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GEOGRAPHIC INTELLIGENCE REPORT

THE VOLGA-URAL REGION

CIA/RR-G-16

December 1956

CENTRAL INTELLIGENCE AGENCY

OFFICE OF RESEARCH AND REPORTS

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THE VOLGA-URAL REGION

Summary

The Volga-Ural Region has become strategically significant as the leading oil-producing region of the USSR. Favorably situated in eastern European USSR and rich in natural resources, it has developed rapidly in the past as a result of the five-year plans and World War II. This development is expected to continue and probably gain impetus in the future.

Power capacity and transmission facilities in the region are at present inadequate. Large-scale efforts to tap the hydroelectric potential of the Volga River system are currently under way, however, and the existing capacity, plus that to be installed in the near future, should satisfy the foreseeable power requirements of the region. Soviet plans also call for a great expansion of transmission facilities.

A great variety of minerals, ranging from fuels to construction materials, are present in the region. The fuel resources include petroleum, oil shale, peat, natural gas, and coal. The region is especially rich in ferrous minerals and alloys. It contains extensive deposits of iron ore and chromite, as well as significant quantities of cobalt, nickel, and vanadium. Copper, magnesium, bauxite, gold, and platinum are the chief nonferrous metals. Potash and phosphate provide the raw-material base for mineral fertilizers. The region also has deposits of many other nonmetallic minerals.

The most important means of transportation is rail, and the railroad network is good according to Soviet standards. Next in importance are the inland waterways, specifically the Volga River system, which is well integrated with the railroads of the region. Highways are of minor importance in the transportation of the region, and the road pattern is sparse and inadequate. Economically, airlines are of minor importance, since their traffic consists mainly of passengers. The region is deficient in pipelines.

Industry is an important branch of the economy of the region, which includes some of the most highly industrialized parts of the USSR. Among the chief industries are metallurgy; the manufacture of machinery, chemicals, and textiles; woodworking; and food processing.

*This report was coordinated with the Agriculture and Petroleum Branches, Materials Division, and with the Transportation Branch, Services Division, of ORR.

Agriculture is limited largely to grain crops, with over 75 percent of the cultivated area devoted to grain. Flax, hemp, sunflowers, sugar beets, potatoes, and makhorka are the chief industrial and food crops, and truck farming and dairying are found near centers of population. Livestock raising is carried on throughout the region. Agricultural production apparently is not sufficient to meet regional requirements.

Approximately 40 to 45 million people live within the boundaries of the study area, or about one-fifth of the total population of the USSR. The heaviest concentration of population is found in the forest steppe between Ryazan' and Borisoglebsk and between Penza and the Vyatka River. Forty percent of the population is urban. Seven major ethnic groups are represented within the region, of which the Great Russian is by far the largest and most influential.

Settlement in the region has been characterized by the rapid growth of urban centers and workers' settlements associated with expanding industrial centers, the oil industry, and hydroelectric developments.

The physical environment, although not optimum, poses no insurmountable obstacles to further development of the region. The East European Plain, which extends across European USSR to the Ural Mountains, encompasses the major portion of the region. The only other outstanding relief feature is the comparatively low Ural Range. Most of the region is drained by the Volga River system, which empties into the land-locked Caspian Sea. Long, severe winters and short, moderately warm summers are characteristic of the region. The mean annual precipitation is between 430 and 635 millimeters (17 and 25 inches). Steppe and forest are the predominant types of natural vegetation.

I. Introduction

The Volga-Ural Region corresponds roughly with the rich oil-producing area that has become known as the "Second Baku." Since the region has never been clearly defined in Soviet literature, it has been delimited to include the major part of the known and possible oil-bearing strata in eastern European USSR (see Map 25546 following page 93) -- an area of about 1,385,000 square kilometers (535,000 square miles).

The era of rapid industrial expansion in the Volga-Ural Region began in 1928 with the inception of the Soviet five-year plans. Until then, the economy was based primarily on local handicrafts and agriculture; industry was limited to the manufacture of textiles in the Ivanovo area and of metallurgical products in the Urals. With the successive five-year plans, industry expanded and new industrial centers sprang up throughout the region. This industrial expansion occurred mainly in the Ural Mountains in close proximity to the extensive and varied mineral deposits and along the Volga River, which provided an important artery for the flow of raw materials. The discovery and rapid exploitation of petroleum in the region has also stimulated industry and greatly increased the strategic significance of the Volga-Ural Region. Further stimulus was provided by the industrial relocation that occurred during World War II.

Raw materials, location, and the Volga River have been and still are the dynamic factors in the economic growth of the region. Of these, the presence of raw materials has played a preeminent role. In the Ural portion of the region, the accessibility of a variety of minerals forms the basis for ferrous and nonferrous metallurgy and the chemical industry. The products of these enterprises supply basic materials for other industries, both within the region and in other parts of the Soviet Union. Although the exploitation of petroleum is of recent origin, the Volga-Ural Region is currently the leading Soviet oil-producing area, and production will undoubtedly increase in the future. Among the other resources are fuels such as peat, oil shale, natural gas, and coal. Some of these lower grade fuels have not been exploited extensively, but their exploitation is expected to increase, since greater use of local fuel resources would make possible the reduction of bulky railroad hauls. Also important are the extensive forests of the region, which supply the raw material for the woodworking industry. (See Maps 25406 and 25407 at end of report.)

