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FLOW CHART FOR DEVISING NATIONAL ECONOMIC PLANS

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[Article by B. V. Labrents, Yu. R. Leybkind and B. L. Rudnik, Moscow; submitted 18 April 1977]

[Text] Centralized economic planning is the nucleus of the entire system for guidance of the national economy in an advanced socialist society and the principal instrument for conducting the social welfare and economic policy of the Communist Party.

A substantial number of the projects to improve economic planning are being carried out as part of the work of setting up the ASPR [computerized system for planning computations]. The first phase of this system has now been accepted for operation, and preparations are under way to develop and introduce the second phase, whose delivery is scheduled for 1980 [1, 2]. The main thrust in projects related to setting up the second phase of the ASPR is to execute the systems approach to solving the problem of improving economic planning. The systems approach makes it possible to single out the development of planning methodology and methods in the following principal aspects as the initial link in that process: the system of plans, the way in which plans are broken down, the system of planning indicators and planing methods.

Synthesizing them could produce the flow chart for compiling the system of economic plans. Development of that flow chart includes the following aspects:

i. definition of the principal stages in the compilation of plans in conformity with the established planning method;

ii. singling out groups of tasks performed in each of the stages and analysis of their interconnections;

iii. creation of units which group together those planning tasks performed in different stages of planning but with a common substance and the same underlying methods in order to devise a uniform technology for their performance;

iv. assignment of specific tasks to relevant units in the organizational structure of planning agencies;

v. determination of the sequence in which planning tasks are to be performed.

In the present stage it is difficult to work out detailed flow charts for planning because of the enormous number of planning computations and the indeterminacy of information links among them. But in our view there is an obvious benefit to be derived from constructing such charts even if the planning tasks are subjected to a rather high degree of consolidation because these charts enable us to get more orderly conceptions of the process whereby economic plans are compiled, to trace the most important flows of economic information, and to enumerate the basic tasks of each of the planning agencies. Construction of a single flow chart for the process of economic planning opens up broad opportunities to run mathematical-economic models and combinations of models on it by connecting the appropriate inputs and outputs on the basis of the information links among the various planning tasks which are set forth on the flow chart.

The present article proposes a possible variant of the flow chart of the process for compilation and interlinkage of economic plans in the integrated planning system [3]. It describes the process at the upper levels of the planning system, levels represented by policymaking bodies, the central planning agencies of the country and of the union republics, union ministries and departments, and agencies which devise comprehensive national economic programs. Within the central planning agencies functional units working on the plan's various sections and breakdowns are distinguished.

The long-range plan, the 5-year plan, and the annual plan make up the system of plans. The first of these is compiled in three stages: the shaping of a conception, devising the main strategies and compilation of the elaborate draft. The long-range plan, which is free from the impact of inertial factors to a considerable degree, opens up broad prospects for economic maneuvers that presuppose not only variation of the plan's quantitative characteristics, but in addition both the definition and assessment of quantitatively different lines of development of the socioeconomic system. The possibilities for using a purposive and normative approach are substantially augmented when a plan is being compiled for a long period of time.

Figure 1 shows the flow chart for the stage in which the conception of the long-range plan is devised.

The following notation has been adopted for this figure and those to follow: A--policymaking bodies; B--central planning agencies; B_1--unit for summary

forecasting and planning, B_2--unit for work on the programmed part of national economic plans, B_3--units for forecasting and planning in the various domains of social development (social welfare, science and technology, the regional aspect, foreign relations, and the administrative system), B_4--units for forecasting and planning the principal types of resources (physical, capital, manpower, natural and financial resources), B_5--units for forecasting and planning the development of intersectorial complexes in the economy; C--agencies devising comprehensive national economic programs; D--planning agencies of the union republics and economic regions; E--ministries and departments of specific sectors and industries.

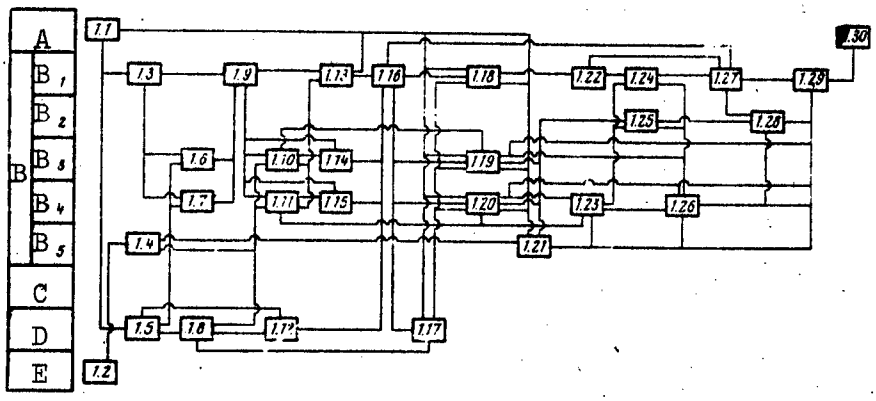

Figure 1. Flow chart for development of the conception of the long-range plan.

The notation used for the units in the flow chart represented in Figure 1 is as follows: 1.1--formulation of the directives representing the basic propositions concerning the country's long-range socioeconomic development; 1.2--preparation of partial sectorial forecasts; 1.3--breakdown of the overall goals in the country's socioeconomic development to the level of the units within central planning agencies; 1.4--preparation of forecasts of the development of intersectorial complexes in the national economy; 1.5--shaping the basic goals of the socioeconomic development of the union republics; 1.6--more detailed statement of goals related to the various domains of social development; 1.7--more detailed statement of goals related to development of the system of resources; 1.8--preparation of partial regional forecasts and ranking the goals of socioeconomic development of the union republics; 1.9--structuring the set of goals in the country's socioeconomic development; 1.10--preparation of comprehensive forecasts for certain sectors of social development and ranking the goals which correspond to the various sectors of social development; 1.11--preparation of comprehensive forecasts of the resources most important to the national economy and ranking the goals in development of the system of resources; 1.12--quantification of goals of the socioeconomic development of the union republics; 1.13--preparation of the summary forecast of the national economy and ranking the goals of the country's socioeconomic development; 1.14--quantification of goals of the individual sectors of social development; 1.15--quantification of goals to be met in building up potential economic resources necessary to achievement of goals for the future; 1.16--arrangement of the quantified goals into

a system; 1.17--detection and analysis of problems in the socioeconomic development of the union republics; 1.18--detection and analysis of macroeconomic problems; 1.19--detection and analysis of problems in individual sectors of social development; 1.20--detection and analysis of problems in creation of potential economic resources required to achieve the goals for the future; 1.21--detection and analysis of problems in development of intersectorial complexes in the national economy; 1.22--preparation of variants of the indicators and proportions applicable to the entire economy in the long-range plan; 1.23--detection and analysis of problems in furnishing basic types of resources to the national economy; 1.24--determination of variants of the national economy's makeup in terms of sectors and industries; 1.25--formulation and analysis of problems which must be solved in compiling the comprehensive programs of the national economy; 1.26--development of a system of balance sheets reflecting production and distribution of the principal types of resources; 1.27--determination of the indicators representing the specific goals of the long-range plan and summary indicators and proportions in the national economy; 1.28--preparation of the list of comprehensive national economic programs; 1.29--preparation of the draft of the conception of the long-range plan; 1.30--approval of the conception of the long-range plan.

The considerably broader freedom of choice among economic and socioeconomic solutions makes it of paramount importance to the long-range plan that we have scientific prediction of future lines of development of society's needs and capabilities for satisfying them, and these forecasts then serve as the basis for the goals of the long-range plan. Its central problem, then, is to register the interaction among economic and sociopolitical processes and scientific-technical progress. In the long run their integration is an exceedingly important aspect of planning, which is why comprehensive and intersectorial problems have leading importance to the long-range plan. In the context of these problems development of a system of long-range forecasts describing the assumed development of the various spheres of the socioeconomic system and the consequences of this or that variant of its development becomes especially important to compilation of a long-range plan that is sound in every respect.

The system of forecasts is represented in the flow chart by partial (sectorial and regional) forecasts (1.2; 1.8), by forecasts of the development of intersectorial complexes within the national economy (1.4), by comprehensive forecasts (1.10; 1.11) and by the summary forecast of the national economy (1.13).

The partial forecasts encompass all the principal aspects of society's development and serve as the basis for constructing forecasts at the level of the national economy. They provide an integral picture of the development of the various sectors of the national economy and of specific industries, of resources, of trends in science and engineering, and of new technological possibilities. These forecasts assess the prospects for utilization of manpower resources and the natural environment, and they describe social processes, foreign economic aspects of development, and so on. The partial

forecasts are prepared within ministries and departments and regional administrative agencies and are submitted to central planning agencies. The following are reflected in the partial sectorial forecast (1.2): the national economy's projected need for the output of the sector; volume and composition of production of the most important products; scientific-technical progress in the sector; the sector's need for natural, material and manpower resources, fixed capital and capital investments; opportunities for export and import of products, raw materials and equipment; ecological consequences of the sector's development; the social consequences of the sector's development; and variants of geographic location of the sector's enterprises over the country.

The second group of partial forecasts is made up of forecasts of the development of the union republics and economic regions (1.8). The purpose of regional forecasting is to obtain a comprehensive assessment of the prospects of the region's socioeconomic development by developing and correlating the following basic forecasts: social-demographic forecast and the forecast of the standard of living; forecasts of the development of sectors and spheres of the region's economy; forecasts of the development and exploitation of natural resources and of environmental protection.

Forecasts of the development of intersectorial complexes in the national economy [4] are prepared on the basis of the partial sectorial forecasts (1.4). Since each sector prepares a forecast of its own development on a relatively independent basis, central planning agencies have the problem of reconciling these forecasts in view of the need to solve the problems most important to the national economy which each of the complexes might have in supplying the economy with certain types of resources or in satisfying certain social needs. One can, then, distinguish two stages in preparation of the forecast of the intersectorial complex's development. The following are determined in the first stage: the complex's volume of finished output and the composition of that output; the volume and composition of output used within the complex; the need for resources from outside the complex; indicators of scientific-technical progress; the geographic location of the complex's productive forces over the country; indicators of foreign relations; and potential ways of improving the organization of production and management of the complex. Consolidated variants of the industries making up the complex are composed in the second stage.

The comprehensive forecasts (1.10; 1.11) are prepared on the basis of information to be obtained from the relevant partial forecasts and forecasts of the development of intersectorial complexes within the national economy. Each of them covers a particular aspect of the country's socioeconomic development and contains a qualitative description and consolidated quantitative description of it.

The following list of comprehensive forecasts might be proposed relative to the tasks of compiling the long-range plan:

i. comprehensive forecasts of certain spheres of social development: social welfare, demographic development, scientific-technical progress and its socioeconomic consequences, geographic location of the productive forces and the development of the infrastructure, foreign relations, and development of the system of administration;

ii. comprehensive forecasts of the resources of the national economy: materials and supplies, fixed capital, natural resources, the status of the environment, and manpower.

The most important task is to reconcile the various comprehensive forecasts within a single summary forecast of the national economy (1.13). The fact that each of the comprehensive forecasts is prepared in more than one variant sharply increases the possible number of variants of the summary forecast. At the same time, the basic requirement which each variant must meet is that its qualitative characteristics be internally compatible and that its quantitative characteristics be internally consistent in consolidated terms. To meet this requirement one must single out the several "basic" requirements (for example, food, housing, etc.) which are most important over the period covered by the forecast and those "basic" products and technologies most important to determination of economic structure, and then these serve as the basis for composing variants of the summary forecast of the national economy and for more detailed reconciliation of other interrelated characteristics of the comprehensive forecasts.

The basic structure of the summary forecast of the national economy might be represented as follows:

i. description of the sociopolitical conditions of the country's development;

ii. synthetic indicators of the development of the national economy;

iii. consolidated quantitative characteristics (along with substantiation) of the most important types of needs which have been singled out and of the support factors related to them;

iv. consolidated indicators of the output of "basic" products and of development of "basic" technologies.

As the forecasts are prepared, the country's long-range development goals are also brought into systematic relation with one another. This process includes the following functions: statement of the overall goals in specific terms (1.3; 1.5; 1.6; 1.7; 1.9), the subgoals denoted are ranked (1.8; 1.10; 1.11; 1.13) [5], and the goals are quantified (1.12; 1.14-1.16) [4]. The goals are developed into a system within the functional units that have been distinguished (B_1, B_3, B_4) within central planning agencies, each of which works on its appropriate fragment. This makes it necessary to correlate the various fragments, and this is done by stages in the unit for summary planning and forecasting (1.9; 1.13; 1.16).

Comparison of the forecasting information with the system of goals makes it possible to distinguish and formulate problems in development of the socioeconomic system (1.17-1.21; 1.23), some of which determine the basis for shaping the programmed portion of the long-range plan. It is a complex and multistage process to work out the comprehensive national economic programs and to reconcile them with the nonprogrammed portion of the national economic plan. In the stage of composing the conception of the long-range plan only its initial stages are accomplished, those stages that encompass detection and description of problems which can be solved only by working out comprehensive programs (1.25) and by making lists of them (1.28).

