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SOVIET-CHINESE SCIENTIFIC INVESTIGATIONS  
OF THE AMUR BASIN

by N. N. Nekrasov and V. A. Shelest

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OF THE AMUR BASIN

Following is a translation of an article written by N. N. Nekrasov and V. A. Shelest in Izvestiya Sibirskogo Otdeleniya Akademii Nauk SSSR (News of the Siberian Department of the Academy of Sciences USSR), No. 10, Novosibirsk, 1959, pages 5-14.<sup>7</sup>

The governments of the USSR and the Chinese People's Republic have concluded an agreement to carry out scientific-research and exploratory-planning work jointly in the Amur Basin, for the purpose of studying conditions and prospects for the development of the productive forces on the Soviet and Chinese territories of the Basin.

This agreement has laid the foundation for broad joint work and constitutes a contribution to the cause of friendship and mutual aid between the two great nations, the Soviet Union and the Chinese People's Republic.

According to the agreement, scientific-exploratory work is to be conducted by the Amur Complex Soviet Expedition for the Study of Productive Forces of the Academy of Sciences USSR and the Heilungkiang (Amur) Complex Expedition of the Commission of Expeditionary Investigations of the Presidium of the Academia Sinica, Chinese People's Republic.

The work of the Soviet and Chinese Amur expeditions is being directed and coordinated by the Joint Scientific Council on the Problems of Amur. The main leaders of the research project on the Soviet and Chinese sides and representatives of local government organs are represented on a parity basis on the Council.

The planning and exploratory work in the Amur Basin is carried out jointly by the Leningrad Department of the Hydroenergy Projects of the Ministry of Construction of Electric Power Stations USSR and the Northeastern Department (City of Chanchun') of Hydroenergy Projects of the Ministry of Water Resources and Electric Power Engineering, Chinese People's Republic. The planning organizations are at present in the process of completing the draft of a plan aimed at utilizing the current of the upper Amur and choos-

ing priority projects for hydraulic engineering construction work.

Work on the drafting of plans for the utilization of the Amur tributaries is being carried out separately by these planning organizations on the territories of the USSR and the Chinese People's Republic.

Various Soviet and Chinese People's Republic scientific-research and planning organizations are taking part in work on the problems of Amur. A large volume of research is being carried out by the Far Eastern Affiliate of the Academy of Sciences USSR.

The Soviet-Chinese Complex exploration of the problems of Amur is being conducted on the basis of the principles of internationalism and mutual brotherly aid. Carried out on the basis of a single plan and under a single scientific leadership, this project constitutes a shining example of the great potentialities and advantages of socialist science.

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The problem of Amur is a major economic problem of international significance. It includes a broad complex of problems connected with the development of the productive forces of the Soviet Far East, Zabaykal'ye, and the Northeast (Dunbey) of the Chinese People's Republic.

The solution of this problem presupposes study of the natural conditions and the various kinds of natural resources (raw minerals, power engineering resources, forestry, fishery, agriculture); presentation and technico-economic evaluation of conditions and directions for utilizing them; characteristics of floods and damages caused by floods; development of an over-all plan for regulating the drainage of the Amur River and its tributaries; establishment of a over-all plan for the creation of a single electric power system in the Amur Basin; development of an over-all plan for mastering the transportation of the Amur Basin; an analysis of the present situation and the creation of a plan for the development of the people's economy in the Soviet and Chinese cis-Amur region; determination of the possibilities for future economic ties between the territories of the Chinese People's Republic and the Soviet Far East and Zabaykal'ye, and evaluation of the effectiveness of the people's economy in that region.

The area of the Amur Basin comprises 1.9 million square kilometers and is equal to the territory occupied by such states as Great Britain, France, the Federal German Republic, Italy, Spain, and Switzerland.

A little more than half of the area of the Basin is

located on USSR territory, 48 percent within the boundaries of the Chinese People's Republic, and approximately 1.5 percent on the territory of the Mongolian People's Republic. The rivers of the Amur Basin (the Argun', the upper and lower courses of the Amur, the Ussury) extend over more than 3,000 kilometers and serve as the natural boundary between the Soviet Union and the Chinese People's Republic.