The Volga-Ural Region is centrally located in relation to other areas with raw materials and industry. To the west is the highly industrialized Moscow area, which supplies the region with a great variety of consumer and producer goods. To the southwest is the

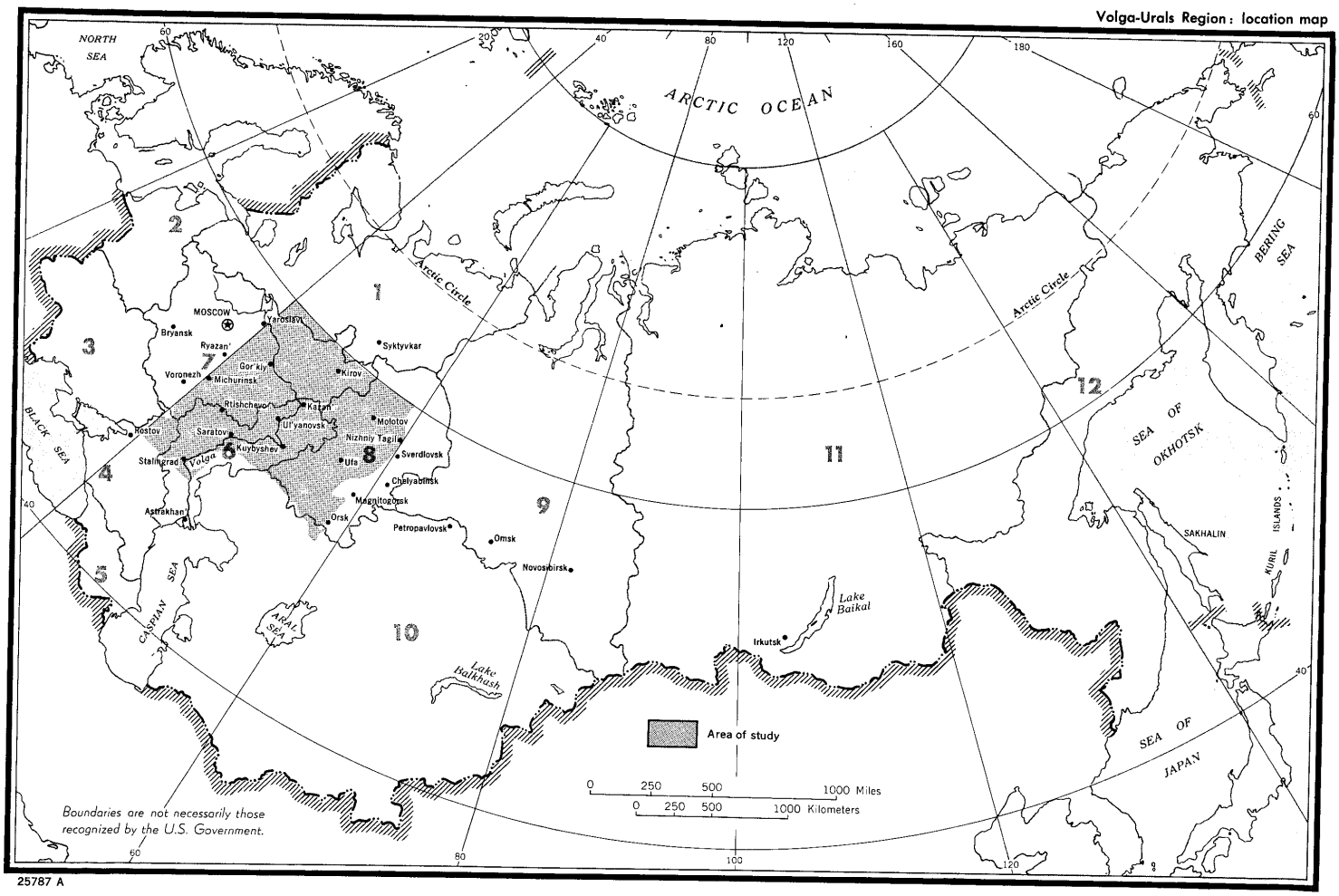
important metallurgical, manufacturing, and agricultural area of the Ukraine. This area provides the Volga-Ural Region not only with metallurgical products, iron ore, and coal for the machine-building and metalworking industries along the Volga but also with agricultural and finished products. To the north are extensive forests and the Pechora coal basin, which in the near future is to be connected directly with the Ural area by rail. To the south is the Caucasus area, important for oil and manganese. To the southeast is Soviet Central Asia, which supplies cotton for the textile industry of the Ivanovo area and is also an important source of coal and nonferrous metals; in the future Central Asia may become an important source of iron ore. To the east are the metallurgical and machine-building industries of the eastern Urals, and farther to the east is the Kuzbas, with its iron ore, coal, and heavy industry.