One of the key factors in working out the conception of the long-range plan is the preliminary determination of indicators relative to specific goals (1.27), which differ from the quantified goals themselves in that they reflect the realistic possibility of meeting needs in view of the level that has been reached in development of the productive forces and resource potential [3, 4]. If central planning agencies are to substantiate and objectively assess capabilities and methods of accomplishing the goals confronting the country, the values of the goal-specific indicators of the long-range plan must be determined for all the intervals of the planning period for purposes of determining the degree of satisfaction of the particular needs at precise moments of time, so that the realistic trajectory of development of the socioeconomic system on the line toward achievement of its ultimate goal can be discovered. Organization of the process of the distribution of resources among the various goal-achieving systems must take into account, first, the limited nature of resources at any particular moment and, second, the need to provide stability and proportionality in development of the national economy as a whole. The technology of the computations involved in the distribution of resources and in determination of the values of the goal-specific indicators of the long-range plan presupposes that a system of balances be worked out to encompass distribution of materials and supplies, fixed capital, manpower, natural resources and financial resources in breakdowns by sectors and industries, by regions and by programs (1.26) and then that the results of distribution of the various types of resources be reconciled and correlated by iteration with the need for them in the breakdown of national economic programs and problems in social development both with respect to each type of resource separately and also for their entire aggregate (1.27). The process of compiling the conception of the long-range plan ends with the composition of its variants (1.29), which are consolidated descriptions of alternative strategies of social development. The full-fledged draft of the conception of the long-range plan includes the following sections [3]: problems in the country's development (including the following: socioeconomic development, scientific-technical progress, foreign political problems, and foreign economic relations); the goals of the long-range plan; the list of comprehensive programs; resources; and the summary section.

The full-fledged draft of the conception of the long-range plan is submitted to policymaking bodies for approval (1.30).

Figure 2 shows the flow chart for development of the basic strategies in the long-range plan.

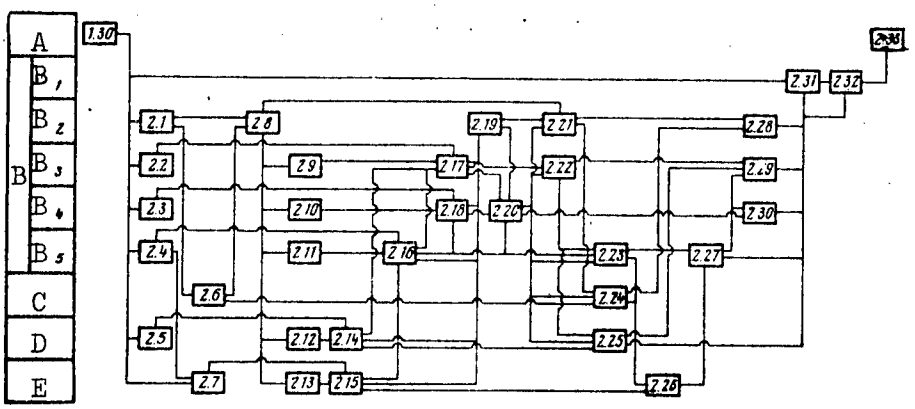

Figure 2. Flow chart for development of the basic strategies in the long-range plan.

The following notation has been used in Figure 2: 2.1--preparation of the initial targets for development of the preliminary draft of national economic programs; 2.2--precise definition of the indicators in the conception of the various sectors of social development; 2.3--precise determination of the indicators in the conception of development of the system of national economic resources; 2.4--precise determination of the indicators in the conception of development of intersectorial complexes in the national economy; 2.5--precise determination of the indicators in the conception of the socio-economic development of the union republics; 2.6--preparation of preliminary drafts of national economic programs; 2.7--development of indicators of the development of sectors and industries; 2.8--examination of the variants of the preliminary drafts of national economic programs and selection of the most effective ones; 2.9--preparation of the program-by-program breakdown of the principal strategies of the long-range plan for the various sectors of social development; 2.10--preparation of the program-by-program breakdown of the principal strategies of the long-range plan for development of the system of national economic resources; 2.11--preparation of the program-by-program breakdown of the principal strategies of the long-range plan for development of intersectorial complexes in the national economy; 2.12--preparation of the program-by-program breakdown of the principal strategies of the long-range plan for development of the union republics; 2.13--preparation of the program-by-program breakdown of the principal strategies of the long-range plan for development of specific indices and sectors; 2.14--interlinkage of the indices of the programmed and nonprogrammed portions of the principal strategies of the long-range plan for development of the union republics; 2.15--interlinkage of the indicators of the programmed and nonprogrammed portions of the principal strategies of the long-range plan for development of sectors and industries; 2.16--interlinkage of the indicators of the programmed and nonprogrammed portions of the principal strategies of the long-range plan for development of intersectorial complexes within the national economy; 2.17--interlinkage of indicators of the programmed and nonprogrammed parts of the principal strategies of the long-range plan within

the various sectors of social development; 2.18--interlinkage of indicators of the programmed and nonprogrammed portions of the principal strategies of the long-range plan for development of the system of national economic resources; 2.19--preparation of estimates of the effectiveness of the comprehensiveness programs from the standpoint of the national economy; 2.20--preparation of balances of production and distribution of the principal types of national economic resources; 2.21--adjustment of the indicators embodied in the initial targets used in development of national economic programs in conformity with the indicators of the supply of resources and estimates of the effectiveness of the programs from the standpoint of the national economy; 2.22--adjustment of indicators corresponding to the various sectors of social development in accordance with the indicators of available resources; 2.23--adjustment of the indicators of development of intersectorial complexes in the national economy in accordance with the indicators of available resources; 2.24--adjustment of the preliminary drafts of national economic programs in accordance with the indicators of available resources; 2.25--adjustment of the indicators of development of the union republics in accordance with the indicators of available resources; 2.26--adjustment of indicators of development of individual sectors and industries in accordance with the indicators of available resources; 2.27--preparation of the draft of principal strategies of the long-range plan for development of intersectorial complexes in the national economy; 2.28--preparation of the draft of the programmed section of principal strategies of the long-range plan; 2.29--preparation of the draft of the principal strategies of the long-range plan for the various sectors of social development; 2.30--preparation of the draft of the principal strategies of the long-range plan for development of the system of national economic resources; 2.31--determination of the summary indicators of the principal strategies of the long-range plan; 2.32--preparation of the draft of the principal strategies of the long-range plan; 2.33--approval of the principal strategies of the long-range plan by policymaking bodies.

The main job to be accomplished by calculations in the stage of outlining the principal strategies of the long-range plan is to work out the preliminary draft of the comprehensive national economic programs, to construct the indicators of the programmed and nonprogrammed parts of the plan and to accomplish their preliminary interlinkage. The tasks in socioeconomic development as defined by the variant of the conception which has been adopted are first itemized. In this stage the functional units of the planning system work out recommendations concerning composition of the various sections of the plan and to determine the relative indicative values of indicators (2.2-2.4). Composition of the program-by-program breakdown of the principal strategies of the long-range plan begins at the same time; its first stage is preparation of the preliminary drafts of the national economic programs [6]. Initial targets to be used in their preparation are prepared by central planning agencies on the basis of the list of programs drawn up when the conception was composed [6]. The preliminary drafts of national economic programs are composed (2.6) on the basis of those targets. They are submitted for examination to central planning agencies. Every draft must contain several variants of the program. These variants are analyzed, and the most effective one is chosen (2.8); the program-by-program targets and the figures

on the volume and composition of resources allocated to meet those targets are communicated to those responsible for performance.

On the basis of the preliminary drafts, each of which contains a description of a definite program as a separate complex of interrelated measures, the programmed portion of the principal strategies of the long-range plan is worked out for the various sectors of social development: scientific-technical progress, environmental protection, and so on (2.9), development of the system of resources (2.10), and intersectorial complexes within the national economy (2.11). The programmed and nonprogrammed parts of the principal strategies of the long-range plan are then correlated (2.16-2.18). In every functional unit estimates are made of the effectiveness of programs, and summarization of those estimates (2.19) makes it possible to examine the effectiveness of each program from the standpoint of the plan as a whole.

In the following stage balances of production and distribution of principal types of national economic resources are worked out (2.20). Discrepancies concerning certain types of resources and consumers are discovered on the basis of a comparison of information which the relevant units supply on the need for resources with the figures already determined on their distribution, and the previous figures obtained for production and use of resources are adjusted. Targets are then assigned to complexes producing resources, and figures are obtained on the volume and composition of resources allocated to perform those assignments; indicators reflecting development of the union republics are then arrived at. These figures are sent to units for planning the development of complexes in the national economy and to the planning agencies of the union republics. Data on the volume and composition of resources allocated for social welfare, scientific-technical development, and so on, are sent to the respective units, where the indicators arrived at previously are adjusted on that basis (2.21; 2.22). Total volumes of each type of resource and the relative importance of the individual goals are used as points of departure in revising the figures on the volume of resources allocated to achieve those goals and the corresponding goal-specific indicators. The following are then determined: targets for complexes in the national economy involved in fulfilling the particular goals; figures on the volume and composition of resources allocated to fulfill those goals; and indicators of the development of the union republics. This material is sent to units for planning complexes in the national economy and to the planning agencies of the union republics.

In the final stage the distribution of the most important types of resources is taken into account in order to adjust indicators computed in the previous stages in the functional units, and then the entire list is drawn up of data which will go into the draft of the principal strategies of the long-range plan (2.27-2.31).

We will examine the composition and peculiarities of the principal groups of these indicators (for more detail see [4]).

It is very important to determination of the tasks of social development (2.29) that the goals be stated in terms of propositions that describe the ultimate results of the economic decisions. Total outlays (capital investments, material resources, etc.) to accomplish the social welfare program are at the same time determined in the long-range plan. The indicators of social development can be divided into general social indicators and those depicting the rise in the people's standard of living. Social-and-demographic indicators play an important role among the general social indicators. First among these is the total population of the country; this is broken down by regions, an urban-rural breakdown is used, and the composition of the population is described in terms of social and ethnic aspects, sex and age. Moreover, a determination is also made of the number of families and of family size, the boundaries of working age (the average age at which people begin to work, the average duration of active work), etc. Indicators of the people's standard of living include the following: general value characteristics and data on personal consumption, development of the service sector, public education, health care and culture.

The indicators of scientific-technical development (2.29) can be divided into three groups: the main lines of scientific-technical development; scientific-technical programs; and scientific-technical progress in various fields of science, engineering and economics.

The task of regional planning is to select that variant for geographic location of the country's productive forces which ensures that the manpower and natural resources of the various regions will be rationally utilized from the standpoint of the national economy and that will minimize transportation costs for movement of raw materials and products. Indicators of development of the infrastructure, which build up conditions for effective realization of the variant that has been chosen (2.29), are also determined. The indicators for geographic location of the productive forces and for development of the infrastructure must in their final form meet social and ecological requirements. The long-range plan's indicators concerning geographic location of the productive forces include the following: characteristics of the general features of the geographic location of production (for example, the national income produced in the European part of the USSR); data on development of individual regions, including the gross product, the national income, and so on; output volumes for those products most important to the national economy; the need for resources, including resources to develop sectors and industries under republic subordination.

The importance of foreign relations and the diversity of their form are steadily increasing in the present stage. When the long-range plan's indices are being devised (2.29), consideration must also be given to such forms of relations with foreign countries as trade-and-economic relations, relations in the domain of capital construction and development of natural resources, monetary and financial relations, scientific-technical relations, and cultural relations.

As indicators of development of the system of management and administration are developed (2.29), it is imperative to depict measures aimed at improvement of methods and equipment used in management and at improvement of the organizational structure and the mechanism of the economy. Improvement of management methods and devices is bound up with further development of ASU [computerized management system], which are based on extensive use of electronic computers and the methods of mathematical economics. The indicators of the long-range plan relevant here include the following: the volume and composition of production of management devices in an itemized list by principal types (electronic computers, data collection and processing equipment, and so on) and also in a breakdown by standard-design installations which have been approved for operation; the figures on distribution of management devices, data on activation and utilization of the largest systems; total costs and cost breakdown for development of the system of management and administration proper and for development of production industries related to it.

Figures on development of national economic resources (2.30)--supplies and materials, fixed capital, manpower, natural resources and financial resources--are an exceedingly important part of the system of indicators reflecting the principal strategies of the long-range plan.

As with the aspects of development of the national economy we have already examined, the indicators reflecting the planned growth of the system of resources must first clearly reflect its goals, whose achievement signifies a given volume and structure of production (utilization) of resources, and second, they must describe measures and fix the magnitude of outlays required to accomplish the quantified goals. The indicators of development of physical resources are as follows: the volume of production and distribution of physical resources; summary data on production and distribution of material resources; the requirement for the resources of industries producing material resources.

In the long-range plan the indicators of the production and distribution of material resources are computed for a limited range of the most important "basic" industrial products; choosing them is an independent problem and can be done by various methods (on the basis of an analysis of the functions of the output of a sufficiently broad range of products and production of the particular product; by singling out some initial or end product within the aggregate under study as the "basic" product; by adopting as the "basic" product an aggregate of products which have similar performance characteristics and production technologies). These indicators must be measured in physical units or certain conventional units which have physical significance and which if possible afford not only a quantitative assessment of the output of the "basic" products, but also of their performance characteristics.

Indicators of the need for resources include the following: the volume of the need for principal resources within each group; costing factors for the production of resources reflecting its efficiency (labor intensiveness, the

capital-output ratio, and so on) and their reciprocals (labor productivity, the capital-output ratio, and so on).

The long-range plan's indicators reflecting development of the system of fixed capital must include the following: the total volume of fixed capital as a whole and separately for productive capital, which in turn is broken down into its active and passive portions; the volume of the most important types of fixed assets; the distribution of fixed capital; amounts of fixed assets put into operation, with separate indication of those resulting from reconstruction and new construction; the volume of state capital investments and the volume of construction and installation work; outlays of resources to develop sectors and industries producing capital assets.

In the planning of manpower resources one must first see to meeting the needs of the members of socialist society for jobs and second to the national economy's need for manpower.

The following are among the long-range plan's indicators of development of the system of manpower resources: the total volume of the country's manpower resources; distribution of manpower resources among fields of employment (social production, housekeeping, and personal subsidiary farming); the volume of manpower resources for the principal occupational-skill groups; the composition of manpower resources with respect to sex and age; the distribution of manpower resources among national economic programs, regions and intersectorial complexes; the scale of personnel training (within specific complexes and for national economic programs); the volume and composition of outlays; and data on long-range measures to accomplish planned migration of the population.