The Amur Basin has a hilly surface, intersected by wide river valleys. Spacious plains suitable for agricultural purposes are situated at the upper reaches of the Argun' in Chitinskaya Oblast and the Inner Mongolia territories, in the Zey-Bureyinskiy and Sungary-Ussuriyakiy between-rivers area, and in the Sungary and Nonni valleys. From the source of the Onon until it discharges into the Tatarskiy Strait, on a 4.354 kilometer stretch, the Amur is the longest river in the USSR; the length of the Amur proper is 2,846 km. The Amur is conventionally divided into three sectors of roughly equal length: the upper Amur, from the location of the confluence of the Shilka and the Argun' to the mouth of the Zey River; the central Amur from the mouth of the Zey River to the mouth of the Ussuri River, near the city of Khabarovsk; and the lower Amur, from Khabarovsk up to the Amur estuary.

The Amur occupies fourth place among the rivers of the USSR and is eighth in the world in terms of the magnitude of its drainage. The annual drainage of the river is tentatively estimated at an average of 350 cubic kilometers of water.

The drainage of the Amur and its tributaries is marked by a sharp seasonal and perennial irregularity. Long low-water periods alternate with period of high summer and autumn rain floods. Thus, at the upper course of the Amur, near the village of Petrovka, the water drainage fluctuates within the limits of 1.5 to 12,000 cubic meters per second, and near the City of Khabarovsk, it fluctuates between 150 and 41,000 cubic meters per second.

Rain floods are the cause of the frequently occurring inundations of the Amur and its tributaries. The enormous, catastrophic floods which occur from time to time have caused tremendous damage to the people's economy of the Soviet and Chinese territories of the cis-Amur region, estimated in the hundreds of millions of rubles and yuans; they have disrupted communication lines, flooded cities and settlements, and hindered the development of the economy of a large kray. In the past, disastrous floods used to occur every seven or eight years on the average. But in recent years their frequency has noticeably increased. Very large inundations were observed in 1872, 1897, 1928, 1950, 1953,

1956, and 1958 in separate parts of the Basin. The valleys of the Zeya, Ussuri, Sungari, and lower Amur rivers suffer most from the overflowing of the rivers.

The development and implementation of effective measures in the struggle against floods is the most important problem facing the people's economy. The over-all utilization of the water energy of the Amur and its major tributaries and the utilization and mastery of the rich natural resources of the cis-Amur territories of the USSR and the CPR (Chinese People's Republic) are all connected with the solution of this problem.

The regions of the Amur Basin, notwithstanding the inadequacy of geological exploration, possess substantial reserves of useful ores. It is obvious that, in the future, not only will the resources of known kinds of useful ores be increased, but new kinds of mineral raw materials will be discovered.

Reserves of siderite-limonite and magnetite ores are known to exist in Preargunskiy Rayon of Chitinskaya Oblast. The reserves of the Berezovskiye deposits (which are the largest ones) are estimated at 500 million tons. A group of iron ore deposits with a total reserve of about a billion tons is located in Amurskaya Oblast. The reserves of ore at the Gar'skiye deposits are estimated at about half a billion tons with a 42 percent iron content. More than 30 deposits of ferrous quartzite, with a total geological reserve of one billion tons, are located in Malo-Khinganskiy Rayon of the Jewish Autonomous Oblast (EAO) of Khabarovskiy Kray; these include the Kimkanok and Kostanginskiye deposits, where the reserves are estimated at about half a billion tons, with an iron content of 35.5 percent. The Aldanskiy (Yuzhno-Yakutskiy) iron ore basin, which contains enormous reserves of high-quality iron ores, adjoins the Amur Basin on the north. Here, too, there is a mighty coal basin with good coking coal.

The regions of Soviet Preamur'ye possess vast zones in which deposits of polymetal ores, copper, solfram, molybdenum, and tin are concentrated. The numerous deposits of Chitinskaya Oblast, Khabarovskiy Kray, and Primor'ye may serve in the future as a mighty raw-material base for the development of a multi-branch industry of nonferrous and other valuable metals. There are also vast reserves of construction materials.