Because of its central location the Volga-Ural Region is a major transit area for raw materials and finished goods; and its transportation system, especially the railroad network, is well developed. Raw materials pass through the region by rail and along the Volga River en route from eastern mineral and agricultural areas to western consuming and manufacturing areas, and finished products from the west cross the region en route to eastern markets. Some of these commodities are in semifinished form and are further processed within the region. Although the Ural industrial complex is better situated than the Donbas for supplying Siberia and Soviet Central Asia with metallurgical and industrial products, the Kuzbas has recently taken over a part of this supply function.

The inland location of the region is also of strategic military significance, making it less vulnerable than other areas to enemy invasion during wartime. This fact, coupled with a favorable combination of raw materials in the Ural Mountains, has made the region an important area for defense industries. The strategic location of the region was demonstrated during World War II, when defense plants were moved into it on a large scale. The farthest advance into the USSR by the Germans during World War II reached no farther than Stalingrad in the extreme southwestern part of the region.

The Volga River and its tributaries have long served as a unifying force for the region. In the past, when waterways were the chief medium of transportation, the Volga River system facilitated trade and contributed to the development of the early Russian state. Russian penetration and development of the region began in the twelfth and thirteenth centuries, when trade centers were founded along the Volga and its important tributaries. By the sixteenth century, after the defeat of the Tatars, Russian influence had spread from the Oka River basin to the entire Volga Basin. Through the years, the Volga River

Volga-Urals Region: location map



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has attracted a great variety of goods, people, and industries, thereby laying the foundation of the present economic structure. Many of the early trading centers, such as Gor'kiy and Kazan', have grown to be key cities of the Soviet Union.

The Volga River system is also important for power and has possibilities for future irrigation. In response to the demands of the economy, the navigation, energy, and irrigation potential of the Volga River and its chief tributary, the Kama, is being developed intensively. According to current plans, eight power dams with an almost continuous chain of reservoirs will be constructed along the Volga from Stalingrad to beyond Ivan'kovo on the upper course of the river, and three more large dams are being built in the Kama. The realization of this program is making available a large amount of electric power, has already improved navigation, and will increase the water available for irrigation -- all of which will enhance the economic potential of the region. The additional power will provide an energy base for much of the region and probably foster industry and agriculture; the improvement of navigation will facilitate the flow of goods; and water for irrigation could raise agricultural productivity somewhat.

Cities within the region may be expected to expand greatly, notably Stalingrad and Kuybyshev. Stalingrad, situated on the Volga River near what will be one of the world's largest power dams, can be supplied with iron ore and coal via the Volga-Don Canal from the Donbas, about 480 kilometers (300 miles) to the southwest. Kuybyshev, farther upstream, is located in the center of an important oil-producing area and near another large power dam and is connected by a major railroad line with consuming areas to the east and west.

Although the region is traditionally an important grain-growing area of the Soviet Union, physical conditions are not optimum for agriculture. Today agriculture seems to be one of the more poorly developed branches of the economy. The agricultural potential of the region is probably considerably greater than the present stage of development would indicate, but no great expansion is expected in the future. Any immediate expansion will probably be associated with the planned large irrigation projects along the Volga and the availability of additional power. Long-range agricultural improvement will be contingent upon greatly increased use of chemical fertilizers and a general rise in the efficiency of labor.

II. Population and Settlement*

A. Population Distribution and Composition

Approximately 40 to 45 million people, or about one-fifth of the total USSR population, live within the boundaries of the Volga-Ural Region. This region is the eastern extension of densely populated central European Russia. The average density of population for the region as a whole is relatively high -- about 34 persons per square kilometer (85 persons per square mile) as compared with 9 persons per square kilometer (23 persons per square mile) for the Soviet Union as a whole.

In 1939 the rural population of the region numbered roughly 36 million. Since then it has probably declined somewhat as a result of the growth of urbanization. The decline, however, has been less than might be expected because it has been partially offset by the natural increase in the rural population.