Indicators of the development and distribution of natural resources must be developed in close conjunction with the planning of measures for environmental protection to realize the goal of meeting man's needs with respect to the quality and diversity of the environment. Various forms of natural resources are used in the national economy: minerals, fuel and power, water, land, timber, biological resources, etc. The adequacy of natural resources is reflected by two groups of indicators. The first group consists of the volume of prospected reserves of the relevant types of resources. The second group includes the volume of production and utilization of natural resources of each type.

The long-range plan must contain computations of indicators describing the diverse aspects of development of intersectorial complexes in the national economy (2.27), above all the output of the complex's end product. These indicators include the following: indicators describing the results of the complex's operation (the volume of output of the end product as a whole and for elements in the product mix); data on scientific-technical progress in the sectors and industries producing the end product (criteria of production efficiency--labor productivity, the capital-output ratio, and so on; the scale of introduction of new equipment, new types of products and services; and the technical level of production); the need for exchange of products

within the complex in order to produce the end product; the need for external resources (materials and supplies, fixed capital and manpower resources)* to produce the end product; indicators of the social consequences of development of the sectors and industries producing the end product (working conditions, the wage level by occupational-skill groups, etc.); and data on ecological consequences of development of sectors and industries producing the end product.

Output consumed within the complex is reflected by the following indicators: its volume and composition, the training of specialists within complexes, scientific-technical progress, the social and ecological consequences of development of sectors and industries producing products consumed within the complex, foreign relations, and the need for internal resources.

The third group is made up of indicators reflecting geographic location of the complex's productive forces. The fourth group consists of indicators reflecting activity of the complex as a whole (the volume of gross output, the total volume of fixed productive capital, and so on).

The summary indicators of the national economic plan are arrived at by following procedure (2.31). They are "start-to-finish" indicators for all stages of planning. The general orientation of plans to accomplish the country's long-range development goals is obtained primarily by means of the principal summary indicators, which constitute the framework of the unified system of long-range, 5-year, and annual plans.

Development of the principal strategies of the long-range plan ends with the composition and approval of the draft of those strategies (2.32; 2.33), which follows this basic outline:

I. Goals of the Long-Range Plan

II. Summary Indicators of the National Economy's Development

III. Comprehensive National Economic Programs

IV. Development of Intersectorial Complexes Within the National Economy

V. Manpower Resources

VI. General Outline for Geographic Location of the Productive Forces

VII. Socioeconomic Development of the Union Republics and Economic Regions

VIII. Environmental Protection and Rational Utilization of Natural Resources

* External resources would be resources produced by other complexes in the national economy and imported resources consumed in the process of producing both the end product itself and also products exchanged within the complex.

XIX. Development of Foreign Relations

X. Improvement of Planning and Management Administration

In the next stage of compiling the system of national economic plans work is done simultaneously on the draft of the long-range plan and the principal strategies of the medium-term plan for the first 5-year period covered by the long-range plan. This approach differs from that proposed, for example, in [7], which proposes that the 5-year plan be compiled after the long-range plan has been worked out.

Figure 3 shows the flow chart for development of the draft of the long-range plan and the basic strategies of the 5-year plan.

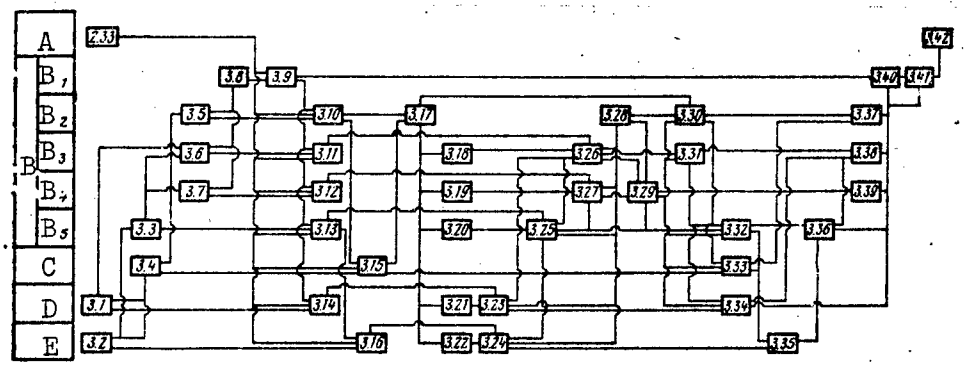

Figure 3. Flow chart for drafting the long-range plan and basic strategies of the 5-year plan.

The following notation has been used in Figure 3: 3.1--analysis of the course of fulfillment of the previous 5-year plan for the economic development of the union republics; 3.2--analysis of the course of fulfillment of the previous 5-year plan for development of specific sectors and industries; 3.3--analysis of the course of fulfillment of the previous 5-year plan for development of intersectorial complexes within the national economy; 3.4--analysis of the course of fulfillment of national economic programs; 3.5--analysis of accomplishment of the programmed section of the previous 5-year plan; 3.6--analysis of the course of fulfillment of the previous 5-year plan in the breakdown by specific sectors of social development; 3.7--analysis of the course of fulfillment of the previous 5-year plan for development of the system of resources; 3.8--analysis of the summary indicators of the previous 5-year plan; 3.9--preliminary determination of the summary indicators of the draft of the long-range plan and the principal strategies of the 5-year plan; 3.10--preparation of initial targets for development of full-scale drafts of long-range national economic programs and preliminary drafts of medium-term national economic programs; 3.11--preliminary determination of the indicators of the draft of the long-range plan and the principal strategies of the 5-year plan for the principal sectors of social development; 3.12--preliminary determination of the indicators of the draft of the long-range plan and of the principal strategies of the 5-year plan for development of the system

of national economic resources; 3.13--preliminary determination of the indicators of the draft of the long-range plan and of the principal strategies of the 5-year plan for development of complexes in the national economy; 3.14--preliminary determination of the indicators of the draft of the long-range plan and the principal strategies of the 5-year plan for economic development of the union republics; 3.15--preparation of full-fledged drafts of long-range national economic programs and determination of their stages to be accomplished in the first 5-year period--preparation of the preliminary drafts of medium-term programs; 3.16--preliminary determination of the indicators of the draft of the long-range plan and the principal strategies of the 5-year plan for development of sectors and industries; 3.17--examination of the variants of the drafts of long-range national economic programs and selection of the most effective ones; preparation of the list of stages of long-range programs to be accomplished in the first 5-year period; examination of variants of preliminary drafts of medium-term programs and selection of the most effective ones; 3.18--compilation of the programmed portion of the draft of the long-range plan and of the principal strategies of the 5-year plan for individual sectors of social development; 3.19--preparation of the programmed portion of the draft of the long-range plan and the principal strategies of the 5-year plan for development of the system of national economic resources; 3.20--preparation of the programmed portion of the draft of the long-range plan and the principal strategies of the 5-year plan for development of complexes within the national economy; 3.21--preparation of the programmed section of the draft of the long-range plan and of the principal strategies of the 5-year plan for economic development of the union republics; 3.22--preparation of the programmed section of the draft of the long-range plan and the principal strategies of the 5-year plan for development of sectors and industries; 3.23--interlinkage of the indicators of the programmed and nonprogrammed parts of the draft of the long-range plan and the principal strategies of the 5-year plan for economic development of the union republics; 3.24--interlinkage of the indicators of the programmed and nonprogrammed parts of the draft of the long-range plan and the principal strategies of the 5-year plan for development of sectors and industries; 3.25--interlinkage of the indicators of the programmed and nonprogrammed parts of the draft of the long-range plan and the principal strategies of the 5-year plan for development of intersectorial complexes within the national economy; 3.26--interlinkage of the indicators of the programmed and nonprogrammed portions of the draft of the long-range plan and of the principal strategies of the 5-year plan in the breakdown by specific sectors of social development; 3.27--interlinkage of the indicators of the programmed and nonprogrammed portions of the draft of the long-range plan and of the principal strategies of the 5-year plan for development of the system of national economic resources; 3.28--preparation of estimates of the effectiveness of comprehensive programs from the standpoint of the national economy; 3.29--development of balances of production and distribution of the principal types of national economic resources; 3.30--adjustment of the figures embodied in the initial targets used in developing drafts of national economic programs in conformity with the indicators of resource adequacy and estimates of the effectiveness of programs from the standpoint of the national economy; 3.31--adjustment of indicators for the individual sectors

of social development in conformity with the indicators of resource adequacy; 3.32--adjustment of the indicators of development of intersectorial complexes in conformity with the indicators of resource adequacy; 3.33--adjustment of the drafts of national economic programs in conformity with the indicators of resource adequacy; 3.34--adjustment of the indicators of economic development of the union republics in conformity with the indicators of resource adequacy; 3.35--adjustment of the indicators of development of sectors and industries in conformity with the indicators of resource adequacy; 3.36--composition of the draft of the long-range plan and the principal strategies of the 5-year plan for development of intersectorial complexes; 3.37--composition of the programmed portion of the draft of the long-range plan and the principal strategies of the 5-year plan; 3.38--composition of the draft of the long-range plan and the principal strategies of the 5-year plan in a breakdown by specific sectors of social development; 3.39--composition of the draft of the long-range plan and the principal strategies of the 5-year plan for development of the system of national economic resources; 3.40--determination of the summary indicators of the draft of the long-range plan and the principal strategies of the 5-year plan; 3.41--composition of the draft of the long-range plan and the principal strategies of the 5-year plan; 3.42--approval of the draft of the long-range plan and the principal strategies of the 5-year plan by policymaking bodies.

On the basis of the variant of the principal strategies that has been adopted, the draft of the long-range plan is composed by further breaking down the elements and by correlating the tabulations and sections of the plan on a balance sheet, taking into account the results in fulfillment of the previous 5-year plan (3.1-3.8).

Work on the drafts of the comprehensive national economic programs comes to an end in the process of compiling the draft of the long-range plan. A list is simultaneously drawn up of the stages of those programs which are to be accomplished in the first 5-year period of the period covered by the long-range plan. The sequence and priority for fulfillment of the various programmed measures over the years of the 5-year period are determined, and preliminary drafts of medium-term programs are compiled (3.10; 3.15; 3.17). The programmed section of the long-range plan and the principal strategies of the 5-year plan is composed on that basis (3.18-3.22).

On the whole the technological processes involved in composing the principal strategies and the draft of the long-range plan coincide. The full-fledged draft of the long-range plan has the same basic structure as the draft of the principal strategies except that the draft of the long-range plan contains an additional section in which the principal strategies of the first 5-year plan are specified. This section in turn is structured as follows:

I. Goals of the Five-Year Plan

II. Summary Indicators of the National Economy's Development

III. Comprehensive National Economic Programs

IV. Social Development and Raising the Prosperity of the People

V. Scientific-Technical Progress and the Efficiency of Social Production

VI. Development of Intersectorial Complexes Within the National Economy

VII. Capital Construction

VIII. Supply of Equipment and Materials

XIX. Manpower and Personnel

X. Financial Plan

XI. Environmental Protection and Rational Utilization of Natural Resources

XII. Foreign Relations

XIII. Socialist Economic Integration

XIV. Improvement of Planning and Management Administration

XV. General Outline for Geographic Location of the Productive Forces

XVI. Socioeconomic Development of the Union Republics and Economic Regions

The transition to the indicators of the medium-term plan is made by determining the rate of fulfillment over the years of the 5-year period, by breaking down the respective indicators of the long-range plan into greater detail and by compiling a breakdown in which those responsible for fulfillment are designated. The goal-specific indicators, whose values are fixed for each year of the planning period, play the decisive role in the 5-year plan; the indicators of the planning balance of the national economy adjusted to take into account the results of fulfillment of the current 5-year plan figure as preliminary references to be used in the distribution of resources among goals, regions and sectors and industries.

The process of compiling the draft of the 5-year plan basically coincides with the process whereby its principal strategies are arrived at. The flow chart for preparation of the draft of the 5-year plan is given in Figure 4.