There are substantial forest resources in the Soviet part of the Basin. The forested area of the Soviet part of the Basin (excluding Chitinskaya Oblast) consists of more than 120 million hectares. The total lumber reserve is nine billion cubic meter. But until now the processing of lumber

has been conducted on a small scale.

The Soviet part of the Basin is characterized by a sparsely populated territory and an only slightly developed agriculture. The total population of this area consists of approximately four million persons. The average population density is 2.4 persons per square kilometer (in the USSR, it is nine persons per square kilometer). The density of the population of Amurskaya Oblast is particularly low -- two persons per square kilometer; in Khabarovskiy Kray, the density is only 1.4 persons per square kilometer.

Only approximately half of the available agricultural land reserve is used for agricultural purposes. Four million six hundred thousand hectares of land were used for agricultural purposes in 1957. The total sowing area consisted of one million eight hundred thousand hectares, including one million hectares of grain cereals.

The natural wealth of the cis-Amur territories of northeast China is great. Deposits of iron ores were discovered in the regions of Nun-chiang, I-ch'un, Chao-hei, Anshan--Pen-chi, and elsewhere; copper, in the regions of Yangtze, Hua-yen, Ai-kun; and raw materials for the aluminum industry in the regions of Pen-chi, Fuo-chao-wan, and An-tung. There are large known deposits of polymetals and lumber in a number of places.

The Soviet and Chinese regions of the Amur Basin possess very considerable electric power resources.

The total geological reserves of coal in the Amur Basin, according to our present knowledge, exceed 200 billion tons; more than 40 billion tons are found on the Soviet side and 160 billion tons on the Chinese side. The explored reserves of coal in the Soviet part of the Basin are calculated at 11.6 billion tons as of 1 Jan. 1958; these consist of 6.8 billion tons of pit-coal and 4.8 billion tons of brown coal.

After being properly enriched, the coal of the Bureyinskiy coal basin of Khabarovskiy Kray in Chitinskaya Oblast might be used for technological purposes. The geological reserves of coal of the Bureyinskiy basin are estimated at 25 billion tons. The coal belongs to the gas-coking, medium, and hard-to-enrich variety. The processing of coal and the derivation of coke, tars, and ammonia water are of interest. But the basic part of these coal resources may be used only for purposes of electric power. Of particular interest for purposes of stationary electric power (electricity stations) are the following brown coal deposits: Khabarovskoye in Chitinskaya Oblast, Raychikhinskoye in Amur Oblast, Bikinskoye -- on the boundary between Khabarovskiy and Primorskiy krays, where the extraction of

coal may be carried out by the open method in sections.

Prospects for utilizing the Kharanorskoye deposits are considerable. Reserves calculated as of 1 January 1958 are approximately 0.8 billion tons, and prospective reserves total approximately two to three billion tons. It will be possible to raise the total amount of coal extracted here in the future to up to 15 to 20 million tons per year with a prime cost of six to eight rubles per ton. By virtue of its reserves of coal and the possibility of their utilization, the Kharanovskiye deposits are at the present time the sole explored base for very powerful (more than one million kilowatt) thermoelectric stations in the regions of Zabaykal'ye.

The largest and most thoroughly explored deposits of Amurskaya Oblast are the Raychikhinskoye brown coal deposits (half a billion tons). The Raychikhinskiy coal, extracted by the open method, may have a self-cost value of 18-20 rubles per ton.

The Bikinskoye deposits of brown coal on the territory of Pozharskiy Rayon of Primorskiy Kray, which is presently being explored, are of great interest for purposes of electric power. According to preliminary estimates, the geological coal reserves of these deposits are two to three billion tons.

The large, high-quality reserves of brown coal in this deposit, its favorable location with regard to large industrial centers and sources of water supply, and the possibility of organizing extraction by open methods, all make it likely that the Bikinskoye deposits will become a primary base of electric power of the Khabarovskiy and Primorskiy krays. The prospective reserves of coal in the Chinese part of the Basin are also quite substantial.