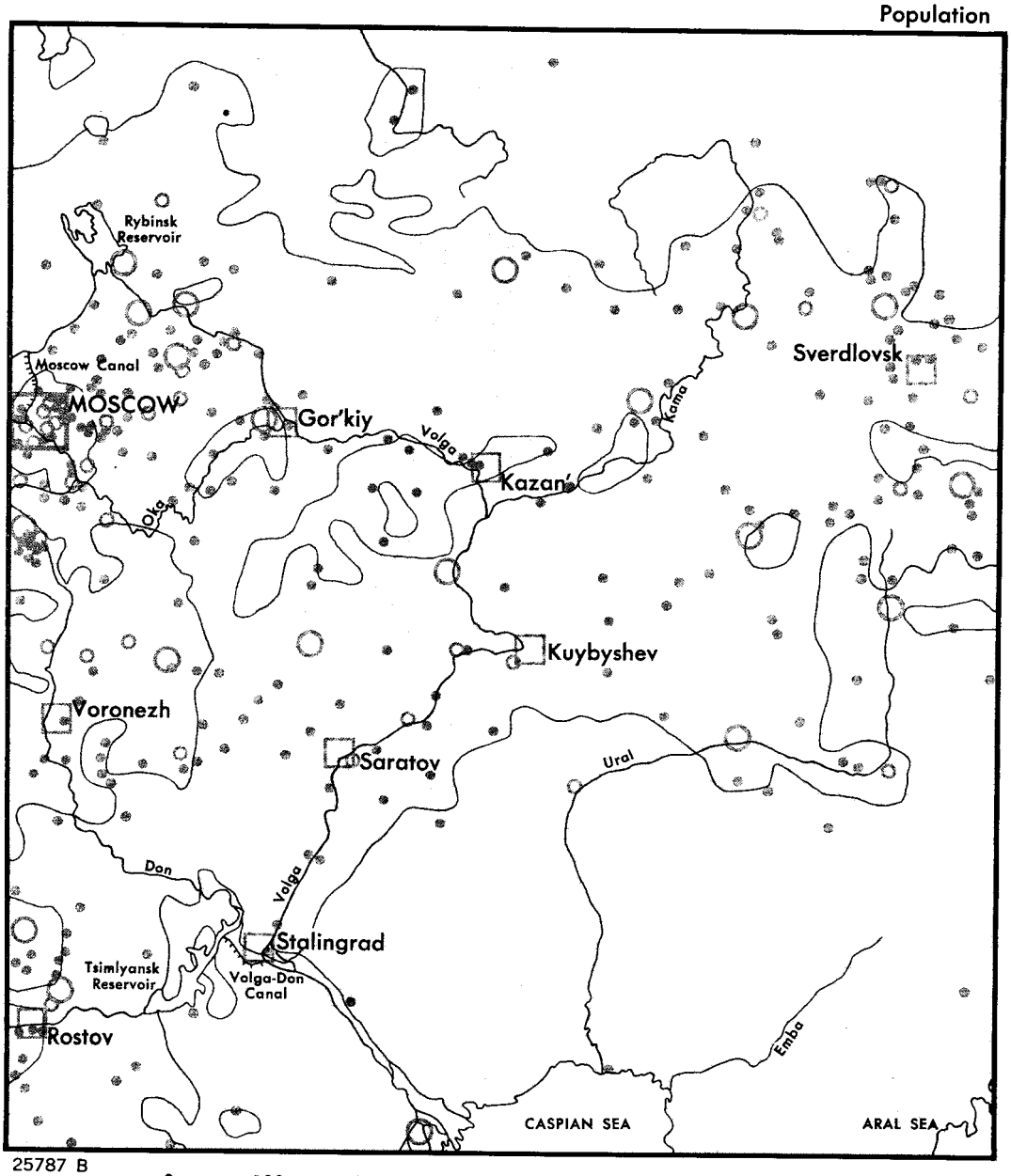
The distribution of the rural population is uneven. Seven areas within the region have population densities ranging from 50 to 100 persons per square kilometer (130 to 260 persons per square mile). The largest area of high population density stretches some 400 kilometers (250 miles) from the vicinity of Ryazan' southward to Borisoglebsk. Another large area extends from the vicinity of Penza northeastward to the Vyatka River. The other areas are smaller and are located near the cities of Kostroma, Gor'kiy, Izhevsk, Ufa, and Saratov.

In practically all of the intervening areas the population ranges from 25 to 50 persons per square kilometer (65 to 130 persons per square mile). Northward toward the colder regions and southward toward the hot arid areas, the population densities become progressively lower, and large areas in the north and south have fewer than 10 persons per square kilometer (26 persons per square mile).

In contrast to the relative decrease in rural population, the population of settlements classified as urban has increased rapidly since 1926, largely because of the industrialization drive that began shortly thereafter. By 1939, the number of urban inhabitants within the Volga-Ural Region was approximately 12 million, an increase of more than 100 percent over 1926. That this trend has continued to the present is evident both from the rapid growth of many of the major cities and from the large number of new cities and settlements. The city of Gor'kiy, for example, is estimated to have added about 230,000

*Background material was derived from sources 1 and 2, Appendix B. Numerical citations in the text also refer to sources in Appendix B.

Population



RURAL POPULATION DENSITY

- High (> 130/mi.²)
- Moderate (25–130/mi.²)
- Low (< 25/mi.²)

URBAN POPULATION

- >1,000,000
- 300,000–1,000,000
- 100,000–300,000
- 50,000–100,000
- 10,000–50,000

inhabitants since 1939; Kuybyshev has grown from 390,000 in 1939 to a present population of about 760,000; and even the smaller cities of Penza and Kirov have increased by about 70,000 each during the same period. 3/ At present, the urban population is estimated at about 40 percent of the total population.

