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Interregional Seminar on Industrial Location
and Regional Development
Minsk, August 1968

14-26

**BASIC PRINCIPLES AND FACTORS
OF INDUSTRIAL LOCATION I/**

Y.G.FEIGIN

Head of the Department of
the Institute of Economics
of the Academy of Sciences
of the USSR.

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**BASIC PRINCIPLES AND FACTORS
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(Summary)

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The report dedicates to the principle basis and important factors, influencing the efficiency of the industrial location in the USSR. The authors of the report proceed from that the irregularity of distribution of the natural and labour resources on the country's territory stimulate objectively the irregularities of the industrial location. But a tendency of strengthening relations between separate branches of the material production, which is increased with the technical progress, reconstruction of old branches and appearing of new ones, and also utilization of new sources of raw materials and energy withstands to this process.

Principles of the industrial location, reflecting the known objective laws of the socialist society are the scientific ones by which the Soviet State is guided in its economic policy.

The choice of the optimum variant of the industrial location depends on all-round calculations of the influence of the natural, historical, national and economic factors on the peculiarities of location. Such an approach ensures the economy of public labour, complex development of the USSR's regions and specialization of the economy, eliminates excessive density of the population in big towns, promotes overcoming of the essential differences between a town and a village, favours the further rapprochement of the development levels of separate territories of the Soviet Union and strengthening the economic relations with other countries.

In addition, in the report there consider the influence of the most important factors upon the character of the indust-

rial location in the USSR; natural conditions, natural and labour resources, scientific-technical progress, transport.

Scales of the industrial need in natural resources, conditioned, first of all, by the level of economic development of the country, cause the use of these resources by ever more number of economic regions. The degree of providing the need in natural resources is an important factor, influencing the character of the industrial location.

The labour resources influence greatly not only the character of industrial location and optimum size of the industrial enterprises but also the structure of regional production.

In conditions of the Soviet Union, where distances between production centres and regions of consumption of the industrial output are large, the role of transport raises. But economic importance of transport development can't be measured by the economy of the expenditures for transport. It is necessary to take into account the influence of transport upon general level of economic development of the regions.

Growth of the concentration of production and technical progress requires a new approach to the problems of the industrial location and planning of the complex development of different regions of the country. The experience of the USSR shows that the choice of place for separate enterprise location may be rational, if this problem is solved in relation to the whole complex of interrelated enterprises, as well as existing ones and being in construction ones.

In the report a great attention is paid to the analysis of the problems of the geographical division of labour and complex development of the economic regions.

The industrial location in the USSR is based on the regular territorial division of labour and system of economic regions. Every economic region has favourable natural and economic conditions for the development of corresponding branches of industry in large scales. Location there of branches of all-union and interregional importance causes location of different adjacent branches. Combination of branches of all-union specialization and adjacent branches is a production complex of an economic region.

In the report on the basis of the concrete material there consider problems of the industrial development in the national republics of the USSR and, especially the problems of the influence of international division of labour on the industrial location, and also main methodological and methodical problems of rising of the economic efficiency of the industrial location.

I. Fundamentals of Efficient Location of Industry in the USSR.

The industrial development of any country in the world, and in particular, of a country which has a vast territory, is impossible to conceive without taking into consideration the originality of conditions and peculiarities of development of various its parts - industrial centres, districts, regions and the territorial production ties which are permanently developing.

The utilization of natural wealth (natural power, mineral, biological and land resources) and labour resources is inseparable of the geographical location of productive branches. The character of spreading of natural and labour resources over the country's territory exerts a great influence on the location of industrial enterprises and complexes.

Technological progress, development of old and arising of new industries, and utilization of new sources of raw materials and energy entail intensification of interbranch ties. The interterritorial ties in the national economy are of various forms, and unequal economic effectivity and becomes a condition of ever-growing importance to the development of productive forces. The increase in efficiency of the national economy and more efficient exploitation of natural and labour resources depends first of all on the level of technical and economic groundfulness of the plans of industrial location, specialization and complex development of the country as a whole and of its separate regions.

Many hundreds of large enterprises are projected and their construction is begun in the Soviet Union every year. De-

termination of the region and point of location for every of those is preceded by thorough economic estimations which take into account a plurality of natural, historic, national and economic factors each of which positively or negatively the economic effectivity of the version of location of new projects or of development of the capacity of existing enterprises, under consideration.

In making these calculations, the projecting and planning organizations proceed from the principles of location of industrial production, which principles are based on the social laws of development of a Socialist society (the law of regular balanced development of the national economy, the law of steady rise in productivity of labour, etc.)