The largest deposits of coal (mostly coking) are found in Kalgan, Chi-hsi, Hsun-ya-shan, Po-li, Mi-shan, and elsewhere. In the southern part of the Dunbey (North-east), there are the deposits of Fu-shun, Pen-chi, Fu-hain, Pei-p'iao, as well as others. There are considerable reserves of brown coal in this territory, located mainly (90 percent) in the northern part of the Dunbey. Known deposits exist in Cha-lai-no-erh, Pei-an, and Hsu-lan. There are also large deposits of brown coal in Yuan-pao-shan and Yangtze in the southern part of the region on the territory of Lioning.

The larger deposits of brown coal on the Soviet and Chinese sides of the Amur Basin may serve as fuel bases for the future powerful thermoelectric power stations.

The potential water power resources of the rivers of the Amur Basin are quite large. According to the data of the Academy of Sciences USSR and the Academia Sinica

CPR, the average annual power of the watercurrent of the rivers of the Basin exceeds 45 million kilowatts (400 billion kilowatt hours of potential energy per year). This total includes 12.2 million kw which are contained in the main tributaries of the Amur, on CPR territory; approximately 12 million kw in the frontier sectors of the Amur, Argun', and Ussuri; and approximately 21 million kw in the lower Amur and the Amur tributaries on USSR territory. Power by rivers is distributed as follows: the Amur -- 14.3 million kw (along the entire river), the Zeya -- 7.1 million kw, the Ussuri -- 4.6 million kw, the Bureya -- 4.3 million kw, the Shilka -- 2.7 million kw, the Sungari -- 2.4 million kw, the Amgun' -- 1.9 million kw, the Sugary the second -- 1.8 million kw, the Nonni -- 1.5 million kw, and the Argun' -- 1.1 million kw.

There is also the possibility of obtaining large amounts of electric energy in the Amur Basin under the very favorable technico-economic indices for the production of electric power at thermo- and hydro-electric power stations.

It clearly follows from the foregoing that, even at the present stage of exploration, the economic regions situated in the Soviet and Chinese parts of the Amur Basin possess considerable mineral-ores, lumber, agricultural, and power resources. The utilization of these resources for the people's economy may sharply raise the industrial power of the Soviet Far East, Zabaykal'ye, and the Northeast of the CPR. The rational utilization of the natural resources of the Amur Basin presupposes the need for definite future cooperation between the economic regions of the Soviet and Chinese cis-Amur regions; in this way, maximum economic results will be obtained by both countries.

The further systematic study of the natural wealth of the Amur Basin will make it possible to broaden the raw material base of industry and to establish new industrial centers.

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The program of scientific research of the complex Amur expedition of the Academy of Sciences USSR and the Hei-lung-kiang Complex Expedition of the Academia Sinica CPR includes the creation of a scientific plan for the development of the productive forces on the territory of the Amur Basin.

In the past, the complex expeditions have achieved certain definite results with the support of the central and local Party and State organs. These explorations have covered numerous sparsely settled and underdeveloped

regions. A large volume of field expeditionary and office (kamerall'nyye) work was carried out and a wide range of materials were collected and generalized.

The Amur problem may be conventionally divided into problems of a geologico-geographical, hydraulic engineering, agricultural, industrial, power-engineering, and transportation nature.

The geologico-geographical aspect of the Amur problem consists in the exploration of the natural conditions of the Basin and in the discovery and technico-economic evaluation of its useful ores.

The geological structure of the Amur Basin was previously studied only on Soviet territory. The Chinese part of the Basin has been given very little attention in this respect.

Geological teams of the Amur Expeditions are drawing up plans for various geological structures and for the prospecting of useful ores in those sectors for which complete maps are still not available.

The expeditionary teams have carried out exploratory work in the vast mountainous regions of the northwestern slopes of Ta-hsing-an, Hsiao-hsing-an, Wang-ta-shan, Lao-ye-ling, Chang-kuang-ts'ai-ling, as well as in the central and eastern parts of Kirin Province.

On the whole, stratigraphy, petrography, tectonics, geological history and principles of the distribution of useful ores were clarified and geological maps were drawn up. The exploration of the climate, hydrology, and geomorphology of the Basin was conducted on a large scale.

The study of the climatic, hydrological, geomorphological, and geological peculiarities of the cis-Amur region will make it possible to determine more correctly the possibilities for the development of individual branches of the people's economy and the proper location of individual industries.