The following notation has been used in Figure 4: 4.1--analysis of results in fulfillment of the previous 5-year plan for economic development of the union republics; 4.2--analysis of results in fulfillment of the previous plan for development of specific sectors and industries; 4.3--analysis of results in fulfillment of the previous 5-year plan for development of intersectorial complexes within the national economy; 4.4--analysis of the course of performance of national economic programs; 4.5--analysis of performance of the programmed section of the previous 5-year plan; 4.6--analysis of results in fulfillment of the previous 5-year plan in its breakdown by specific sectors of social development; 4.7--analysis of results in fulfillment

of the previous 5-year plan for development of the system of resources; 4.8--analysis of the summary indicators of the previous 5-year plan; 4.9--preliminary determination of the summary indicators of the draft of the 5-year plan; 4.10--preparation of the initial targets to be used in working out full-fledged drafts of medium-term national economic programs and plans for accomplishment of the stages of long-range programs tc be fulfilled in the given 5-year period; 4.11--preliminary determination of the indicators of the draft of the 5-year plan with respect to the principal sectors of social development; 4.12--preliminary determination of the indicators of the draft of the 5-year plan for development of the system of national economic resources; 4.13--preliminary determination of the indicators of the draft of the 5-year plan for development of complexes within the national economy; 4.14--preliminary determination of the indicators of the draft of the 5-year plan for economic development of the union republics; 4.15--preparation of full-fledged drafts of medium-term programs and plans for accomplishment of the stages of long-range programs to be fulfilled in the given 5-year period; 4.16--preliminary determination of the indicators of the draft of the 5-year plan for development of sectors and industries; 4.17--examination of the variants of drafts of medium-term programs and plans for accomplishment of stages of long-range programs to be fulfilled in the given 5-year period and selection of the most effective ones; 4.18--composition of the programmed section of the draft of the 5-year plan for specific sectors of social development; 4.19--composition of the programmed section of the draft of the 5-year plan for development of the system of national economic resources; 4.20--composition of the programmed section of the draft of the 5-year plan for development of complexes within the national economy; 4.21--composition of the programmed section of the draft of the 5-year plan for the economic development of the union republics; 4.22--composition of the programmed section of the draft of the 5-year plan for development of sectors and industries; 4.23--interlinkage of the indicators of the programmed and nonprogrammed parts of the draft of the 5-year plan for the economic development of the union republics; 4.24--interlinkage of the indicators of the programmed and nonprogrammed portions of the draft of the 5-year plan for development of sectors and industries; 4.25--interlinkage of the indicators of the programmed and nonprogrammed portions of the draft of the 5-year plan for development of intersectorial complexes within the national economy; 4.26--interlinkage of the indicators of the programmed and nonprogrammed parts of the draft of the 5-year plan in the breakdown by specific sectors of social development; 4.27--interlinkage of the indicators of the programmed and nonprogrammed parts of the draft of the 5-year plan for the development of the system of national economic resources; 4.28--preparation of estimates of the effectiveness of the comprehensive programs and of their stages to be accomplished in the given 5-year period from the standpoint of the national economy; 4.29--preparation of balances of production and distribution of the principal types of national economic resources; 4.30--adjustment of the figures used as initial targets for purposes of working out drafts of medium-term programs and plans for accomplishment of stages of long-range programs to be fulfilled in the given 5-year period in conformity with the indicators of resource adequacy; 4.31--adjustment of indicators for the specific sectors of social development in conformity with the indicators of

resource adequacy; 4.32--adjustment of indicators of development of intersectorial complexes in conformity with indicators of resource adequacy; 4.33--adjustment of the drafts of medium-term programs and plans for accomplishment of stages of long-range programs to be fulfilled in the given 5-year period in conformity with the indicators of resource adequacy; 4.34--adjustment of the indicators of economic development of the union republics in conformity with indicators of resource adequacy; 4.35--adjustment of indicators of the development of sectors and industries in conformity with the indicators of resource adequacy; 4.36--preparation of the draft of the 5-year plan for development of intersectorial complexes; 4.37--composition of the programmed section of the draft of the 5-year plan; 4.38--composition of the draft of the 5-year plan in the breakdown by specific sectors of social development; 4.39--preparation of the draft of the 5-year plan for development of the system of national economic resources; 4.40--determination of the summary indicators of the draft of the 5-year plan; 4.41--preparation of the draft of the 5-year plan; 4.42--approval of the draft of the 5-year plan by policymaking bodies.

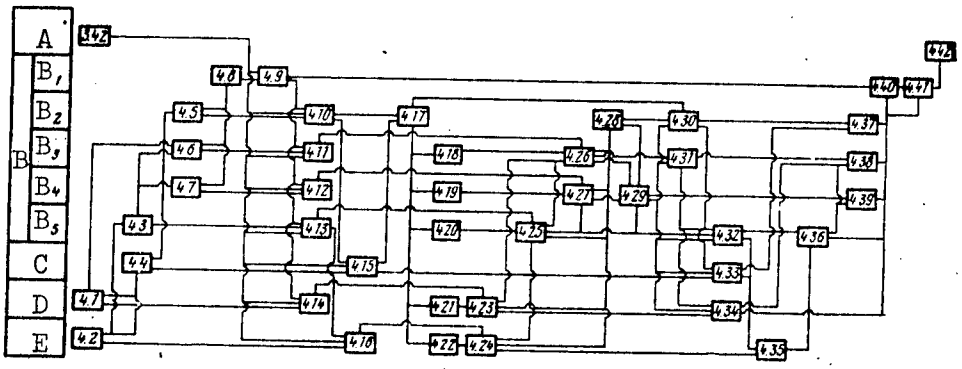

Figure 4. Flow chart for preparation of the draft of the 5-year plan.

The principal purpose of the 5-year plan is to define for the planning period a current investment policy oriented toward accomplishing long-range goals. An important role in the medium-term plan is also given to working out the economic mechanism and to devising a sound system of regulatory indicators and standards; this is specifically reflected in the relevant structuring of the system of indicators of the 5-year plan.

The 5-year plan contains a detailed program of measures and strategies for use of resources in order to achieve the intermediate and final results in development of the country's social welfare. The list of consumer products and services is considerably longer than in the long-range plan, indicators are given for activation of respective capacities and facilities, sources of financing are specified, and the size of expenditures of materials and labor to develop the nonproductive sphere are set (3.38; 4.38).

The indicators of the regional development of the national economy are broken down into more detail in the 5-year plan thanks to the distribution among the years of the planning period of measures and assignments related

to geographic location of the productive forces and development of the infrastructure which are the specific embodiment of the regional development strategy which is derived from the General Outline for Geographic Location of the Productive Forces and Strategic Direction of the Overall Development of the Various Union Republics and Economic Regions and the Largest Regional-Production Complexes (3.38; 4.38), which has been worked out in the long-range plan.

The following indicators of scientific-technical development are adjusted in the 5-year plan: the scientific-technical research and development projects to be carried out in the given planning period, the status of performance of work on various scientific and technical problems, and indicators of the achievements of science and technology adopted in the national economy and assessments of their effectiveness (3.38; 4.38).

As for the planning of foreign relations, the plan contains a consistent breakdown of commodity exports and imports with respect to regions and types of goods, volumes of goods to be exported and imported, and the size of the respective exchange receipts and payments (3.38; 4.38).*

Indicators of development of the system of administration and management of the national economy are given specific form by breaking down the list of management tools and resources expended and by setting dates for completion of the most important measures to improve the system of management and to accomplish the phase-by-phase introduction of the largest ASU (3.38; 4.38).

With regard to planning development of the system of national economic resources the transition from the long-range plan to the 5-year plan is made by stating in more detail the list of those resources and by drafting a specific list of producers and consumers (3.39; 4.39). A system of partial physical balances is worked out. Sources of capital investments and the projects they are applied to are specifically stated in order to characterize development of the system of fixed capital. By contrast with the long-range plan, in which the total volume of capital investments and the volume of construction and installation work are computed, in the 5-year plan the leading role is now played by the indicator of the amount of work to be done on finished projects, enterprises, and projects near completion which are subject to acceptance by customers and the indicator of the volume of unfinished construction at the end of the planning period.

The indicators of the growth and distribution of manpower resources are stated in more detail in the 5-year plan in that they are broken down into a longer list of specific specialties and vocational-skill groups, computations are made of the indicators of current interregional redistribution of workers, and so on.

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* If receipts and payments are planned in conformity with long-range agreements, then the respective indicators are supplemented by data on medium-term and short-term monetary and financial agreements.

As we have already noted, particular importance is given in the 5-year plan to the planning of normative regulatory indicators whose purpose is to guarantee that associations and economic organizations pursue a stable orientation from the standpoint of the national economy and that the distribution of the most important types of resources is as sound as possible.

The system of normative regulatory indicators contained in the 5-year plan should include the following basic groups: average prices for groups of commodities; wage levels which take into account sectorial, industrial and regional coefficients; rates of payment on all types of resources, including sectorial and regional peculiarities; tax rates; rates of transfers from profit to the state budget and to sectorwide, industrywide and regional development funds; rates of transfers to economic incentive funds of associations, enterprises and organizations, etc.

The role of the annual plan in the system of national economic planning is to state the tasks of the prospective plans in more detail and to accomplish those tasks. It is worked out on the basis of the year-by-year breakdown of the 5-year targets to take into account the status of fulfillment of the current 5-year plan and results in fulfillment of the previous annual plan. The annual plan's orientation toward performance of tasks defined in the 5-year plan is ensured through the current redistribution of the most important types of resources and centralized investments made from the state budget and development funds of sectorial and regional complexes in the national economy. The central place in current planning is therefore occupied by elaboration of plans concerning the following: utilization of productive capacity, centralization of distribution of certain types of material resources, intersectorial and interregional deliveries, financial and credit relations, and the state budget.

The flow chart we have examined describes the process of planning in a rather consolidated form. At the Central Institute for Mathematical Economics a more detailed chart has been worked out; in our opinion it could be used as the structural foundation for implementing the systems approach to organization of the process of the compilation and interlinkage of national economic plans in the Computerized System of Planning Computations.

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DIRECT LONG-TERM CONTRACTUAL ARRANGEMENTS ADVOCATED

Moscow KHOZYAYSTVO I PRAVO in Russian No 8, Aug 77 pp 27-34

/Article by A. Lebed', deputy chairman of USSR Gossnab/

/Text/ In January of this year the Dnepropetrovskaya Oblast Committee of the Comparty of the Ukraine held a meeting which was rather unusual. It presents interest, because the executives of production associations and enterprises, organs of material and technical supply, arbitration, and justice participated in it. Those who assembled talked about how to finalize sooner and more successfully the transfer of enterprises from mass and large series production to direct long-term arrangements, having laid long-term economic contracts in the foundation of their relations. This is one of the urgent tasks of today, set by the 25th CPSU Congress. The same subject was discussed at an analogous meeting, held by the Zaporozhskaya Oblast Committee of the Comparty of the Ukraine. Here as well as there they talked frankly about both the successes and the defects in the planning and organization of economic arrangements, in the practice of consummating and fulfilling long-term contracts.

In order to increase the interest of soyuzglavsnabsbyt's /Main Administrations for Interrepublic Supply and Marketing of Materials and Equipment/ of USSR Gossnab, transferred to the new system of planning and economic stimulus, in the development of direct long-term economic arrangements (PDKhS) the evaluation of their performance was made dependent also on the expansion of deliveries according to PDKhS.

Starting with 1977 USSR Central Statistical Administration, for its part, introduced permanent statistical records about contracts for the delivery of goods for production and technical purposes, separating into a special item indicators which refer to the consummation of long-term contracts in respect to these arrangements.

Not wishing to burden the readers by listing the many events connected with the organization and development of PDKhS, I would like to say nonetheless that in March 1977 USSR Gossnab held in Moscow an All-Union seminar in which economic executives, scientists, and representatives of the organs of arbitration and legal services in respect to contracts took part.

What caused such a great interest in this problem? It would hardly be a mistake, if we will draw the following conclusion: Many directors of production associations, enterprises, and other managers of economic operations have proved through their own experience that the introduction of long-term economic arrangements can have a considerable influence on the increase of production effectiveness, quality of goods, expansion of the assortment, and can contribute to the regularity of deliveries.

And now let us refer to the concrete examples of the effectiveness of PDKhS.

The introduction of measures at the Gor'kiy Automobile Plant, based on long-term contracts with metallurgical plants and enterprises, permitted it to reduce the metal-intensiveness of manufactured goods by slightly over 11,000 tons a year, which amounted to an economy of more than 1.5 million rubles. This plant has also transferred itself to a fully mechanized transportation of component items and individual types of raw materials and materials from 16 supplying plants with whom the auto plant had coordinated the design, has manufactured a special kind of metal tare for multiple use, and has given technical assistance in the development of technology of the organization of mechanized warehouses for marketing. As a result, 570,000 rubles were economized only by discarding the wooden tare, downtime in railway transport was reduced by 84,000 car-hours, and an economy of 234,000 rubles was received in transport-procurement expenses.

At the Kurgan Omnibus Plant, due to the transfer to direct long-term arrangements for the deliveries of metal goods, the number of times when one type of materials was substituted with another was reduced from 194 to 62. This has led to the reduction in the plant's press shop of the manufacture of molds for the parts by 1.5 percent and to the increase of the use of capacity from 9.85 to 0.92 percent.

The Zaporozh'ye Kommunar Automobile Plant and the Zaporozhstal' Steel Mill have been cooperating for many years. These relations have helped to reduce the defects in thin-sheet steel, caused during deep stretching for the parts of the body of the Zaporozhets automobile, from 13 to 0.2 percent.

Total deliveries of goods for production and technical purposes according to PDKhS now constitute 37 billion rubles. The evaluation of the volumes of deliveries according to these arrangements can be approached not only from the point of view of value. Already more than 50 percent (slightly less for ferrous metals) of deliveries of goods for common use are realized on the basis of PDKhS. Of course, all that has been attained cannot be considered a limit. For the expansion of PDKhS there are many different possibilities, and this is what the plans of development of these arrangements anticipate for the Tenth Five-Year Plan.

The organs of USSR Gossnab in conjunction with the industrial ministries are called upon to resolve the above problem.

We think that in this five-year plan one of the most important directions in the development of direct arrangements should become the overall improvement of the quality factor with strict observance of such quantity factor as further expansion of the volume of deliveries according to PDKhS.

What is the main goal in the development of PDKhS?

In our opinion, it consists in organizing long-term business cooperation of manufacturers and consumers on the basis of national economic plans. It will assist in fulfilling the tasks in respect to the production and deliveries of goods, in improving their quality and expanding their assortment, in ensuring that goods are shipped in the most adequate condition for consumption in production, and in using the material resources rationally and economically.

Now, let us examine the forms and methods of reaching the above-mentioned basic goal of PDKhS, taking into account the experience already accumulated in this field.

The first group of questions is connected with the planning and ensurance of the stability of economic arrangements.

Until 1974 the volumes of deliveries according to direct long-term arrangements were established between the enterprises-manufacturers and consumers for the year that was planned. And, one must say, any kind of appeals to establish long-term cooperation between enterprises had no substantial influence. Most of them still established among themselves economic arrangements limited by the year planned. But the situation changed drastically when, according to the order established by USSR Gossnab for plans for PDKhS, soyuzglavsnabsbyt's began to show the volumes of deliveries for the five-year plan broken down by the years. It became certain that relations between the suppliers and consumers will become more stable and firm. The establishment of five-year plans of attachment through direct arrangements has enforced plan and legal grounds for the consummation of long-term contracts. At the All-Union seminar, which was mentioned in the article, there were press comments addressed to soyuzglavsnabsbyt's and territorial organs of USSR Gossnab that they often, as before, give out orders for one year. This criticism is correct, and it refers especially to the Main Administration for Interrepublic Deliveries of Metal Products (Soyuzglavmetall). In order to eliminate this defect, all organs of Gossnab are obliged to ensure strict observance of fulfillment of the established order of attachment of consumers and suppliers to PDKhS and determination of the volumes of delivery for a long period of time.