The population of the Volga-Ural Region underwent a noticeable change during World War II, when some 10 million people, including many technicians and highly skilled workers, were evacuated eastward from areas threatened by the Germans. A considerable number of these evacuees were resettled in the Volga-Ural Region. Especially large increases occurred in some districts of the Urals. The southwestern part of the area, however, experienced some population losses through the forced migration of workers eastward and through the evacuation of at least 400,000 ethnic Germans from the liquidated Volga-German Republic.

In the past, workers in other areas have been offered inducements for moving voluntarily to the Ural region. These inducements have included free transportation at the expense of the hiring enterprises, allowances and food while in transit, lump-sum grants for workers and families, loans for housing construction, free technical training, and tax exemptions. Practically all these inducements appeared to be still in effect as of 1955. Favorable wage differentials constituted another important inducement. Wages in the Urals averaged about 20 percent higher than in many other areas and were set even higher for the coal, ferrous metallurgy, and oil industries. 4/

An important factor in determining the overall industrial and agricultural potential of a population is the number of persons of working age. In the USSR as a whole, the proportion of persons of working age (generally assumed to be the age group between 16 and 59), which supplies 80 to 90 percent of the civilian labor force, is about 62 percent of the total population. When applied to the Volga-Ural Region, this proportion would give a work force of approximately 27 million. It has been estimated that the working-age population is increasing at a rate of almost 2 percent a year.

The current ratio of 100 men to 117 women will gradually even off as the years pass. This anticipated change in the ratio of males to females will increase overall labor productivity because of the greater efficiency of males in some types of work.

Of the seven major ethnic groups living within the limits of the Volga-Urals Region, the Great Russian group is by far the most numerous and influential. Great Russians occupy most of the important industrial and administrative positions. On occasion, entire cities, such as the

new oil town of Oktyabr'skiy in Bashkirskaya ASSR, have been built to house "imported" Great Russian workers.

The native population groups are relatively insignificant in number and influence. The largest, the Mordvins of Mordovskaya ASSR, numbered only 1,451,000 in 1939. The remaining groups in order of size were, in 1939, the Chuvash, Bashkir, Udmurt, Mari, and Tatar. These ethnic groups comprise a considerable part of the agricultural labor force, but some individuals serve as unskilled and semiskilled workers in the newly developed oilfields.

Population transfers during World War II brought large numbers of Great Russians, Ukrainians, and Belorussians into the Volga-Ural Region. Lack of data makes it impossible to determine the magnitude of these transfers.

B. Urban Settlement

Settlement in the Volga-Ural Region is characterized by the rapid growth of urban centers. For example, of 51 smaller industrial cities on the western flank of the Urals, from the vicinity of Molotov to the area just south of Ufa, 34 have achieved city status since 1926, 20 of these since 1940. Many of the older centers, such as Molotov and Ufa, have also grown enormously since World War II. At present the region includes close to 200 settlements with over 10,000 inhabitants each, most of which are clustered about the major industrial centers. Over a dozen are cities with more than 200,000 inhabitants.

The majority of the settlements are located along rivers or streams, where water is available. The larger settlements are likely to be situated at the junction of a major river and an important tributary.

The major cities in the Volga-Ural Region, as in other parts of the USSR, are generally administrative, cultural, industrial, and transportation centers.

Gor'kiy, with a population of approximately 876,000, is the largest urban center in the region. The city is located at the confluence of the Volga and Oka Rivers and derives importance from its transportation and industrial activities (Figure 1). Among the major products manufactured are locomotives, ships, airplanes, automobiles, tanks, and artillery. The city also produces chemicals and processes lumber, wool, and flour.

Kuybyshev, the second largest city, has a population of approximately 760,000 and is situated at the confluence of the Volga and Samara Rivers. From its original importance as an old trading town,