The Hydraulic Engineering Complex is one of the leading elements of the Amur problem. It includes the regulation of the drainage of the Amur Basin and its all-around utilization for the people's economy, control of floods, production of water power, improvements in navigational conditions, and implementation of hydro-ameliorative measures.

The control of floods in the Amur Basin constitutes the most urgent prerequisite for the broad economic utilization of the natural wealth of Soviet and Chinese cis-Amur region. Regulation of the drainage of the Basin, through the creation of capacious reservoirs on the Zeya, Bureya, Upper Amur, Nonni, and Sungary the Second rivers, as well as on certain tributaries of the Ussuri River, should be

recognized as the most effective measure in the control of floods.

Construction of dams in the Amur Basin presupposes the erection of hydroelectric power stations. The exploration by the Amur and the Heilungkiang complex expeditions and the hydroenergy projects of the CPR and the USSR have demonstrated the possibility of placing a large number of hydroelectric power stations on the large- and medium-size rivers of the Amur Basin.

Very large and economical hydroelectric power stations (GES) can be constructed on the Amur (four or five on the upper reaches, one at the middle, and two at the lower reaches), two or three stations on the Zeya, from two to four stations on the Bureya, and three stations on the Second Sungary. Smaller and economical hydroelectric power stations can be erected on the Selemdzhe, the Argun', the Shilka, the Nonni and its tributaries, and on the source and tributaries of the Ussuri.

The larger hydroelectric power stations on the Amur (Kuznetsovskaya, or Sukhotinskaya, Amazarskaya), the Zeya (Zeyskaya), the Bureya (Tyrmenskaya, Zhelundinskaya), and Sungary the Second (Lung-wyang-mao and others) will supply electric power at a cost-price within the limits of 150 to 1.2 kopecks per kwh with a capital investment of 30-50 kopecks per kwh annual production -- including flood damage -- even if all construction costs are charged against electric power engineering.

Erection of water reservoirs will make it possible to raise the water level of the river during low-water periods and will improve navigational conditions. Low-water conditions will be eliminated by letting out water from reservoirs and subsequently, by erecting a cascade of hydroelectric power stations and by creating an uninterrupted series of reservoirs and sluices.

In addition to regulating drainage and improving navigational conditions over sectors of rivers which are difficult to cross, the following water-way connections can be made in order to utilize further the water transportation of the Amur Basin:

- a) The Lower Amur with the Tabo Bay of the Tatar Strait through the Bol $\frac{1}{2}$ shoye and Maloye Kizi Lakes and the Tabo River;
- b) The Middle Amur through the Ussuri River, Khanka Lake and Suyffun River with the Peter the Great Gulf in the region of Vladivostok;
- c) The Amur with the Yellow Sea through Sungari and Lyao-hei.

A great deal of attention should be devoted to the problems of soil conservation. In addition to eliminating floods in the cis-Amur territories, it is very important to take measures to lower the level of the subsoil waters in muddy regions and to irrigate lands that suffer from drought.

Regulation of the drainage will have a positive effect on the fishing economy of the Basin. Arrangements for breeding valuable species of sweet-water fish should be made at the large artificial water reservoirs; at the same time, devices for the passage of fish should be planned for the dams of the Basin.

The agricultural complex of the Amur problem consists in the further development of agriculture. The improved utilization of the lands already in use, and the inclusion in agricultural production of new arable areas and pasture grounds. An increase of the volume of agricultural production is required in order to broaden the production base of the cis-Amur regions. In order to fully provide the population with agricultural products, it is necessary to increase the gross production of plant-growing three to four times and that of animal breeding six to eight times.

A solution of the agricultural aspects of the Amur problem would require the implementation of large-scale soil conservation projects, the application of the necessary kinds of fertilizers, a rational selection of farm cultures and cattle breeds, and the extensive mechanization and electrification of labor-consuming processes in farming.

The industrial power engineering aspects of the Amur problem include the creation of a powerful and economical base of power engineering which would fully and reliably provide for the power needs of the people's economy; at the same time, the existing branches of industry, production, and productive complexes in the Amur Basin must be developed, and new branches must be created.

One of the most important conditions for the successful development of the people's economy is the rational organization of a power engineering base in accord with the exigencies of an expedient distribution of the productive forces and the achievement of a high level of economic development.