USSR Gossnab takes all the measures, directed toward the elimination of defects in the organization of planning the economic arrangements, liquidation of facts of unjustified change of the plans of attachment and of substitution of suppliers. Besides this, a closer and more accurate interaction is needed among soyuzglavsnabsbyt's and ministries and their industrial associations in questions of tying in production plans with deliveries of products over a five-year period.

Apparently, it's time for long-term cooperation of enterprises, transferred to PDKhS, to be supported not only by the plans of attachment, which are issued by soyuzglavsnabsbyt's, and by five-year production plans, which are established by higher organs, but also by distribution plans of the most important types of products, calculated for five years.

Also connected with this is the problem of increasing the role and the responsibility of industrial ministries for the organization according to the plan of the development and ensurance of the stability of lengthy economic arrangements which are being established. Events indicate that when USSR Gossnab does not coordinate well enough the attachment of concrete consumers and manufacturers with the ministries, this sometimes causes serious discrepancies during the organization of direct arrangements. As it is found later on that a delivery of goods according to PDKhS planned ahead by soyuzglavsnabsbyt is sometimes aborted because the expected future change in the specialization of the supplier was not taken into consideration.

Significant here is also the legal aspect of this problem. The official joint establishment or coordination by soyuzglavsnabsbyt and the ministries (industrial associations) of attachment plans for direct arrangements makes them mandatory not only for the suppliers, consumers, and organs of material and technical supply, but also for the ministries who plan production and allocate funds.

Plans of lengthy attachments, worked out in this manner, will be studied more carefully from the point of view of the stability of production and consumption of products, specialization of production, possibilities of organizing transit shipments and the rationality of transportation, reality of the expected introduction of production capacities in operation, and other factors.

While advocating to ensure the stability of long-term economic arrangements and to eliminate facts of frequent and unjustified changes in them, one cannot, at the same time, consider them as something untouchable. Economic development, unquestionably, requires to introduce corrections in the plans in certain instances, but one must do this in a well thought-out and organized manner, without disrupting production according to the plan.

The criteria for the change of the mentioned plans, by which all organs concerned with the organization of PDKhS should be guided, have already determined themselves. They are: introduction of new production capacities; reconstruction of enterprises; discontinuance of the output of goods in the established order; utilization of new, more advanced types of materials.

The stability of economic arrangements is organically linked with the stability of production plans which are established for production associations and enterprises. The existing laws determine the order and the dates for the introduction of changes in these plans by the ministries (industrial associations), but, unfortunately, they are often violated. For example, tasks

for the first quarter of the year are transferred to subsequent quarters or from one enterprise to another, and all this is done without due coordinations with delivery plans and existing contracts.

However, only reprimanding the violators of plan discipline did not give any effect. Therefore, USSR Gosplan, USSR Gossnab, and USSR Central Statistical Administration have approved Letter of Instruction No AV-35-D/AL-30-698/4-102[1] from 8 October 1976. The gist of this letter is as follows: If a ministry or industrial association violated the dates for making changes in the quarterly production plans or did not coordinate them with the soyuzglavsnabsbyt's which have given out the plans of attachment, these changes are not accepted by the planning, supplying-selling, and statistical organs. Consequently, if, for example, for a steel mill the volume of production of rolled stock is reduced in the second quarter at the expense of a relative increase in the fourth quarter and this is done without an agreement with Soyuzglavmetall, the organs of USSR Central Statistical Administration will accept from the enterprise a report on the fulfillment of the production plan for the second quarter only for the originally established plan assignments by the ministry or industrial association. Let us hope that successive implementation of such an order will enable to do away with facts of thoughtless and arbitrary changing of production plans and will serve the purpose of enforcing economic arrangements.

In the "Main Directions of the Development of USSR National Economy for 1976-1980" there is an indication of the necessity to increase the role of enterprises in the formation of production plans, using the system of orders and economic contracts on a large scale.

As regards methodology, this task has not found its clear resolution yet, and it is apparent that USSR Gosplan with the participation of USSR Gossnab, the ministries, and departments will have to work out the respective instructions.

Direct long-term economic arrangements create the most favorable conditions for increasing the role of consumers in the formation of production plans. But it is also clear that expansion of the practice of establishing such arrangements, consolidation of volume indicators made known to suppliers and consumers, and transfer from the giving out of specialized orders to the plans of attachment, in which the volume of delivery in the group assortment (nomenclature) is determined, create two problems. The first one is protection of the lawful and justified interests of consumers who, during the consummation of contracts, often encounter the refusal of suppliers to satisfy their demands in respect to the expanded assortment. The second is guarantees for the suppliers, ensuring for them a real possibility of accepting the orders and satisfying the demands of consumers. A certain amount of work in this direction is done by the State Arbitration. In the Instructions of

1 "Byulleten' normativnykh aktov ministerstv i vedomstv SSSR" /Bulletin of Normative Acts of USSR Ministries and Departments/, 1977, No 1, p 3.

the USSR Council of Ministers' State Arbitration Commission from 31 Oct 75, "Procedure of the Organs of Arbitration in Respect to the Settling of Disputes, Arising During the Consummation, Alteration, and Annulment of Contracts for the Delivery of Produce and Goods," the organs of arbitration are oriented to limit the acceptance of refusals of suppliers to satisfy the demands of customers in respect to assortment by exceptional circumstances, for example, by the absence of technical possibilities to manufacture the concrete items. An analysis of the arbitration experience shows that it is necessary to improve the legal settlement of these relations.

In connection with this, it is expedient to discuss a very worthwhile suggestion about the development and approval by the All-Union industrial associations and soyuzglavsnabsbyt's of nomenclature (assortment) lists of products manufactured by each production association and enterprise taking into consideration their specialization.

This list will show the assortment (nomenclature) in groups and in detail, and it can be used as an instrument for the planning of production and delivery of goods and as a basis for the consummation of contracts.

We have in mind that in accordance with such a list, the customer will have the right to demand, within the limits of deliveries determined for him, the consummation of a contract for the delivery of goods of the types, models, marks, and sizes he needs.

No matter how well the planning and organization of the development of PDKhS is carried out, the long-term contract will in the end remain the chief instrument of cooperation of enterprises.

In the Ninth Five-Year Plan the consummation of contracts for a period of five years on the basis of plans of attachment by all production associations and enterprises could not be achieved. At fault were the above-mentioned reasons and the underestimation of such contracts by some economic executives. In the past five-year period there were only 8,500 such contracts or 13.6 percent of all contracts for the delivery of goods through direct arrangements.

The turning point occurred during the campaign for the consummation of contracts for the Tenth Five-Year Plan.

Along with the measures to put in order the distribution of plans of attachment (with the volumes of deliveries for the five-year period), USSR Gossnab and the State Arbitration of the USSR together with the ministries and departments carried out organization work to ensure that all deliveries according to PDKhS are covered by a wide range of long-term contracts.

On the basis of the report of the USSR Gossnab and the USSR State Arbitration, the USSR Council of Ministers ordered the USSR ministries and departments and

the councils of ministers of Union republics to undertake measures to eliminate the defects mentioned.

As a result the level to which the deliveries according to direct arrangements were embraced by long-term contracts has become considerably higher.

According to data as of 1 December 1976, in accordance with the plans of attachment given out by soyuzglavsnabsbyt's for this five-year plan, the associations and enterprises have signed nearly 95,000 contracts for a period of five years which constituted already 82 percent of all contracts for deliveries according to PDKhS.

Enterprises of the USSR Ministry of Ferrous Metallurgy, USSR Ministry of Construction Materials, Ministry of Paper Industry, and other ministries have managed to fulfill this task and on the whole to ensure full coverage by five-year contracts.

However, not all ministries have properly concluded long-term contracts. For example, those which have low indicators are Ministry of Electrical Equipment Industry (32 percent) and Ministry of Heavy and Transport Machine Building (60 percent). Apparently, certain territorial organs of USSR Gossnab also did not work actively enough with the enterprises of the above-mentioned ministries.

That these organs can help to achieve good results shows the experience of the Dnepropetrovsk territorial administration. Their well-organized control resulted in the fact that the enterprises-suppliers of this rayon have made contracts with 6,133 consumers, transferred to direct arrangements, for a period of five years.

The consummation of long-term contracts for the five-year plan is the duty of enterprises transferred to direct arrangements, which follows from the decisions of the 25th CPSU Congress and legislation about the deliveries of goods.

In 1976 USSR Gossnab and the USSR State Arbitration have issued a joint instruction to the territorial organs and the organs of state arbitration to check how the contracts were negotiated. In doing this they expected that state arbitration organs will have to induce those enterprises-suppliers who avoid their duty, to conclude contracts for the five-year plan. This, of course, is an extreme measure, however, it must be applied, if certain economic executives do not fully understand the importance of establishing long-term contractual arrangements.

If, as the data on the conclusion of long-term contracts for the Tenth Five-Year Plan shows, everything on the quantity side of the matter is more or less all right, in many instances one cannot say this about the quality of the consummation of contracts, about the effectiveness of the contractual mechanism.

An economic contract, concluded between the supplier and the customer for five years or a longer period, must secure the business collaboration of parties and must be one of the chief instruments of the organization of the fulfillment of plans of production and deliveries.

At present a movement is spreading throughout the country in respect to the launching of socialist competition among the related industries. Associations and enterprises on the basis of such long-term cooperation are developing and carrying out joint ventures intended to ensure regularity in production and deliveries, expansion of the assortment and nomenclature of products, assimilation and introduction of the most economical and progressive types of equipment, goods, and materials, and improvement of their quality. In these conditions the useful initiative of related industries to establish friendly and businesslike cooperation of enterprises must be strengthened by perfected organizational and legal forms of functioning of the contractual mechanism.

"Sample Contract for the Delivery of Products According to Direct Long-Term Economic Arrangements" No 53 from 11 November 1973, developed with the participation of ministries and approved by USSR Gossnab upon agreement with the USSR State Arbitration, serves this purpose.

When this sample contract was developed and introduced, it was intended that long-term arrangements among enterprises must not be limited only to the usual obligations in respect to the deliveries of goods. Under the new conditions, enterprises, when concluding contracts for long periods of time, are oriented toward joint development and realization of measures in respect to the expansion of the assortment of goods to be delivered, introduction of the most economical and advanced types of goods, taking into consideration the newest achievements of science and technology, and improvement in the effectiveness of using material resources.

Contracts may anticipate mutual obligations concerning the improvement of production technology and the quality of goods, rendering of technical assistance during the manufacture and exploitation of goods, during the installation, and so on.

The associations of GAZ /Gor'kiy Automobile Plant/ and ZIL /Moscow Automobile Plant imeni I. A. Likhachev/, the Mytishchi Machine-Building Plant, the Kuznetsk and the Denpropetrovsk Steel Mills, the Podol'sk Accumulator Plant, and a multitude of other enterprises, using contractual contacts and long-term cooperation, have become business partners in the full sense of this word. These are not simply customer-supplier relations, but relations based on socialist cooperation and mutual assistance.

As an example let us take the Magnitogorsk Steel Mill. According to direct long-term arrangements it realizes more than 750 million rubles' worth of goods according to 320 contracts.

In cooperation with the Sverdlovsk Law Institute, the steel mill has worked out contracts for the delivery of metal and metal products which satisfy the interests of both the supplier and the consumers of metal.

On the basis of long-term contracts for the delivery of metal products the mill has entered into agreements with a number of enterprises on the creation of complex creative brigades for the development of measures to improve the quality and effective use of metal. Thus, the creative brigades of the steel mill and the Automobile Plant imeni Likhachev are successfully working on the improvement of the technology of manufacturing hot-rolled pickled sheet-metal for deep stamping.

Creative brigades of the Magnitogorsk Steel Mill, Gor'kiy and imeni Likhachev Automobile Plants, the Kremenchug Wheel Plant, and other enterprises have developed a new production technology for non-aging marks of steel which made it possible to resolve the problem of considerable improvement of the mechanical properties of steel.

According to contracts for the delivery of sheet-metal to the associations of VAZ [Volga Autoplant] and KamAZ [Kama Automobile Plant], the steel mill in cooperation with scientific research institutes of ferrous metallurgy and automobile machine building has set up the manufacturing process and assimilated the production of new marks of steel which are successfully used today not only at these enterprises, but at all other automobile plants of the nation as well.

The new technology of rolled steel has enabled to improve the quality of sheet-metal and lower its sorting according to pin holes three times, to reduce the cross thickness difference of sheets, and to ensure the delivery of cold-rolled sheets to the Volga Automobile Plant and other consumers with a tolerance according to stricter standards.

Are such arrangements characteristic of many enterprises transferred to direct long-term economic ties? As yet, not. Unfortunately,--and the analysis of contractual arrangements confirms this--many contracts, although concluded for long periods of time, differ little from previous contracts of delivery.

Research conducted by the Scientific Research Institute of Machine Building in 110 enterprises of the Ministries of Ferrous Metallurgy, Chemical Industry, Paper Industry, Automotive Industry, Construction Materials, and several other ministries, confirms that only 50 percent of contracts for the Tenth Five-Year Plan meet the requirements of the sample contract for the delivery of goods according to direct long-term economic arrangements.

The formal nature and low quality of many contracts is confirmed by the fact that nearly half of the above-mentioned contracts do not contain terms regulating the order and dates of submission of orders and specifications, do not concretize the dates of delivery within the quarters, and a number of other important conditions.