The principles of industrial location which are, in general, true reflecting the cognized objective regularities of the society, are scientific theses the Soviet State is guided by in its economic policy and in the problems of location of industries. These principles are being improved and extended on the basis of comprehensive consideration of the experience in development of productive forces in the USSR and other countries of the Socialist system.

The location of industrial production in the USSR is determined by the following general principles which are inseparably linked and combined with one another:

- planned location of industries all over the country in accordance with the purposes of ensuring the most efficient utilization of the created productive apparatus, natural and la-

bourv resources in all regions on the basis of accounting the State interests and economic social requirements;

- development of social division of labour between separate parts of the country on the basis of equality and mutual assistance;

- complex development of economy in separate parts of the country, combined with specialization of the parts in those branches of industry and agriculture for whose development there are the most favourable natural and economic conditions;

- systematic reduction of the difference in level of economic development of different part of the country;

- taking advantages of international Socialist division of labour for the development and location of productive forces in each Socialist country.

The planning of development and location of industrial production, which is based on the above basic principles, ensures minimization of expence of labour at all stages of the production process and consumption of the output, the most economical-ly-rational territorial organization of the national economy and territorial productional ties both between separate parts of the country and within each of those; eliminates excessive congestion of population in large towns, assists in overcoming the essential differences town and village, in further reduction of difference in economic level of separate territories of the Soviet Union, and promotes for the strengthening of economic relations with other countries.

Half a century of experience in development and location of industrial construction witnesses the fact that planning of

the location of industry on the basis of the above principles ensures an increase in the productivity of social labour and in the effectivity of the whole national economy of the USSR since the objective possibility of establishing optimum proportions between all links of the social production in accordance with a common plan gives a broad scope to the location of production over the country's territory in the way most effective to its development.

Bringing of some industries nearer to sources and others to the regions of consumption increases the productivity of social labour, cuts the production costs, involves new regions and new natural resources into national economic turnover, cuts down irrational haulage. At the same time this provides for the solution of the problem of overcoming the economic backwardness of the outlying national districts and getting rid of the substantial differences between town and village.

The system of planned economy makes it possible not only to take into account the regional demands but also to locate the production as near as possible to the regions of consumption in accordance with the achieved level of development of productive forces.

Continuous growth of production presupposes not only the introduction of latest techniques but also successive involvement of newer labour and natural resources of all the country's regions into the national economic turnover, and especially of the regions whose resources are not still under sufficient exploitation.

Planned location of large-scale production does not mean any isolation of individual regions in the country. It leads clo-

to levelling of the economic development of all its parts on the basis of using the latest techniques.

The degree of influence of natural conditions on the development and location of industries varies with the level of the country's productive forces, with the level of scientific and technological progress achieved.

Also account of various factors which influence this process one way or another is necessary parallel with the general and particular principles to true comprehend the process of locating industrial enterprises. These are natural resources and natural conditions, labour resources, technological progress, transport factor, time factor, agglomeration and concentration of production as well as factors of the more particular order - specific demand for power, fuel, material, etc.

2. Principal Factors of Location of Industries

2.I. The Natural Resources and Conditions. Their Dispersion over the USSR.

The scope of factors of the most importance which influence the location of industries includes the magnitude of the demand for raw materials, fuel and energy resources, and the degree of providing the developing industrial production with those. It is, of course, necessary to take into account the natural conditions of extraction and utilization of the resources revealed. It is for the Soviet Union with its vast territory and great variety of natural and climatic zones that the account of natural conditions is of great importance when versions of location of industries is under consideration.

If the scale of industrial demand for natural resources is determined, in first place, by the level of economic development of the country, the degree of providing for that requirement depends on how much these natural resources have been investigated, which natural wealth is in possession of the country, what is their geography.

As is well known, that the share of the processing industry in the structure of industrial production increases as the level of economic development rises. This is caused not only by springing up of new types of production which not bound with the primary processing of raw material directly, but also by the fact that the processing industries are developing at higher rates than the extractive branches are. At the same time, the increase in the scale of production brings the necessity of ever-growing expenditures on extraction of primary natural materials. In the USSR only for the period from 1940 to 1967 the extraction of mineral and fuel resources increased as follows: of coal to 360%, of oil to 930%, of natural gas to 4680%, of iron ore to 560%, of cement materials about 15 times, logging to 230%, catch of fish, sea animals, whales and sea products to 460%, etc. It should be added thereto that in extracting coal and iron ore, logging, and producing cement The Soviet Union gained first place in the world and in extracting oil and natural gas is second to USA only.

The magnitude of demand for natural resources by the industrial production exerts an ever-growing influence upon the location of industrial enterprises in view of its character. The influence is far from being identical for different industries.

The choice of regions and points of location of processing industrial enterprises is less bound with the location of primary natural resources. On the contrary, establishments of the extracting industries are bound close to the sources of materials.