The relatively uniform distribution of power engineering resources on the territory of the Basin will make it possible to create a powerful power engineering base in each region of the cis-Amur, without resorting to the transmission of energy over long distances. However, while solving the long-range problem of the electricity supply for the cis-Amur regions, it is necessary to orient oneself from the very outset to the parallel creation of electric stations and

electric power systems.

The need for creating power systems in the Soviet part of the Amur Basin has become especially urgent in view of the anticipated appearance of consumers of electric energy throughout the entire territory (the railroad which is being electrified and oil and oil products pipelines).

The utilization of the power engineering (and particularly water power resources of the Soviet and Chinese sides of the Basin will naturally necessitate the unification of the electric power systems of these regions into a single electric power engineering system (YEES) for the Amur Basin. Its connecting links may be the powerful hydrostations which are jointly used on the Amur: Sukhotinskaya, or Kuznetsovskaya, Amazaraskaya, Khinganskaya, as well as the Kharanorskaya and Bikinskaya regional condensatory electric power stations on USSR territory and the Cha-lai-no-erh Yangtse station on CPR territory.

The merger of the electric power systems of the Northeast of the Chinese People's Republic and the Soviet Far East, as well as the electric power stations of the Amur Basin, is an absolute necessity and will result in a reduction of electric power output (because of the reduction of the combined maximum load and the lowering of the reserve power). It will raise the power of the aggregates at the stations, improve the working order of the electric power stations, realize economies in fuel and in the unloading of transport, reduce the personnel at stations, etc.

Our knowledge of the natural resources of the Amur Basin makes it possible at the present time to outline certain general features of the development of the basic fields of industry in the regions of Soviet and Chinese cis-Amur.

The Council for the Study of Productive Forces of the Academy of Sciences USSR has suggested, as part of a program of scientific development, the creation of an electro-metallurgical plant in Amurskaya Oblast for the production of electric pig iron, steel, and rolled iron. This plant will utilize the ores of the Gar'skiy deposit and the electric power of the Zeyskaya Electric Power Station. The plant will be a component part of the system of ferrous-metallurgical enterprises east of Lake Baykal (the Nerchinskii metallurgic plant in Chitinskaya Oblast and the Chul'manskiy in Southern Yakutiya).

The large-scale production of polymetals and other metals needed by the people's economy can be organized in the southeastern rayons of Chitinskaya Oblast.

By virtue of their specialization, Primorskiy and Khabarovskiy krays constitute a major raw material base for the various branches of nonferrous and light metals product-

ion.

Petroleum can be obtained through the pipeline which at present runs in the direction of Bashkiriya-Novosibirsk-Irkutsk. It can serve as a raw material base for the manufacture of various synthetic materials in the rayons of the Soviet cis-Amur, including synthetic rubber, plastics, synthetic fibers, etc.

The organization of large-scale metallurgical industries will require the construction of coal-tar by-products plants; these will, in turn, increase the raw material resources of the chemical industry, particularly those used in the manufacture of synthetic materials.

Wood-pulp resources should be extensively utilized by the chemical industries. The nitrate and phosphorus fertilizer industry is of great importance in these regions.

The building materials, machine building, wood processing, light, and food industries should undergo extensive development.

The formation of new industrial bases and complexes in the Amur Basin presents a rather complicated technical and economic problem.

By way of conjecture, taking into consideration the current data on the natural resources of the Soviet part of the Amur Basin, it is possible to outline the following draft for the formation of new industrial bases and for their distribution:

a) The Amazarsko-Nerchinskiy industrial complex. The powerful condensatory electric station operated on Charnorskiy coal and the Amazarskaya hydroelectric may serve as the power base for this complex power station. The basic industries of the complex may consist of a polymetal group of plants (the smelting of lead, zinc etc.), light metal plants, mineral (phosphorus) fertilizer plants, and other plants producing chemical products. In the more distant future, titanium and copper-smelting industries may be organized here. The Nerchinskiy Metallurgical plant, the construction of which is being planned, also gravitates to this industrial complex.