This brings about a considerable practical conclusion that it is necessary already in this five-year plan to increase the attention to questions of the effectiveness and quality of long-term contracts, to study thoroughly outstanding experience in this field, and to disseminate it on a large scale.

We think the interest in developing such a progressive form of economic arrangements should be increased not only among the consumers, but among the manufacturers as well. In practice, enterprises-consumers realize most of the economic effect from the development of direct long-term economic arrangements. In order to get the manufacturers interested in satisfying the demands of consumers more fully, it is necessary to study well the question of establishing a system of economic stimulus for production associations and enterprises-suppliers when they attain high economic and technical indicators connected with the introduction of new types of products, expansion of the assortment, satisfaction of special demands in respect to the quality and reliability of goods, maximum preparation of products for production consumption, and so on. Other measures to increase the role of long-term contracts in the organization of production, supply, and marketing of goods are also needed.

The sample contract for the delivery of goods according to PDKhS serves as some sort of a general reference for production associations and enterprises which establish contractual arrangements, but by virtue of its nature it cannot reflect the peculiarities of production and delivery of individual types of goods. A big assistance in the work of enterprises would be the development by the industrial ministries in conjunction with the soyuzglavsnabsbyt's of sample contracts for the industries or methods for their conclusion.

A great number of pre-contract disputes in respect to the deliveries of goods passes through the system of state arbitration organs. Usually the subject of these disputes are quantity, assortment, dates of delivery, accounting, and certain other questions. Arbitration has great possibilities for increasing influence on the parties according to the contract. It requires from them to concretize more accurately their arrangements in respect to a wide range of conditions, including those which go beyond the limits of purely delivery arrangements. Together with USSR Gossnab and involving scientific research organizations it would have been useful to analyze pre-contract disputes, settled during the consummation of contracts for the delivery of goods according to PDKhS, and to give detailed instructions to the organs of arbitration.

A considerable amount of experience, accumulated in the course of PDKhS development, makes it possible at the current stage to raise a question about the improvement of the legal settlement of relations, resulting from these arrangements. Its urgency is all the more obvious, because in the decree of the CPSU Central Committee and the USSR Council of Ministers from 25 June 1975, "Measures in Respect to the Improvement of Economic Legislation," material and technical supply is named among the paramount basic directions in which the improvement of economic legislation must be carried out.

We know that the Statute on the Deliveries of Products for Production and Technical Purposes, issued in 1969, is on the whole adapted for the regulation of the relations of parties, based on the planning of deliveries for one year.

Separate norms of this statute, which refer to the conclusion of contracts according to PDKhS, do not embrace to the full extent the big and complicated complex of questions connected with the peculiarity of settling long-term economic arrangements. Gaps in this field were filled until the present time with normative acts, issued by USSR Gossnab, and instructions of the USSR State Arbitration. Taking into account the scope of direct long-term economic arrangements and the prospects of their future expansion, the big changes which have occurred in recent years must be reflected in the Statute on the Deliveries of Products for Production and Technical Purposes--the main normative act approved by the state. USSR Gossnab and USSR State Arbitration with the participation of ministries, departments and councils of ministers of Union republics are now preparing supplements and changes to this statute.

In the revised normative act, regulating the deliveries of goods, certain founding principles, anticipated in the draft of the Constitution of the USSR, must be clearly expressed, including the indication that the economy of the USSR constitutes a unified national economic complex, embracing all links of public production, distribution, and turnover on the territory of the country, and the indication of the necessity to combine centralized management with the independence of economic operations and the initiative of enterprises, associations, and other organizations.

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RESOURCES, INDUSTRY OF SIBERIA SURVEYED

Budapest FIGYELO in Hungarian 24, 31 Aug, 7 Sep 77

[Article by Dr Jozsef Garam: "A Glance Into the 21st Century"]

[24 Aug 77, pp 1, 10]

[Text] The Treasure House of Nature

In the country of the Czars Siberia was a region to which no one went of his own free will and those sent were not only the prisoners for punishment but also the officials, soldiers and police to watch those persecuted. Even after the victory of the October Revolution decades of effort were required for this formerly frightening region to become an area in which they succeeded in guaranteeing not only the possibility of a human life suiting present needs but also the conditions for swift economic, social and political development. The speed of growth, which became so swift especially after discovery of the Siberian oil deposits, was summed up by the French journal REALITES by noting that Siberia was "the new Eldorado, the land of pioneers, of infinite expanses, of unparalleled energetics and mineral riches."

It has an area of 12 million square kilometers (1.5 times that of the United States of America), and a population today of about 20 million. The richness and circumstances of this great area are well characterized by a statement of one of the most prestigious American journals according to which this region "fascinates, frightens and shocks one; it is a mythical land which nevertheless exists and he who does not know it does not know the future of our earth either."

And yet the significance of Siberia was long recognized by scientists and those with vision; as a great illuminated sign in Novosibirsk, the "capital" of Siberia, proclaims Lomonosov had already stated that "Siberia will make Russia great." And Lenin also knew and took into his calculations that "the mineral treasures of Siberia are limitless."

The futurologists have much debated which country or region will serve as a foundation for the future of the 21st century. According to some it is

Asia, according to others South America and according to others Africa. I think, however, that for anyone who has spent even a little time with the Novosibirsk unit of the Soviet Academy of Sciences and in the laboratories and homes of Akademgorod (Academy City) and who has only glanced into its geological museum can hardly have any further doubts. I think that one can state without exaggeration that the coming century will be the century of Siberia--not only because Siberia is in the Soviet Union and thus in a socialist country but also because of its real economic potential.

The Discovery of Siberia

Development of this eastern region of the Soviet Union began in the early period of Soviet power; of course, the economic conditions of that time did not permit swift economic development for this required a material and intellectual investment which could not be undertaken by the Soviet power struggling with military and economic intervention. This was one reason why exploitation of the gigantic potential wealth could begin only relatively slowly. The swift growth of the power and economic strength of the Soviet Union has made it possible to turn much greater sums than before to the exploitation of what is in the strict sense of the word a treasure mine.

But a great impetus to development was given by the discovery of the great coal and water energy reserves of Siberia. Another qualitative change came when it was discovered that one would have to modify the idea according to which virtually every mineral treasure of the world could be found in this gigantic area except for oil.

After the 1950's it was proven that not only could one find in Siberia virtually every element in the Mendeleev Table--and in quantities suitable for industrial production--but also that there existed here the largest petroleum and natural gas reserves in the world. According to information based on geological research the quantity of oil and natural gas which can be found here surpasses the potential reserves of the Near East and probably of the entire world. In addition to the mineral treasures one can also find here half of the exploitable wood reserves of the world and a considerable part of the fresh water reserve.

The Hinterland of Development

When we speak of Siberia in this article we will mean--deviating somewhat from administrative usage thus far--the Far East as well. Formerly this great area was divided into western and eastern Siberia and the Far East. Present usage speaks rather of southern, near northern and far northern regions. From the economic, geographic, and climate points of view this division better expresses the different developmental possibilities because, for example, the southern regions of western Siberia, eastern Siberia and the Far East alike can be used for agricultural production.

Only limited agricultural production is possible in the Near North. In the Far North one can have only mining and--under special conditions--processing industry production. (Of course, we must also use the old division too because many of the statistics are still grouped in this way.)

The agricultural production of the southern band of Siberia is very significant from the viewpoint of the economic development of the region for it is from here that one must supply as much as possible of the agricultural goods for the workers in the near and far north. This is a realistic goal for the number of sunny hours from May to August is 1,116 in Novosibirsk, 1,125 in Omsk, 1,154 in Barnaul while only 951 in Moscow and 1,159 in Krasnodar. Taking into consideration the peculiarities of the Siberian climate cultivated crops can ripen even in the short Siberian growing season. In summer the temperature in the southern part of the region sometimes reaches plus 40 degrees Celsius.

The southern areas also play a very important role because in general it is here that one finds the processing and machine manufacturing industry which produces the equipment, tools of production and other industrial articles which can also be used in the unique natural and climate conditions of the near and far north and also because this area is most approachable and its infrastructure is more developed.

So the southern band is more or less the "hinterland" for the region lying farther north which is so extraordinarily rich in mineral raw materials. Industry in the southern region actually began a swift development during World War II when many factories had to be moved here from the European parts of the Soviet Union. Many of these factories and machines remained here and this became the base for the further development of the industry serving the northern territories. (Of course, what has been said cannot be regarded as exclusively valid, for machines and foodstuffs are also sent to the northern areas from other parts of the Soviet Union and vice versa and the products of Siberian industry are used in the European parts of the Soviet Union; indeed, the export of some factories is significant also.)

Large scale industrial development started in the 1950's and in the 20-25 years since then the production of electric power has increased 130-140 times and that of iron ore mining six times. (Of course, a role in the very swift growth statistics is also played by the fact that the base, the basis for comparison, was very low in many cases.) Naturally the new branches, oil and gas production, increased most swiftly but wood industry production increased also. Formerly 70-80 percent of the wood production of the Soviet Union came from the European part where there is relatively little wood as compared to Siberia for about 80 percent of the wood reserves of the Soviet Union--36.5 million cubic meters--can be found in Siberia. In addition to the present increased rate of production it is also true that the natural increase exceeds wood production many times.

(The bulk of the Siberian wood consists of the most valuable industrial types such as the durable, rot resistant and quick growing larch, timbers of which do not lose their durability even after long exposure to water.)

The Value of Water Reserves

The industrial development of Siberia is facilitated and even demanded by the fact that more than three-fourths of the usable fresh water reserves of the Soviet Union can be found in Siberia. The water flow of the three chief rivers, the Yenisey, the Ob and the Lena is more than one-third that of all other Soviet rivers combined. And the world's largest reservoir of fresh water, Lake Baykal, is there also.

The water reserves of Siberia can be used in many ways:

--for travel and transportation purposes, offering the only possibility for moving people and goods in some areas today, and

--for construction of hydroelectric power plants which are extraordinarily economical and of unparalleled size on earth.

It is thus understandable that the so-called water demanding branches of industry, including the wood processing and chemical industry enterprises, must be built here.

The importance of water as an industrial raw material can be judged from the fact that a modern synthetic rubber factory consumes as much water as a city of 300,000.

It is difficult to estimate the magnitude of the economic reserves of Siberia. This is partly because so far only a fraction of the raw material reserves have been revealed--however astoundingly great they may seem to be already. (This is especially true of metals, copper, oil and gas.) But it is also true because not only does the geological map of raw materials hiding in the depths of the earth change from day to day but also the possibilities of exploiting those known earlier is changing by an order of magnitude as a result of the technical-economic progress of the country.

The change in the program for construction of hydroelectric power plants is a good example of this. Those who prepared the Angara-Yenisey plan in the 1940's planned the Bratsk Power Plant for a capacity of 2.6 million kilowatts and the Krasnoyarsk for "only" 450,000 kilowatts. The finished Bratsk Power Plant had a capacity of 4.5 million and the Krasnoyarsk 6 million kilowatts. These differences in magnitude do not derive from the "limited vision" of the designers and planners but rather primarily from the fact that great industrial complexes arose very quickly in the vicinity of the power plants which can use large amounts of energy. (It would not have been worthwhile, given the power transmission possibilities of the time, to build such large capacities from which the electric power unused

on the spot would have had to be transmitted many thousands of kilometers.) So it is not an exaggeration to regard as only a "minimal program" that gigantic plan according to which the total capacity of the 17 power plants being built on the four rivers of the Yenisey, the lower and upper Tunguska, the Kureyka and the Nastayka, will be 60 million kilowatts with a production of 274 billion kilowatt hours, which is more than one-fourth of all the power produced in the Soviet Union in 1975. (By way of comparison, the 1975 power production of the FRG was 286 billion kilowatt hours, that of England 282 billion, that of France 184 billion and that of Italy 146 billion kilowatt hours.)

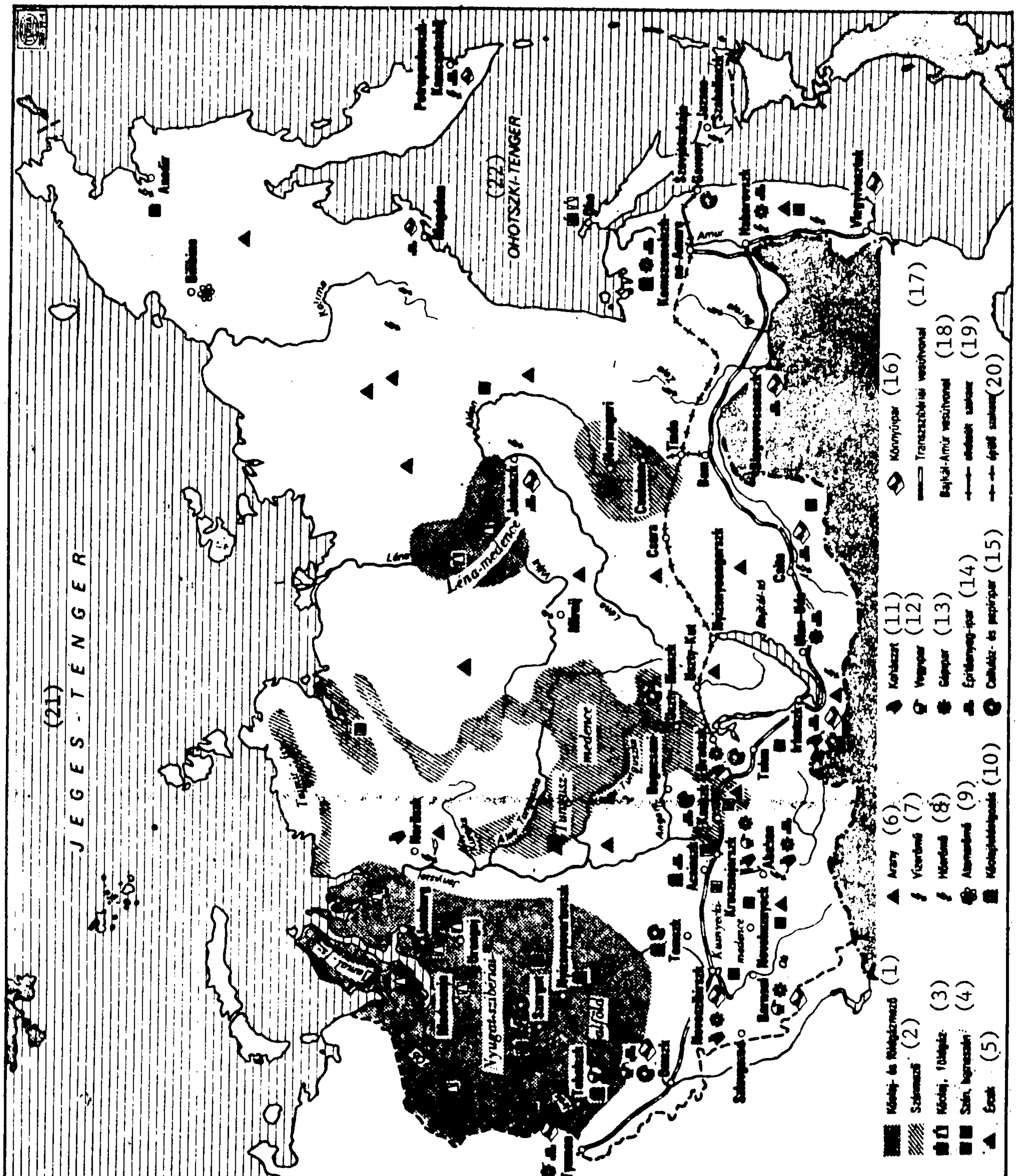
Coal...Oil...Natural Gas

It is even more difficult to pass a reliable judgment on the magnitude of the coal, oil and natural gas reserves or on the rate of their production for prospecting, industrial exploitation and use began only a short time ago. Nevertheless, the achievements are such that they have worthily attracted the attention of the entire world.