Therefore, especial significance is acquired by a possibility of choosing a material source more effective for being exploited by these industries, this depending on how much the country is provided for with such resources.

Development of industrial production is entailed not only by the increase in requirements for respective kinds of natural resources but also by the change in the structure of raw materials and fuel consumed toward the increase in the share of mineral wealth, i.e. of the resources which are practically unrenewable. Utilization of these resources in industrial production is highly effective. The fact has, however, to have been taken into consideration already now that the ever-growing industrial demand for these resources, which are relatively scanty, will result in the necessity for the mankind to start exploitation of more deep deposits of minerals, of lower quality and more difficult to extract under their complex mining and geological conditions.

The fact is well known that the possibility of choosing the optimum version of location of extracting industries in relatively not large in territory a country is limited. In this aspect vast in area countries are in a better position since they have many possibilities of establishing a succession in the involvement into exploitation of the prospected deposits of mineral resources. Among these countries the USSR counted in where the mineral materi-

al base developed for the last three-four decades covers in excess of the requirements of the country's national economy for underground resources.

At present the Soviet Union is the first in world by its explored resources of iron and manganic ore and ores of many non-ferrous metals, mercury, tungsten, aluminum containing minerals (bauxite, nepheline), of chemical raw materials (phosphorites, apatites, potash salt, sulphur), by its total resources of coal, turf, timber, by its potential hydroenergetic resources. The country's mineral basis enables a broad complex of branches of industrial production to be developed on a required scale. Therefore, it is of particular importance for the USSR to ascertain the succession of launching exploitation of the most effective deposits. This problem is rather complicated if the fact is taken into consideration that the most part of its natural resources is the East, relatively less developed regions of the country. In locating industrial enterprises this has to be taken into consideration.

... Labour Resources as a factor of Location.

The geography of population exerts rather great an influence upon the location of industrial production. This influence counts not only in the character but also in the structure of industrial location. Other things being equal, (providing with natural resources, achieved level of scientific and technological progress), the maximum economic effect is ensured in case of agreement of location of industrial production and of location of population.

Rather an original state has historically arisen in the Soviet Union. More than $3/4$ of its total population lives in its West regions (inclusive of Urals), it is over about $1/3$ of its territory. These regions produce over $4/5$ of the total of industrial output of the whole country and consume about the same part of the total of fuel and electric power.

The vast areas of the East regions are populated insufficiently, there being, however, concentrated the main natural resources of the USSR. All this has led to the fact that location of industrial enterprises in the East regions and in the West regions each has its own specific character.

In the regions of the European part of the USSR, main attention is paid to the location of greatly labour consuming industries first of all, and in the East regions of greatly energy and fuel consuming industries based on own low-cost raw material, fuel and energetic resources. At such an approach, not only rational utilization of labour resources is achieved in the whole country, but also the most effective natural resources are involved into the production, as well as a number of other problems are solved of more rapid industrialization of recently economically underdeveloped regions of the country's national outskirts.

When locating industrial enterprises in the West, densely populated regions, one has to take into consideration the necessity of solving the problems of small and medium-size towns. The presence of small town-type settlements with a small population makes the construction of big industrial establishments therein difficult, and besides this does not solve the problem of efficient utilization of labour resources in all such regions. Thus,

labour resources influence the choice of the optimum size of enterprise, too.

2.3 Scientific and Technological Progress and Location of Industry.

One of the most important factors of increasing the economic efficiency of industrial location over the territory of a country is the utmost utilization of the achievements in science and technology.

The latest achievements of science and technology in many branches of industry and first of all in electric power generating in the chemical industry, metallurgy, machine building make the construction of big and very large productive establishments and complexes economically expedient. The increase in their economic efficiency is, in first place, achieved through increasing the capacity of individual machines and plants, this being inseparably linked with the scientific and engineering progress.

The growth in concentration of production and rise of its technological level require a new approach to the problems of industrial location and to planning of complex development of individual territories of the country. The experience of the USSR shows that location of big and very large establishments as well as their complexes over the Soviet Union's territory should be reasonably combined with the location of medium-size and relatively small enterprises, in particular, those of the light and food industries. As well in the heavy industry, not every extantion of enterprises may be economically efficient. In other words, the optimum not the maximum size of a new or reconstructed establishment should be chosen. And it should be taken into account that the choice of a point of location for an enterprise individually

may only be efficient if the problem is solved with regard to a whole complex of interrelated establishments both existing and under construction as well as in prospect to be located in this region or industrial centre in the near future.