b) The Zeysko-Svobodnenskiy industrial complex. The Zeyskaya hydroelectric power station (GES) of 800,000 klw can serve as the source of the power supply of the complex. The construction of this station is urgently needed in order to eliminate the disastrous floods in the Zeya and Middle Amur valleys. In addition, a certain quantity of electric power can be transferred to this rayon from the other power and hydroelectric stations (Kuznetsovskiy, or Sukhotinskiy GES, Raychinskiy TETS). The presence of iron ores, lignite, and cheap electric power will determine the industrial special-

ization of the Zeysko-Svobodnenskiy industrial complex. An electrometallurgical plant, metal machine building plants, nitrate fertilizer enterprises, wood processing plants, and wood-pulp chemical plants may serve as basic industrial enterprises.

c) The Blagoveshchensko-Raychikhinskiy industrial complex. The central hydroelectric power station (the Sukhotinskiy, or Kuznetsovskiy alignment would serve as the power base for this industrial complex. It would be expedient to create a petroleum-refining and petro-chemical group of enterprises in this rayon. The chemical oil products are the raw materials for the manufacture of plastics, synthetic rubber, synthetic fibers, detergents, etc. Plants for the production of rubber could be set up, and, where necessary, ammonia and ammonium nitrate producing enterprises could be established.

The Chabarovskiy industrial group of enterprises is presently being formed around the middle course of the Amur River. Basically, this is a center for the various branches of machine building. The future construction of the Bikin-skiy Hydroelectric Power Station and the powerful Khingan-skiy Hydroelectric Power Station will exert a great influence on the economy of Khabarovskiy Kray. It may be advisable to create a specialized group of enterprises in Malo-Khinganskiy Rayon for the production of nonferrous metals. The problem of creating a coal-processing group of enterprises utilizing Bureinskiy brown coal should be studied.

A major industrial center in the region of the city of Komsomol'sk-on-the-Amur is being developed at the lower reaches of the Amur River. Machine building and chemical plants for the processing of lignite are being erected here. Machine building and nonferrous metallurgy will in the future be further developed in Primorskiy Kray.

The people's economy in the Chinese regions of the Amur Basin will develop at a rapid rate. Northeast China already occupies first place in the Chinese People's Republic in the production of the basic types of industry, including ferrous and nonferrous metals, machinery, electrical equipment, chemical products, wood-pulp, etc. It is also first in the development of transportation lines and power installations.

The volume of industrial and agricultural production has risen sharply under the conditions of the realization of the big leap forward in the development of the Chinese people's economy begun in 1958. Dunbey, Harbin, Tsitsihar, Changchun, and other cities, have become large centers of heavy machine building. Kirin has become the

center of the chemical industry and Kalgan, Hsun-ya-shan, Chi-hsi, Liaoyang, and Cha-lai-no-reh have become centers of the coal-extracting industry. Various branches of industry are being built up in Mutanchiang, Chiamussu, Kungchuling and other cities.

The Heilunkiang Complex Expedition of the Academia Sinica CPR has prepared scientifically substantiated proposals on the long-range development of the various areas of the people's economy on the Chinese territory of the Amur River Basin.

The problem of developing economic cooperation between the USSR and the CPR in the work of the complex study of the Amur Basin is of great importance.

The distribution of natural resources in both the Soviet and Chinese sections of the Amur Basin has in certain instances its own specific differences; as a result of these differences, favorable conditions are created for broad economic cooperation and for a more rational division of labor. Flood control measures in the Amur Basin must be carried out through the joint efforts of the CPR and the USSR. A single electric power system for the Amur Basin must come into being. The development of metallurgy in both parts of the Basin could be realized by utilizing both the coking coal of the Chinese part of the Basin and Soviet iron ores. Transportation between the Northeast of China and the Soviet Far East must be further developed.

Soviet-Chinese cooperation will contribute toward an accelerated development of the productive forces on both territories of the Amur River Basin.

A close, sincere friendship has developed between the Soviet and Chinese scientists and engineers on the basis of their joint work in solving the Amur problem. The Chinese people, who have marked the glorious 10th anniversary of the proclamation of the Chinese People's Republic, have the best wishes of the Soviet scientists as well as of all the Soviet people for further successes on the road to building Socialism in their country.

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