We can illustrate this statement with only one or two examples. Thus far only 15 percent of the western Siberian plain has been surveyed more or less thoroughly and that only to a limited depth. Already, as a result of this, petroleum and natural gas deposits of industrial significance have been found in an area of 1.7 million square kilometers. Of these the Tyumen and Samotlor petroleum deposits have already become famous; their reserves can be estimated only in billions of tons; or consider the Urengoy gas and gas condensate areas where the reserves exceed 10 trillion cubic meters. (The reserves which can be exploited in the northern part of the western Siberian plain are estimated at 24-25 trillion cubic meters.)

There are gigantic oil and especially large gas reserves on the Yamal peninsula lying at the mouth of the Ob also but similarly rich deposits have been discovered in eastern Siberia also in the large area lying between the Yenisey and the Lena and on the Taymyr peninsula too. Nor are the more approachable oil reserves of the Irkutsk or Novosibirsk region without interest. In the course of prospecting and exploitation work scientists and public opinion have received many gratifying surprises. If anything can be surprising in Siberia. In the course of my talks in Novosibirsk, for example, it was said, almost as a commonplace, that a well drilled at that time was giving 500 tons of oil per day. (In America they regard as rich those wells whose yield exceeds 2-3 tons per day.)

Not only is the yield of the Siberian wells large but in some areas the quality of the oil being brought to the surface is absolutely outstanding. Among the oil samples of the geological museum in Novosibirsk one can find bottles of black, red, light yellow and even white "oil." The octane number of the last is so high that--as they said--it can be used without refining not only as fuel oil but even in vehicles operating on gasoline.


(21)
JEGES-TENGER
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OHOTSZKI-TENGER
Léna-medence
Könnyűipar (16)

Key:

1. Petroleum and natural gas fields
2. Coal fields
3. Petroleum, natural gas
4. Coal, brown coal
5. Ores
6. Gold
7. Hydroelectric power plant
8. Thermal power plant
9. Nuclear power plant
10. Petroleum processing
11. Metallurgy
12. Chemical industry
13. Machine industry
14. Construction materials industry
15. Cellulose and paper industry
16. Light industry
17. Trans-Siberian Railway
18. Baykal-Amur Railway
19. Finished section
20. Section under construction
21. Arctic Ocean
22. Ohotsk Sea

It is not a matter of indifference that as a result of developing oil drilling technology they can drill wells in many places to a depth of 2,000 or 2,500 meters in 10-12 days.

It is characteristic of the growth of oil production that while they produced a total of 1 million tons of oil in Siberia in 1965 production here will reach or surpass 300 million tons by 1980 which is to say that in this five-year plan the entire increase in the oil production of the Soviet Union will come from here.

The situation is similar with coal, too. According to the surveys the largest coal reserves of the Soviet Union are in Siberia. The coal reserves are simply inexhaustible. Coals of high calory value and often of anthracite quality are found in areas as large as countries, coals which can be mined by surface operations.

The Kuznetsk basin is characteristic of the coal reserves which can be found in Siberia. The thermal value of the coal here exceeds 8,000 calories and the coal reserves of the basin to a depth of 600 meters are estimated at more than 210 billion tons of which 70 billion tons already constitutes an opened industrial reserve. The potential reserve of cokable coal is 75 billion tons and the industrial reserve is more than 30 billion tons.

The brown coal basin of Kansk-Achinsk is also worthy of note; the great advantage of this is that it lies near the Trans-Siberian rail line and mining conditions are extraordinarily favorable. The cheapest coal in the entire country is produced here. (The production cost is 50 kopeks per ton or less than one filler per kilogram.) The really gigantic fuel reserves of Siberia, however, are in the near and far north. In the regions of the Ob-Irtysh, the Tungus, the Taymyr and the Lena basins one can find coal reserves which are not yet exploitable. This is a task for the more distant future.

[31 Aug 77, pp 8-9]

[Text] The Role of the Industrial Complexes

Due to the extraordinarily rich deposits the local costs of using or producing the ores, nonferrous metals, fuels, wood and water which can be found virtually everywhere in Siberia are very low. In the Tyumen region it costs 9 kopeks to increase oil production by 1 ton and 2 kopeks for gas as compared to an average of 82 and 62 kopeks respectively for the Soviet Union. The production costs for coal in the eastern Siberian surface workings are one-fourth those for deep mines and the productivity of work is many times higher. One-tenth as many men are needed to produce a thousand tons of coal in these workings as are needed in the mines of the Donets basin. So it is understandable that production costs are virtually negligible in the great Siberian coal deposits, especially in the case of surface working. (They do not come to even one-half a ruble per ton.) The electric power obtained in the mammoth hydroelectric power plants requires only one-half to one-third the expenditure of other power plants. The following table illustrates this very well:

Technical and Economic Data for the Hydroelectric Power Plants of the Soviet Union*

Technical and economic data	Angara-Yenisey hydroelectric power plants**	European part of the country combined
Number of hydroelectric plants	6	107
Output, 1,000 kW	20,101	24,843
Electric power produced, million kW hours	93,920	83,003
Specific investment costs		
rubles per kW	150	359
kopeks per kW hour	3.2	10.5
Production cost, kopeks per kW hour	0.059	0.155
Listed costs per 1 million kW hour	4,430	14,160

*Data from the book titled "Energy Economy of the Soviet Union, 1971-1975."
**After complete construction.

The two most important difficulties in exploiting the natural treasures of Siberia are settling the region with experts who will live there constantly and building up the infrastructural network, which is even more difficult than the former.

Transportation Costs

Low production costs are a very important part of management but still only a part. Transportation costs greatly increase the total economic

costs of the Siberian coal, oil and raw material treasures. In the first place this is because where there are roads, railways and telecommunications equipment the burdens on them are extraordinarily great and in the second place because a good bit of the potential and very cheaply exploitable raw materials are in areas where there is simply no communication network today and where it is difficult to imagine economical transportation over long distances with present means of transportation. This is why the leaders of the Soviet Union use the so-called complex zones system to exploit the Siberian raw material treasures.

There are many advantages to use of complex economic systems. One is that the interlinked parts supplement one another "on the spot." Agriculture supplies the areas being industrialized with food, the local machine factories produce special vehicles and machines for the producing branches and the raw materials brought to the surface by them are processed into finished products relatively close to the deposits. This is giving a great impetus to the industrialization of Siberia and makes it easier to employ not only men but also women, thus aiding the settling of newly arriving workers. Another advantage is that providing infrastructural services to the relatively centralized complexes is easier and costs much less which, recognizing the very expensive nature of this, is a factor to be considered.

The Western Siberian Plain

Several such complex economic zones have been in the process of construction for a longer or shorter time. One of these is for complex utilization of the economy of the Western Siberian Plain. The most important task here is oil production and oil transportation and creation of pipeline oil transportation. Realization of the program has been under way for years, in the course of which several cities have been built in these areas which are called on to facilitate oil mining, manufacture of machines and equipment used in oil mining and assembly of the pipelines. It is necessary to lay many tens of thousands of kilometers of pipeline in this area by means of which one can transport not only oil but also several tens of billions of cubic meters of natural gas annually.

According to the plans, 250-260 million tons of petroleum will be produced in this area in 1980, 400-500 million tons later. In the vicinity of the petroleum and gas deposits they are building oil and natural gas collectors, refineries and purifying equipment so that insofar as possible they can transport from here ever more processed, more valuable and smaller volume products. This will make use of the oil and gas lines under construction more economical.

The quickening pace of development is well illustrated by the fact that it took 20 years to reach a production of 100 million tons whereas in the next 10 years the planned increase in production is about 300 million tons.

The production of petroleum and gas started in this area the construction of large capacity petrochemical bases also.

Despite this the petroleum and natural gas from these deposits goes primarily to the European parts of the Soviet Union where they have significantly transformed the energy balances of the most important industrial centers.

In addition to these one finds in the Western Siberian Plain very rich deposits of so-called gas precipitate where about 15 percent of the gas produced is propane, methane or dry gas. These are the most important raw materials of the chemical industry especially for manufacture of synthetic rubber, plastics and synthetic fibers.

The mining of brown coal and nonferrous metals, especially bauxite, and the wood processing industry also stand before a swift development in this area. Great tasks await the construction industry and the builders of the transportation network there.

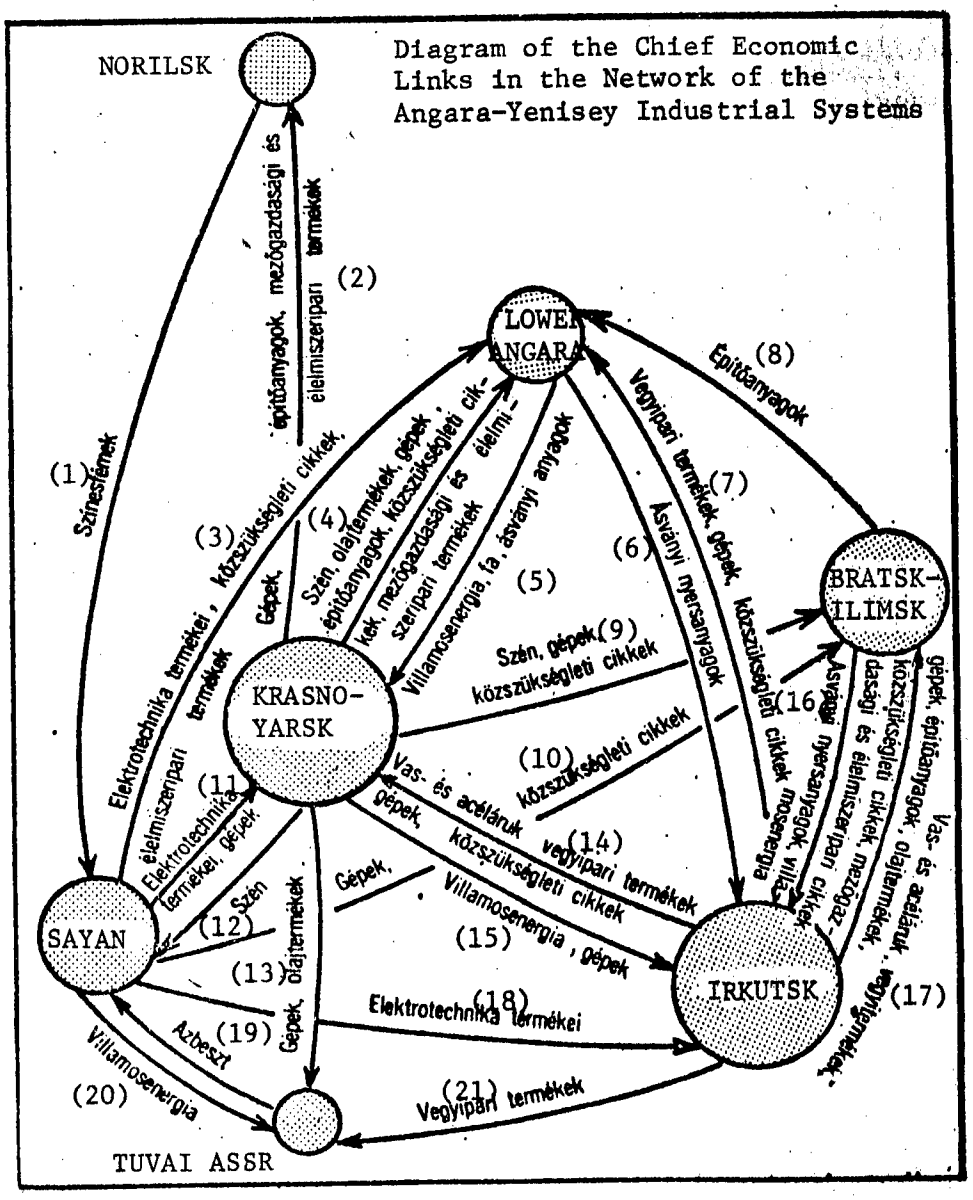
The Angara-Yenisey Zone

The second large complex economic system is the Angara-Yenisey zone. This is based on the world's largest hydroelectric power plant system, processing the raw materials which can be found nearby with the cheapest power in the Soviet Union. Primarily wood and hydrocarbons. In accordance with this they have built in this area a number of oil processing chemical industry plants, paper and cellulose factories and a specialized machine industry and light industry. (Tomsk has developed into a large educational and scientific center and it will grow more in the future, too.)