Increased efficiency of industrial location with regard to the achievements of science and technology depends firstly on the electric power generating capacities whose scale of development, in first place, determines the level of economic development of a country. On a level with that, the scientific and technological progress in energy generating itself represents one of the most important factors of improving the location of industrial production. The possibility of constructing large-scale electric power stations generating a great amount of electric energy, establishing powerful energetic networks capable of transmitting this cheap electric power through hundreds and thousands kilometres, all this exerts direct influence upon the character of location of industrial establishments over the country's territory, contributes to increasing the efficiency of not only transport and economic links but also of the whole industrial production.

In virtue of the progress in chemistry, vast potentiality have arisen for chemization of the country's national economy, extension of utilization of raw material resources, establishment of new complexes of industries. In combination with electrification chemization of the national economy creates objective preconditions for increasing the efficiency of location of the whole industrial production in the country, union republics and economic regions.

Development of complex mechanization and automation leads, as is well known, to cutting down the labour consumption in the

industrial production and, hence, to proportional reduction in the demand for manpower. This is of particular importance to the regions where shortage in labour resources is observed but where other conditions very favourable to development and location of industrial enterprises therein exist.

In the USSR such regions are to the east of the Urals. On the other hand, the existing region-to-region natural and climatic differences impose their effect upon the character of technological development. The geographic position, area of a mineral deposit, conditions of its exploitation and others, all this require application of various techniques even in one and the same branch of extractive industry. Also the processing industries bring their own demands to engineering and technology.

Thus, it is necessary for the planning of location of productive forces to take into account the interrelationship of technological progress and local natural and economic conditions of development of national economy industries.

The ever-growing influence of scientific and technological progress on the location of industrial production manifests the vital importance of the problem of comprehensive consideration of not only the level of technological development having been reached but also the potential achievements of science and technology in prospect. This must be taken into consideration because the establishments projected, in particular such as metallurgical works, big electric power stations, chemical combines, have, first of all, run more than a single decade.

2.4. Transport Factor

Location of industrial production, geographic division of labour to and specialization of regions depends to a great extent

on the level of development and geography of the transport system. The influence of the transport factor is sharply intensified in the countries where there are long distances between consuming regions and producing centres. The speed and cost of haulage are economic factors of great importance to and influence upon the development and location of production. High speed and low cost of haulage are dependent on the level of development and equipment of the transport system, its density in the territory, coordination between separate types of transport, etc.

The main demands made by industrial production of the transport are increase in the speed of delivering goods and passengers, and decrease in the cost of transportation. These can be met by virtue of technical reconstruction of the transport means and system on the latest scientific basis.

The postwar years have brought great development of pipeline and electron-carrying types of transport. The USSR exemplifies this rather graphically. In comparison with 1940, the total length of the trunk pipelines has grown $7^{1/2}$ times as long and is at present over 30.000 km long. About 9/10 of the oil extracted in this country is delivered through trunk oil pipings. The gas transporting pipelines trunks which is about 55.000 km long in total has been established in the postwar years. In 1967 the gain of the natural gas in the Soviet Union totalled almost 160 milliards cu.metres which is equivalent to about 230 millions tons of coal.

The development of pipeline transport has had a very great effect on the increase in efficiency of other kinds of transport, and in first place, of railways, but also on the geography of the

oil and gas extracting industries of the country since exploitation of these progressive kinds of underground resources became possible also in remote, underdeveloped regions and under severe natural and climatic conditions. So, in a few years about half the all-union output of natural gas will be from regions of West Siberia, that is from regions very remote from the main industrial centres and transport ways of the USSR.

Great potentialities for further rationalization of the industrial location is provided due to the forced development of electron transport. In comparison with 1940 the length of electric power transmission lines of 35-kW and higher tension has grown more than 16 times as long and is now over 300.000 km, the 400-800 kW lines being 10.000 km long.

The importance of air transport is growing in difficult-of-access and thinly populated regions where other kinds of transport is not developed and there are unfavourable conditions for the development thereof.

The experience of the USSR manifests that the economic significance of measures of developing transport means is not to be measured by the saving on transport costs only. It is also necessary to take into consideration the effect the transport has on the development of production as its general factor: industrial enterprises are located, agriculture develops, new towns spring up in the regions near by the new transport way, etc. Construction of new railways and motor roads, development of new lines of river navigation improve the structure of the existing transport system and its manoeuvrability, shortens the hauls, and in the end, increase the efficiency of location of industrial en-

terprises and, hence, the efficiency of the development of the whole production. This effect will be the stronger, the larger is the country's territory and where the transport network is still underdeveloped.