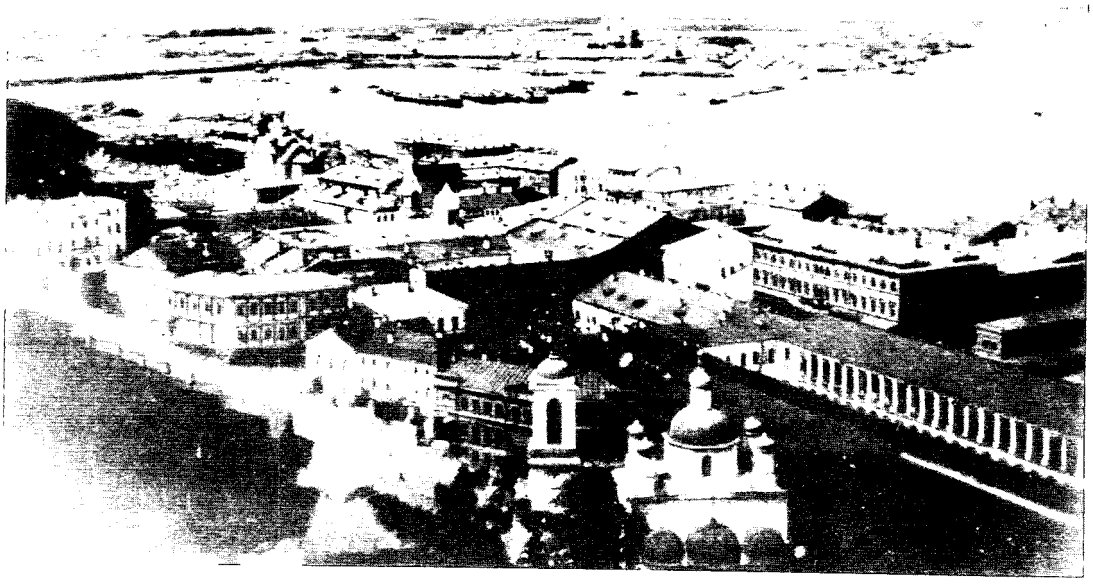


Figure 1. View of Gor'kiy at the confluence of the Oka and Volga Rivers.

Figure 2. Saratov on the middle Volga. (Date unknown)

it has become one of the largest ports and transshipment centers on the Volga River. At present, aircraft production is its largest industry. Kuybyshev also contains an arms plant, oil refineries, ball-bearing works, shipyards, and food-processing plants.

Kazan', at the junction of the Volga River and a key east-west railroad line, has a population of about 565,000. It is the capital of the Tatarskaya ASSR and is important as a producer of synthetic rubber, aircraft, and optical equipment. Also noteworthy are its woodworking and fur-processing industries.

The city of Molotov on the Kama River has roughly 538,000 inhabitants. It is an important producer of machine tools, aircraft engines, ships, telephone equipment, munitions, chemicals, and lumber. It is also the administrative center for Molotovskaya Oblast'.

Stalingrad, with about 525,000 inhabitants, is located at a bend of the Volga River between Saratov and Astrakhan'. Recently rebuilt after having been extensively damaged in World War II, Stalingrad is an important river port and rail center for the transshipment of such commodities as petroleum, lumber, and coal. It also has important metallurgical, chemical, and lumber industries.

Saratov, which is also located where a main railroad line crosses the Volga River, has approximately 518,000 inhabitants (Figure 2). This river port is especially important as a transshipment point for petroleum moving from Baku to the central European USSR. Oil refining, the manufacture of machine tools and of agricultural and electrical machinery, sawmilling, and food processing are the chief industries of the city. It is also an important producer of storage batteries. Saratov is an oblast center.

Ivanovo has about 319,000 inhabitants. Other major cities, such as Nizhniy Tagil, Ufa, Izhevsk, Penza, Chkalov, and Kirov, range in size from 200,000 to 300,000; and Ul'yanovsk, Syzran', Orsk, Tambov, and Vladimir have populations of 100,000 to 200,000. In addition to their industrial importance, these cities serve as administrative and transportation centers for their respective areas.

Although some of these smaller cities were newly established, most were expansions of smaller, older settlements. For example, the relatively new metallurgical city of Dobryanka in Molotovskaya Oblast' evolved from a settlement that was established in 1752. In other instances, some of the larger cities expanded to such an extent that whole new cities were formed from their suburbs. The industrial section of Berezniki, for example, broke away from the parent settlement to form the new city of Usol'ye. Many of the smaller towns such as

Novo-Troitsk, a new metallurgical city founded in 1945, and Gubakha, a new coal city formed in 1941, developed as a result of the merger of two smaller neighboring settlements.

As might be expected, workers' settlements are most numerous in the vicinity of large established industrial centers and near the particular factory in which the workers are employed. The exact number of new workers' settlements is difficult to determine since new settlements appear practically every time a new factory is constructed or an old one is expanded. New forestry workers' settlements, however, tend to appear in areas that were previously unsettled.

In the past, workers' settlements have generally consisted of one-story wooden huts. Recently, however, construction has in some instances turned toward more substantial multistoried apartment buildings of brick and cinder-block construction.

C. Rural Settlement

Rural settlements vary greatly in size, ranging from 5 to 5,000 households. They generally consist of a compact group of one-story wood or mud huts, possibly with a few administrative buildings of more substantial brick or stone construction.

In the northeastern section of the Volga-Ural Region, villages are strung out along the many forested valleys and along roads. They vary in size from fewer than 50 inhabitants for the vast majority up to 500 or more for some of the larger villages.

In the west-central areas, the settlements are somewhat larger. A large percentage of settlements have from 50 inhabitants to more than 500 (Figures 3 and 4); but some of the larger villages have over 2,000 inhabitants. Sel'sovets are generally located in these larger villages.

Within Kuybyshevskaya, Saratovskaya, and Stalingradskaya Oblasts to the south and southwest, villages are still, for the most part, relatively small, usually with fewer than 200 inhabitants (Figures 5, 6, 7, and 8). Houses are one-story huts, but clay becomes more important as a building material. The larger villages often contain sel'sovets and act as the administrative and commercial centers of their areas. The population of such villages often exceeds 5,000 and occasionally 10,000.