The Angara-Yenisey zone is gradually becoming a great synthetics industry center because the conditions are very favorable for the development of large petrochemical factories and the energy demanding chemical industry branches which process hydrocarbon raw materials.

The situation is similar with nonferrous metallurgy and aluminum processing, for the regions of the Altay mountains and Yakutia and the regions northeast of the Baykal are rich in copper, nickel, lead, zinc ore, tin, cobalt, mercury and rare metals.

This complex includes the Krasnoyarsk, Sayan, Irkutsk and Bratsk-Ilimsk investments, too, all of which contain a multitude of gigantic enterprises.



Key:

1. Nonferrous metals
2. Machines, construction materials, agricultural and food industry products
3. Electrotechnical products, consumer articles, food industry products
4. Coal, oil products, machines, construction materials, consumer articles, agricultural and food industry products
5. Electric power, wood, mineral materials
6. Mineral raw materials
7. Chemical industry products, machines, consumer articles
8. Construction materials

9. Coal, machines, consumer articles
10. Machines, consumer articles
11. Electrotechnical products, machines
12. Coal
13. Machines, oil products
14. Iron and steel goods, chemical industry products, machines, consumer articles
15. Electric power, machines
16. Mineral raw materials, electric power
17. Iron and steel goods, chemical products, machines, construction materials, oil products, consumer articles, agricultural and food industry articles
18. Electrotechnical products
19. Asbestos
20. Electric power
21. Chemical industry products

Of these systems the Krasnoyarsk, or more precisely the city of Krasnoyarsk itself, is really the central link of the entire Angara-Yenisey system because of transportation (it lies at the juncture of the Yenisey and the Trans-Siberian railway) and because of its powerful machine industry and light industry. Of special interest to us is the aluminum industry base which is being built which will manufacture alumina from a raw material and with a technology differing from that of Hungary.

Because of its relationship to Hungary it is especially interesting to mention the Bratsk-Ilimsk system. It is here that they are building the Ust-Ilimsk combine in the realization of which several socialist countries, including our homeland, are participating.

The unparalleled swift development and change in these regions is well illustrated by the fact that even today only the geographic experts, I believe, know the names of the cities of several thousand inhabitants in the interdependent urban zone developing around the Irkutsk system. (Such as Usolye-Sibirskoye or Cheremkhovo.)

The development of the zones is being greatly aided by the fact that a number of scientific institutes of the Novosibirsk branch of the Soviet Academy of Sciences, several special branches of industry research institutes, and institutions of higher learning are working in Irkutsk which, in addition to teaching, are dealing with basic questions of developing the productive forces of Siberia.

Along the BAM

The third large industrial complex is linked to construction of the Baykal-Amur railway. In essence they are developing 11 smaller complexes in a zone of about 200 kilometers along the new 3,200 kilometer long railway. This rail line will relieve the burden on the old Trans-Siberian line and

will substantially accelerate transit shipments from the Far East and Japan to the European parts of Russia or to Western Europe.

The volume of trade between Europe and the Far East is about 16 million tons per year. Of this 85 percent goes by ship and the rest by air or, primarily, by rail. Container traffic consists of 600,000 units of which 100,000 units now go by the Trans-Siberian railway. Express freight trains now make the trip between Nakhodka and the western border of the Soviet Union in 10-12 days. After the BAM line is linked up the transit time will be reduced to 7 days. And, as the prestigious Austrian transportation journal VERKEHR states, "shipping will be able to do nothing" to oppose this saving in time. It will also be possible to build "branch lines" into previously unapproachable areas of the Far East. The natural treasures found here--thus far only very sparsely developed but promising great riches--will become exploitable, primarily in those factories which will be built in this zone in the future.

All three of the great industrial complexes mentioned have great construction industry units and factories which have the task not only of construction but also of experimentation on and realization of how to create settlements and large cities under the severe climate conditions of the areas lying farther north, settlements and cities in which life will be not only bearable but also pleasant, and how to establish factories in the near and far north which can operate steadily.

So an important condition for the development of Siberia is that machines, equipment and materials be adapted to the severe natural and climate conditions of the north, that they be manufactured in "northern versions." The greatest role in this pioneering work is being played by the enterprises belonging to those industrial complexes and by those scientific institutes already in operation or to be built in the future in various parts of Siberia.

[7 Sep 77, pp 8-9]

[Text] The Difficulties of Exploitation

The potential economy of Siberia requires a radical change in settlement policy. It is not possible to conquer, occupy and exploit the areas exclusively with machines. Men are needed, too. A good bit more men than the original inhabitants of Siberia. Settlement in Siberia is all the more important because even though several tens of thousands, primarily young people, annually undertake work in Siberia the population of the area is not increasing (1973 was the first year in which the number of immigrants exceeded the number of emigrants).

There were views earlier than the settlers--especially in the north--could not adapt, could not adjust biologically to the new circumstances. It is now becoming ever more clear that acclimatization to the unaccustomed

living conditions and mode of life can be realized with suitable selection and scientifically founded organized preparation.

In the interest of an easier settlement of the area the Siberian Geographic Institute has mapped and grouped the new industrial settlement zones. The ratio of settlement in Siberia differs greatly among these zones.

For Example--Norilsk

The largest number, naturally, remain in the zones most suitable for settlement where the heating season is not more than 150 days and the average annual temperature not lower than minus 2 degrees Celsius. (These are the densely populated southern zones where there is even agricultural production.)

Also favorable for settlement is that zone where the heating season is not longer than 220 days and the average annual temperature not lower than minus 5 or 6 degrees. (This is in any case a very healthy region with a sickness ratio lower than the national average.)

Suitable for settlement is that zone where the heating season reaches 250 days and the average annual temperature is below minus 10 degrees. But it is suitable only if the buildings are supplied with special heating and the people supplied with suitable special clothing.

The areas suitable for settlement with difficulty can be made bearable for Europeans only by fundamentally redesigning the buildings. Here the soil is constantly frozen, the sickness ratio exceeds the national average and a good number of those settling here acclimatize with difficulty or not at all.

Care by the state and suitable work by the scientists have succeeded in developing large settlements even in the severe regions where tens and even hundreds of thousands of people live in suitably constructed model cities. (For example, in Norilsk.) Building and settling these cities is extraordinarily expensive. Many times the national average. This large investment pays off only if those working here can offer suitable output, can "pay" with suitable economic profit for the sums spent to improve living conditions.

In addition to such activity in the southern zones a great role is played in settling Siberia, in conquering the northern regions, by how experts and scientists live in and adapt to these areas.

Siberian Scientists

The significance of this has long been clear to the leaders of the Soviet Union and this is why, among other things, they formed 20 years ago the

Siberian branch of the Soviet Academy of Sciences in Novosibirsk, the chief task of which is pioneering work. The institutes of this branch are working effectively in such important branches of science as mathematics, nuclear fusion, organic and inorganic chemistry, hydrodynamics, cytology, genetics, geology and others. In many of the above areas the Siberian scientists occupy a leading position in Soviet science. The Siberian mathematics school, for example, has won broad international recognition and top rank schools have been established in hydrodynamics, nuclear physics, chemistry, geology, economics, etc. Some institutes of the Siberian branch (the catalysis institute, the soil frost research institute) are the only academy institutes in the country in their branch of science.

Important discoveries have been made in these institutes in the areas of physics, geology, mathematics, chemistry, biology and other sciences. In a number of branches of science the Siberian scientists have won strong positions in the front rank of international research.

In addition to basic research the Siberian scientists have had a considerable role in solving such special "local" problems as designing vehicles, machines and equipment which will operate reliably at temperatures 50-60 degrees below freezing, in developing houses, residential areas and cities which insure human conditions in such cold, in developing pipelines of 1,420 and 1,640 millimeter diameter (the Alaska oil pipeline has a diameter of 1,200 millimeters) or in designing 1.2 million volt alternating current and 1.5 million volt direct current long distance line equipment. (The Vinnitsa-Albertirsa line is 750,000 volts.)

In addition to the scientific work great care and effort are expended on training the experts needed to conquer Siberia. Thus, in addition to the Novosibirsk branch of the academy, an entire network of universities and institutes has already been built up in Novosibirsk, Tomsk, Krasnoyarsk, Irkutsk, Omsk, Tyumen, Ulan-Ude, Yakutsk and other cities. Organizing education and scientific life is an important condition in Siberia for saving manpower and for attracting young people into the program for conquering the distant parts of the country.

A staff of experts trained "on the spot" offers great aid to the successful and final settlement of immigrants. But aid is also offered in this by the government's wage and social policy whereby they try to make work done in the severe areas "paying." Wages in Siberia are 1.5-3 times higher than in other areas of the country.

All these efforts, however, cannot result in a massive increase in the population in the near future, in increasing the number of those who settle permanently.

The leading organs must and are reckoning with this fact.

Labor Force, Transportation, Construction

The industrial structure and employment policy of the region are defined by the labor force problems and settlement difficulties of Siberia.

It is best to settle in Siberia primarily those branches which are least labor intensive, to strive for maximal mechanization and automation when building factories. Such an industrial settlement is investment intensive. Later, however, this investment is accompanied by great profit. Not only because only in this way can the potential economic reserves of this rich area be exploited, reserves which will make the Soviet Union even economically indisputably the most powerful country in the world, but also because such an industrial settlement can be a base and a model for the organization in the entire country of factories working with the most modern technology.

Even today the productivity of labor in the giant factories of Siberia is the highest in the Soviet Union; they have the best economic efficiency. Partly because they are gigantic and have cheap raw material supplies but also because they have been forced to use the most developed technology and to spread the most modern technical organizational and leadership methods.

Because of the size of the area and the unfavorable soil and climate conditions one key to the exploitation of Siberia is communications and transportation. The basic transportation network is interdependent with the location of the large industrial complexes and the raw material deposits.

Development of the railways seems necessary for regular conduct of and expansion of economic activity. The Trans-Siberian railway is not sufficient for this for it can only handle east-west traffic in the southern part of the country. Railways must be built which go farther north and create a link there between the Urals and the Pacific. The much discussed main Baykal-Amur line (the BAM) is already under construction, plans for a northern Siberian railway are being prepared, but transportation systems for the western Siberian plain and the economically very important Angara-Yenisey zone are also in the construction or planning stage.

Air transportation for both people and goods plays a great role in Siberia; many previously unapproachable areas can be reached in this way.

A very extensive system of oil and gas pipelines is being built at a swift pace. But the construction not only of railways and roads but also of pipelines presents builders with extraordinary tasks which often seem insoluble.

The pipelines present just one example of the difficulties of construction--over and above the material ones. There are 240 natural obstacles

on one 266 kilometer stretch of a line in the western Siberian plain, a relatively short stretch--they had to bridge more than 60 rivers, streams and dry rills and many swamps. Much of the area is swampy with depths of 2.5 and even 7 meters. More than one-quarter of the section of line goes over marsh. One can hardly imagine more difficult oil pipeline construction conditions for winter in this region lasts 7 months with a hard frost of 50-60 degrees; the summer is short and hot with many mosquitoes and insects. The area is completely uninhabited and without roads; the pipes had to be transported in winter on auto trails through the snow or by air a distance of 500 kilometers. And this area lies relatively close to Europe.

Conquering the areas farther north and east means even more unimaginable material strength, human effort and virtually insuperable technical obstacles.

The Necessary Investments Cannot Be Measured

Even on an historical scale the exploitation of the Siberian areas requires gigantic material assets. Assets of a size which even one of the world's most powerful countries, the Soviet Union, cannot produce within a short time. Thus the quick exploitation of these areas can be realized only with very broad international cooperation and only if we look beyond those transportation and communications ideas which we consider most progressive today. In many of these areas present technological conditions can hardly be used. So it was not surprising when one of the most famous Soviet geologists, leader of the geological institute in Novosibirsk, said that the swift conquest of these areas was unimaginable without researchers and experimenters of such imagination as Tsiolkovsky, who dreamed of rockets--and how realistic these dreams were even if a little early at the time--when even airplanes were regarded as a curiosity, people who, as he said, might think of, for example, not railways or pipelines but of gigantic freight carrying airships for transporting the oil riches of these immeasurably rich but extraordinarily difficult to approach regions, bestowing such a gift not only on their own people but on all mankind.

A relatively swift exploitation of the great reserves of Siberia, including the fuels, is very timely. After 2.5 years work, 70 experts from 16 countries have prepared a study to show what the energy situation and energy policy of the earth will be by the end of the millenium. According to the authors of this work the oil imports of the Western world will be 2.5-3 billion tons in the year 2000. The supply of the OPEC countries will not reach even 2 billion tons. And since nuclear energy will not represent a significant ratio in the energy balance by the end of the millenium it is not surprising to hear the opinion of Prof Hans K. Schneider, leader of the Energy Management Institute of Cologne University, according to which "one cannot form a picture today of how the energy needs of the earth can be covered by the end of the century."

Thus, the conquest of Siberia, exploitation of its raw material treasures, is a very important--one might say indispensable--task for today and for the end of the century, the solution of which will require almost immeasurable material and intellectual efforts. Nevertheless this is of first order importance because it will increase the economic strength of the Soviet Union to a gigantic extent, laying the foundations for the future of not only the largest socialist country but of the entire progressive world, the fate of the coming century, the fate of the 21st century.

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