3. Geographic Division of Labour and Complex Development of Economic Regions. Economic Zonation.

Location of industrial production in the USSR is based on planned territorial (geographic) division of labour and on a system of economic regions according to the above. Within the vast territory of the Soviet Union regions are determined each having favourable conditions, natural and economic, for developing certain industries on a large scale. Location of industrial enterprises of all-union or many-regions importance preconditions for establishing, in the same region, associated enterprises (energy generating, transport, building materials industry, municipal economy, etc.) In the process of further development formation of centres takes place which in their total form up a productive complex of the economic region. Thus, complex development of economy in an inseparable agreement with the specialization of the region represents a combination of industries and inter-associated enterprises which is optimum for the given level of development of productive forces. It is intended to provide for the most efficient utilization of natural and labour resources, productive capacities of establishments and transport means.

The level of development of the economy, the effects of scientific and technological progress and, in first place, prospecting and exploitation of new sources of raw materials and energy, the ever-growing concentration of industrial production,

all this leads to ever new features acquired by the specialization and complex development of economic regions. First of all, an increase in the number of specializing industries is observed in every republic and economic region, which leads to still closer links between industrial establishments. Hence, complex development of national republics and economic regions preconditions combining industries with associated branches and correct intraregional cooperation of enterprises. At the same time the regional complex includes also branches which satisfy not only the specializing industries but also the local needs of the region.

Further improvement of specialization of economic regions and rationalization of interregional links depend, in the first place, on the extent of optimization of the round of industries which have to receive necessary development side by side with the specializing branches in every economic region.

It is of great importance that the plans of development and location of industrial production provide for the achievement of the most economically effective structure of industries and the most economical links between enterprises in the economic complex of the economic region.

As the scale of industrial production is increasing, there grows the necessity of constructing enterprises designed to satisfy the own needs in each economic region.

It is reasonable that in each economic region a number of enterprises of building material and of light and food industries processing local raw materials are devoted to a degree at which the own needs are completely satisfied. The above list of industries which are reasonable to develop in each economic region is

not of any universal character and obligatory to all economic regions. It should be taken into consideration what general level of industrial development has been achieved in the country, how is it provided for with natural resources, also account should be taken of the size of the region itself, its geographic position, transport network, density and character of settling of its population and other factors. In the USSR there are economic regions each having a territory which is a few times as large as the territories of Great Britain, France, Italy, FRG in total.

Problems of economic planning the productional zoning is of no decisive importance to countries which are small in territory, therefore the problems and ways of specialization and complex development of their national economy should firstly be considered on the scale of the whole state. Anyway, the complex of industries in an economic region in such a country will not comprise a wide range of various branches since there may be the case that even on the all-state scale development of some or other industries will prove to be inefficient.

Hence, when solving the problems of specialization and complex development of economic regions, one has to proceed from not only local but also all-state interests and potentialities.

Under the conditions existing in the USSR, the efficiency of location of industrial production is influenced by the economic zoning, that is by the division of the country into large economic zones each of which unites a group of near-by economic regions.

The formation of economic zones is of paramount significance to the complex exploitation of natural resources, to concentration of production, reasonable cooperation of specialized enterprises,

to their material supplies, speeding-up of turnover, and to reduction of excessively long haulages.

The formation of economic zones makes it possible to solve such important problems of national economy as establishment of large metallurgical, fuel-producing and energy-generating bases as well as development of the most rational economic ties to provide for an increase in the economic efficiency of the whole national economy of the country.

Within the boundaries of an economic zone, more effective solutions can be found of problems of cooperation of large-scale machine-building plants, etc.

Three big economic zones are ascertained in the USSR's territory: European part of the country, the Urals, and the regions to the east of the Urals.

Each of these zones is of its own specific character and has to solve certain tasks of the national economy.

In the east zone, general attention is paid to the development of, mainly, the highly labour-consuming branches of industrial production (machine-building, light, food and chemical industries), to enhancement of the fuel and energy base, further development of the iron-and-steel industry, gas- and petrochemistry.

The Urals are a connecting link between the east and west regions of the country. Here has already been established a wide-range economic complex of industries which on its own basis of various raw material resources. The leading role in the complex is played by the iron-and-steel and non-ferrous industries, machine building, chemistry and some other branches of heavy industry. In prospect, the main attention in the Urals will be attached to ex-

tending the capacities of the existing establishments and to enhancing the fuel and energy basis.

In the east economic zone, there concentrated the main resources of coal, hydraulic energy, lead, zink and tin ores, gold, diamonds and other natural resources of the country. Utilization of all this wealth is associated with vast investments on pioneering development of a considerable part of that territory. These investments will be repaid by the high efficiency of many mineral and energetic resources.

With regard to the shortage of labour resources in the east zone priority is gained by the development and location of highly energy-consuming but low labour-consuming branches of industrial production. Great attention is attached to the creation of more favourable living conditions for the population since many regions in this zone are notable for unfavourable natural and climatic conditions.