As a result of the program for consolidating kolkhozes, which began in 1950, some isolated attempts may have been made to merge several small villages into larger settlements called "agrogorods" or

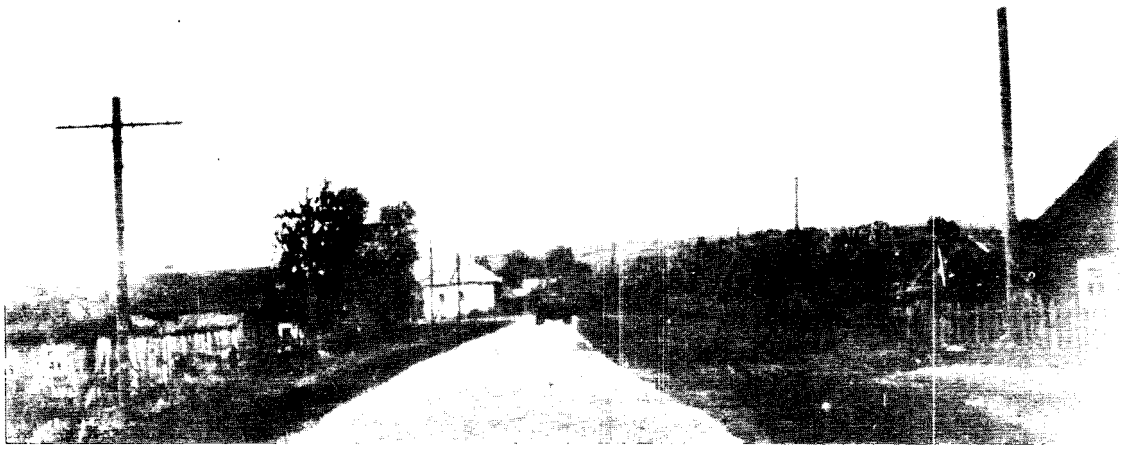


Figure 3. Kryukovo, a small town south of Morshansk in Penzenskaya Oblast'. (1955)

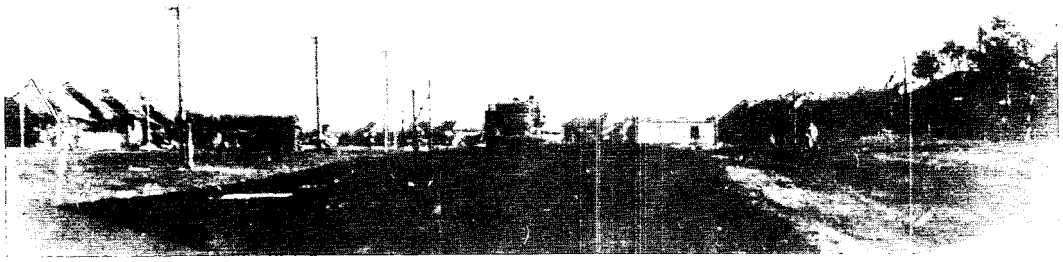


Figure 4. Tatanovo, a small town north of Tambov. (1955)

Figure 5. View of Perevoloki, east of Syzran'. (1955)

Figure 6. Town along the Volga east of Syzran', probably Batraki. (1955)

Figure 7. A kolkhoz village in Stalingradskaya Oblast'. (1946)

Figure 8. A kolkhoz village in Kuybyshevskaya Oblast'. (1946)

farm-cities. Even these feeble attempts at consolidation, however, appear to have been abandoned in recent years.

D. New Settlements and Trends

Most of the new towns and settlements in the Volga-Ural Region are developing in conjunction with the expanding industrial centers, the growth of the oil region known as the "Second Baku," or the establishment of the Tsimlyansk and Kuybyshev hydroelectric plants. Many of the larger cities have become the nuclei for a ring of satellite industrial towns. Around Kirov, for example, the new satellite towns and woodworking centers of Novo-Vyatsk and Kirov-Chepetsk on the Vyatka have recently evolved from small former workers' settlements.

An important stimulus to new settlement has been the relatively recent oil boom in the region (Figure 9). In the Tuymazy oilfield of the Bashkirskaya ASSR, the city of Oktyabr'skiy, with over 40,000 population, has evolved from a workers' settlement established during World War II. In Tatarskaya ASSR, the recently founded town of Al'met'yevsk was designed to be the new center of the rapidly growing oil industry. The Moscow Institute of Town Planning is preparing a general plan for the development of Al'met'yevsk over the next 20 to 25 years. At present, construction of the city is progressing at a rapid pace, and rows of multistoried apartment houses, parks, and avenues are under construction. In Chkalovskaya Oblast', the town of Buguruslan has been rejuvenated by the growth of the oil industry and is expanding rapidly. Several technical schools for oil specialists and other educational institutes are being established here.

