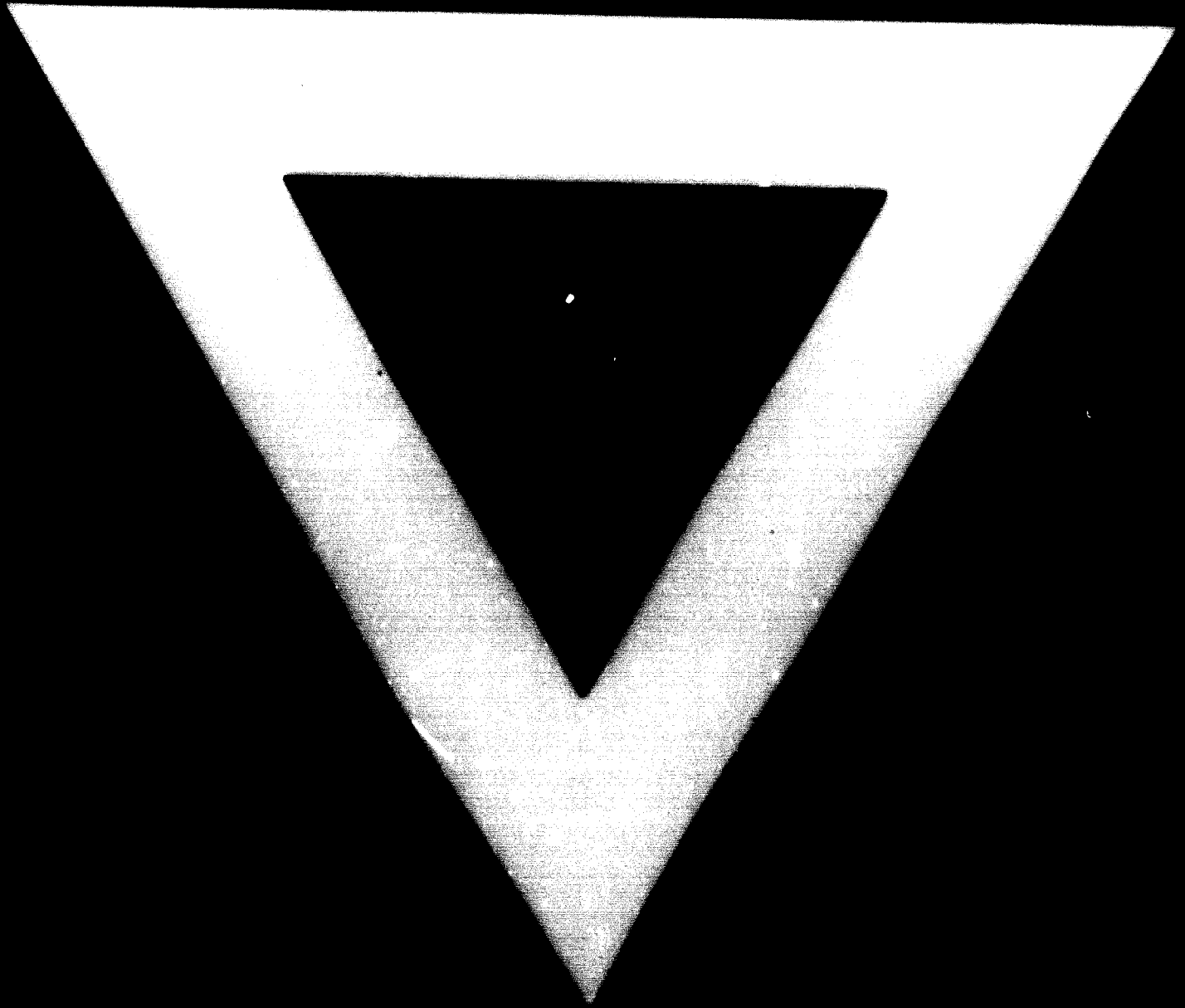
United Nations publications may be obtained from bookstores and distributors throughout the world. Consult your bookstore or write to: United Nations, Sales Section, New York or Geneva.

COMMENT SE PROCURER LES PUBLICATIONS DES NATIONS UNIES

Les publications des Nations Unies sont en vente dans les librairies et les agences dépositaires du monde entier. Informez-vous auprès de votre librairie ou adressez-vous à: Nations Unies, Section des ventes, New York ou Genève.

COMO CONSEGUIR PUBLICACIONES DE LAS NACIONES UNIDAS

Las publicaciones de las Naciones Unidas están en venta en librerías y casas distribuidoras en todas partes del mundo. Consulte a su librero o diríjase a: Naciones Unidas, Sección de Ventas, Nueva York o Ginebra.



17.7.74