Scientifically grounded regioning of production and consumption of raw materials, fuel and products, development of more improved a structure of economy in the national republics and economic regions, rationalization of intraregional and interregional productional links all over the country - all this provides for the maximum economic effect to be obtained at the minimum expense of human and materialized labour.

4. Development of Industry in National Republics.

Industrial production in the former Russian Empire was notable for not only its low level of development but also its deformed location over the territory. It was concentrated in a few industrial centres in the European part of the country. And a num-

ber of basic industries which gained the highest rates of profit were to a considerable extent under control by foreign capital (mining, machine-building industries).

About 3/4 of pig-iron yield and almost 9/10 of the whole coal yield in the country was taken in the South mining region. Over 9/10 of the total oil yield of the Tsarist Russia came from the Caucasus. More than half the product of the manufacturing industries came from the Central provinces and St. Petersburg, Kazakhstan, Middle Asia, Transcaucasus and other national outskirts were the most underdeveloped industrially.

"The Rights of Peoples of Russia Declaration" - one of the first legislative acts of the Soviet State - proclaimed the equality and sovereignty of all peoples of the country, their right to free-determination, repealed all national discrimination which existed before. The establishment of legal equality had not, however, in itself solved the whole of the national problem yet. There were many examples in the history where an underdeveloped country had been proclaimed independent nominally but continued being a raw material appendage of a metropole, having a corresponding structure of economy which was advantageous to the metropolis and did not provide for rapid rise of the material welfare and culture of the population in the underdeveloped country. This way of the industrial development in the national republics of the USSR could not go. That is why liquidation of the historically established economic inequality of the central and outlying regions had become one of the fundamental principles in the location of industrial production in the USSR.

Rapid rates of developing the economy and culture in the

Russia's national outskirts underdeveloped before proved to be possible only with broad economic help of all peoples of the country. That is why, already in the first years of Soviet Power, whole works and factories were rebased from the central industrial regions in the European part of the USSR into the Middle Asia regions which had been far backward, and supply of various machinery and other equipment thereto had been intensified. Scientists, experienced engineers and technicians, skilled workers, public health and education workers have been sent thereto and helped not only in developing the local economy but also in training national specialists and skilled workers.

National specialists and workers were trained also at higher and medium-level special educational institutions in Moscow, Leningrad and other important industrial centres and also at progressive industrial establishments in the country.

Prominent scientists and specialists of the Soviet Union take part in scientific expeditions for studying the natural wealth in the national republics. This work resulted in discovering a plurality of deposits of various useful minerals extracting of which had contributed to comprehensive development of economy in the republics and raised their proportion in the USSR's economy.

As long ago as before the world war industrialization of the national republics was established. The changes which were in progress after the world war in their industrial development are witnessed by the evidence concerning the whole eastern zone which comprises the economically most backward before national regions.

In comparison with 1940 the proportion of the eastern regions in the all-Union production of the most important industri-

al products increased in 1966: in electric power generating from 9.2% to 24.6%; in oil extracting from 6.3% to 8.0%; in natural gas output from 0.5% to 17.7%; in coal mining from 28.7% to 40.5%; in manufacturing of metal-cutting machine-tools from 1.6% to 5.3%. Now, the share of these regions in the all'Union output of iron ore is 16%, of mineral fertilizers 16%, about 1/10 of smelted iron and steel, and rolled iron and steel, a little below 1/5 of artificial fibre, etc. Due to higher rates of industrial development in the formerly underdeveloped national republics the gap between their levels of economic development and that of the highly developed regions of the country has for the years of Socialist construction reduced to 1/8 - 1/9.

At present, the economy of each union republic is a highly extended complex of branches of industrial production. For example the industrial complex of Uzbekistan counts over 70 industries, inclusive of iron and non-ferrous metallurgy, gas, oil, coal, chemical industries, various machine-building branches, a broad round of industries of building mineral materials, light and food industries.

The most significant feature of the development and location of industrial production in the national republics is their general orientation toward their own natural resources. The economic structure of national republics differ from one another rather substantially. This is accounted for not only by the diversity of natural resources but also by historic conditions, customary habits of the people, geographic position, etc. When long-term plans for development and location of industrial production are worked out, all these features are taken into account.

In the economic structure of each national republic there

are industries whose output is consumed all over the country, this is industries of the all-Union specialization. In the Baltic republics such industries are low metal-consuming machine building instrument making; in Azerbaijan - oil and chemical industries, precision machine building and instrument making, etc. The rest of industries of the republic's complex of national economy is, as a rule, developed to an extent necessary to satisfy the local requirements. In planning the location of enterprises of industries relating to the all-Union specialization, the part of the national republic in the all-Union production of the given product is first of all taken into consideration. For instance, in Kazakhstan, there are very favourable conditions for the development of fuel and chemical industry, iron and non-ferrous metallurgy. The scale of production of these industries is, however, dependent on the consuming capacity of the whole country's national economy and on the possibility of satisfying the demand for the given product in the most effective way.

Economic collaboration of national republics, extension and strengthening of their economic ties is organized in the way of specialization and cooperation of enterprises. As is well known, the higher the level of industrial development, the greater the need in construction of specialized establishments since such are favourable to the development of large-scale and mass production, thus providing for the highest productivity of labour, better utilization of equipment, cutting down the production costs.

Cooperation of specialized enterprises entails reduction of excessively long and opposite hauls of goods and parts, favouring more effective development of economy in each national re-

public and establishment of the most rational inter- and intraregional economic ties.

Thus, comprehensive development of all-Union specialization industries favours the acceleration of development of economy in the national republics and the strengthening of their interregional ties. And it should be noted that at subh location of industrial production the latter is achieved as close to its sources of raw materials, fuel and energy as possible.

No oversimplification is admissible in solving the great and complicated problem of levelling the economic development of the national republics. Gradual equalizing their levels does not mean any absolute levelling. The latter is not reasonable, nor possible, too, because of the differences in the natural and economic conditions in the national republics.

Cutting down the gap between the levels of economic development in the national republics of the USSR is and will further on be in progress in the way of strengthening the republics' specialization in the industries for which there are favourable natural and economic conditions in the republics.

5. International Division of Labour, Its Influence on Location of Industries.

With the World Socialist system arisen in the postwar years, a new type of international division of labour has been established which had substantial an influence upon the location of industrial production in each country of this system. International Socialist division of labour is based on the principles of sovereignty and equality, and mutual benefit and friendship of all peoples.

Coordination of national economic plans of the World Socia-

list System's countries, which is the main means of planned regular improvement of the international division of labour, is aimed at bringing into effect the interrelated objective principles of this division of labour, these including:

- determination, for each country, the necessary proportions of economic development to be provided for its economic being balanced;

- ensuring such rates of growth of production which most fully satisfy the requirements of the population in each country at minimum expenses of social labour;

- achievements of the most comprehensive utilization of all type resources by establishing correct correlation of international division of labour and complex development of economy in each country;

- overcoming of the historically established inequality in the level of economic development of some countries through their industrialization based on the utmost utilization of the internal potentialities of each country as well as of the advantages of the World Socialist system as a whole.

Coordination of the national economic plans, which is carried out both in bilateral and in multilateral ways, concerns first of all the industries of international specialization and cooperation, and transport which serves the international goods turnover.

International division of labour is assumed to expect in each Socialist country, development of its fuel, power and raw material industries, increase in proportion of the industrial branches which provide for scientific and technological progress, especially of machine building and chemical industries, develop-

ment of the building materials, light and food industries based on own resources of raw materials, development of agriculture, transport and communications. The division of labour ensures accelerated industrial development of formerly underdeveloped regions of the country and full employment for its able-bodied people.

The scale and structure of industrial production in each Socialist country is determined with regard to the necessity of obtaining the utmost effect on the basis of international division of labour. The rise in productivity of social labour, it being the main criterion of economic efficiency of such division of labour, is achieved, in particular, through the most reasonable location of productive capacities for the output of similar and interchangeable products.

6. Methodological and Methodic Problems of Increasing the Economic Efficiency of Industrial Location .

With the increase in industrial production, with the acceleration in scientific and technological progress in all branches of national economy, especially in connection with utilization of new sources of raw materials and energy, with the broadening of the range of interchangeable materials, solving the problems of the economic efficiency of the location of industries is more complicated.

All this makes it necessary to elaborate a wide range of methodological and methodic problems of determining the economic efficiency of further location of industrial production.

One of the starting requirements to the estimation of the efficiency of location of new enterprises is comprehensive study and correct evaluation of the regional diversities in natural and

and economic conditions. This presumes working out of a system of regional technical and economic indices and of methods of using them. Paralelly, it is of great importance to have scientifically grounded methods of determination of regional diversities in rates of consumption of materials, fuel, energy, expenses on labour, of calculation of the efficiency of interchangeable resources, of the estimation of the optimum sizes of industrial enterprises in various regions, etc.

The industrial location of enterprises might prove to be economically ineffective if designing versions have been carried out without taking into account the regional balances of fuel, energy and raw material resources expected to be utilized.

Thorough economic calculations by means of which determination is obtained of regions and points of construction of new industrial enterprises are to take into consideration not only the direct but also the associated investments and costs as well as the rationality of the future links of those enterprises and complexes thereof with the resources of materials, fuel and energy and with the regions and points of consumption of their output.

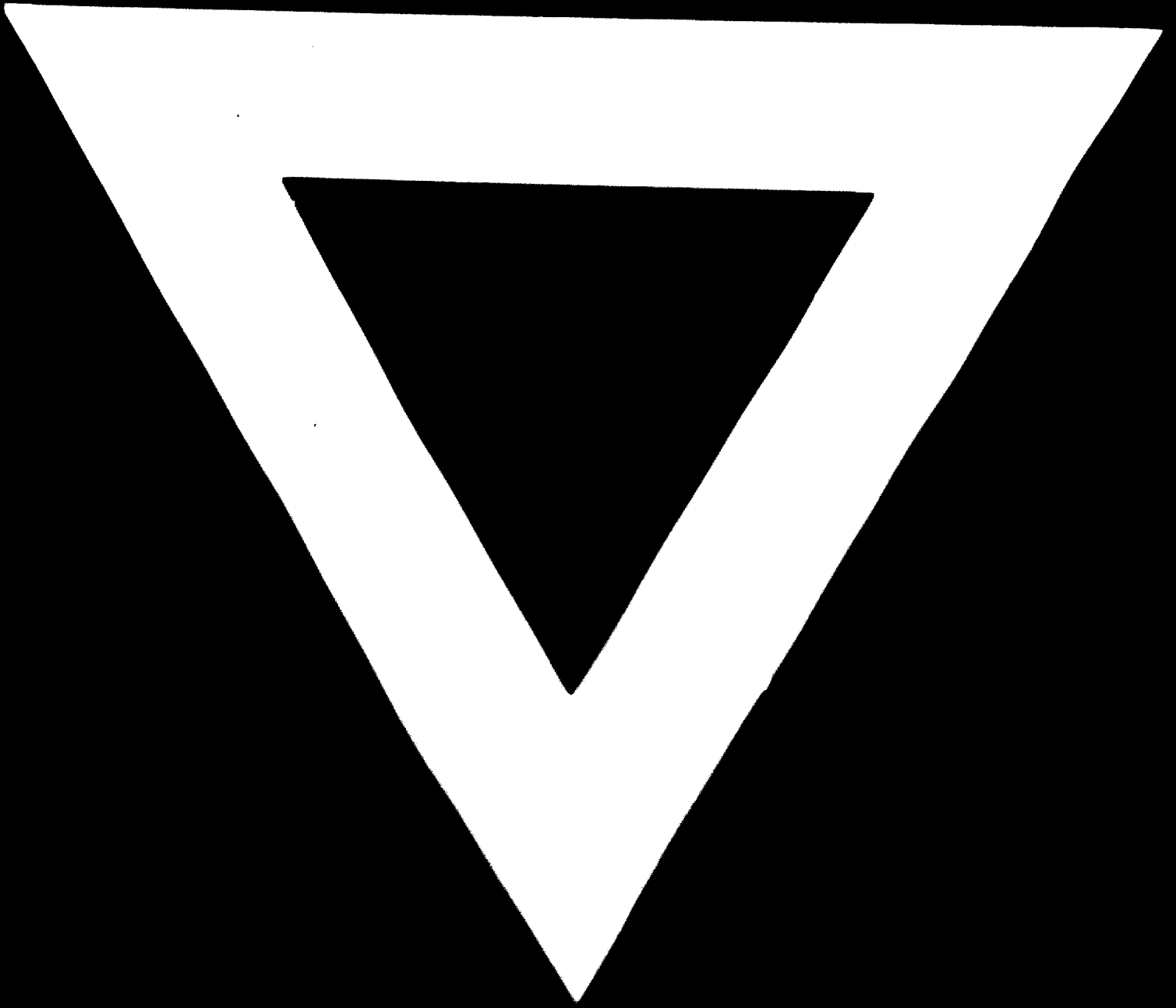
Location of industrial production, which depends on a plurality of factors is a sphere of economic problems many of which are most exactly solvable by means of mathematical economic methods and electronic computing techniques.

Many scientific and planning institutions are engaged in rationalization of locating industries. They have worked out special methodic aids which help in making technical and economic calculations for choosing the most effective versions of location of industrial enterprises and complexes. Among such kind aids it is advisable to mention "Methods of Estimating the Economic Effi-

ciency of Location of Industries in Planning and Projecting New Construction" prepared by the Institute of Economics, USSR Academy of Sciences, "Principal Methods of Working Out the General Scheme of Location of Productive Forces in the USSR for the period 1971 - 1980" proposed by the Council for the Study of Productive Forces, USSR Gosplan, and others.

There has already been rather voluminous literature on the problems of improving the location of various branches of industry and of the industry as a whole.





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