Hydroelectric developments have also had a decided influence on new settlement (Figure 10). The construction of the Kuybyshev dam and power station on the Volga has resulted in the creation of many new towns and has given new life and purpose to several older cities. The new towns of Komsomol'skiy and Zhigulevsk, approximately 70 kilometers (45 miles) upstream from Kuybyshev, have been built to house the power-station workers at the new dam. Other recent developments in this area include the new cities of Portgorod and Stavropol' (to replace the old Stavropol', which will be inundated by the new reservoir) and the lock settlement of Poselok Shlyuzovoy. On the opposite side of the river, not far from Zhigulevsk, is the new and rapidly expanding town of Morkvashi, which produces construction materials.

According to Soviet accounts, all of the new towns are being built of brick and follow a prescribed pattern of development. Each new town is to have asphalt streets, blocks of multistoried flats, stores, schools, and the inevitable house of culture.

Figure 9. Oilfield workers' settlement under construction in the Zhiguli Mountains near Kuybyshev.

Figure 10. A recently constructed settlement for workers of the Kuybyshevskaya hydroelectric power project. (1952)

Since the dam of the Kuybyshevskaya Gidroelektricheskaya Stantsiya (GES) will raise the waters of the Volga some 20 meters (65 feet), several of the older cities along its banks are having to reconstruct their port facilities. Work of this sort is in progress at Kazan', Ul'yanovsk, Melekess, and Sengiley. A new port is being built on the outskirts of Ul'yanovsk, which is being designed as one of the largest ports in the Greater Volga area. The port facilities of Kazan' are to be radically reconstructed, with new quays and dikes. The Leningrad State Institute for Planning and Municipal Construction has drafted plans for the reconstruction of 19 cities in the vicinity of the Kuybyshev reservoir.

In the area southwest of Stalingrad the construction of the Tsimlyansk reservoir and hydroelectric plant and the Volga-Don Canal has necessitated a considerable amount of relocation and new urban development. In Nizhne-Chirskiy Rayon (now in Kamenskaya Oblast') alone, some 37 settlements and 33 kolkhozes were displaced. The new settlement of Kalininskaya has been built to house the farm people dispossessed by the flooding. Eight new settlements are being built along the route of the Volga-Don Canal. According to Russian sources, Novyy Rogachik, a former farm on the steppes, is developing into an important port on the Volga-Don Canal and a transshipment point for building materials, grain, and coal. The new settlements along the Tsimlyansk reservoir and the Volga-Don Canal seem to be well planned and permanent.

The new settlement of Volzhskiy was built in 1954 to house the construction workers of the Stalingrad hydroelectric powerplant. Volzhskiy is called the "stone city" because of its hundreds of 2- and 3-story masonry apartment houses. Reportedly the city has hydroelectric technical schools, stores, and asphalt-paved streets.

The area along the upper Volga that will be flooded by the new Gor'kiy Reservoir has also been the site of recent building activity. On the shores of this future "sea," harbors and landing stages are being built for the anticipated shipping. New towns of permanent construction, with multistoried apartment houses and schools, are also being built for the workers at the power project. To protect some of the older cities such as Yur'yevets, Kineshma, and Kostroma from flooding, extensive systems of dikes are under construction.

The area surrounding the Kama "Sea" in Molotovskaya Oblast' is another center of building activity. The creation of the reservoir has also resulted in the development of many new workers' settlements, as well as the rejuvenation of many older cities. With the formation of the sea, the cities of Molotov, Berezniki, Solikamsk, and Verkhne-Chusovskiye Gorodki will become more important as river ports. New

harbors are presently under construction at Berezniki and Molotov. Although the 186-mile-long reservoir is constricted by the narrowness of the Kama Valley, it has made necessary the movement of some older towns to higher ground.

In the future, the current high rate of city expansion is bound to decrease somewhat as the present rapid rate of industrialization begins to level off. On the other hand, the growth of new workers' settlements seems to be continuing at a rapid pace, primarily because of the housing needs of workers involved in building the hydroelectric projects now under way or planned. Many of these settlements will gradually evolve into full-fledged cities.

The basic pattern of settlement seems to be relatively uniform. In the great majority of cases, expansion of the cities and the development of new population centers are taking place within the well-established and already densely populated industrial areas. The only really new areas of urbanization are associated with the development of the "Second Baku" oil region and with the new hydroelectric projects along the Volga River.

In spite of the considerable amount of new construction, most of the cities are overcrowded and inadequately supplied with housing. Furthermore, much of the current building is of such inferior quality that it is not uncommon to find almost new apartment houses in various states of disrepair.

III. Transportation*

Transportation facilities in the Volga-Ural Region include railroads, waterways, airlines, highways, and pipelines, but the most important means of transportation is rail. The preeminence of rail transportation is partly a result of the region's central location. The major east-west lines of the USSR cross the region, providing connections with areas to the east and west, as well as satisfying internal transportation requirements. Next in importance is the inland waterway system, which is well integrated with the railroads of the region. The Volga River is the main artery of water transport. It is the most important inland waterway in the Soviet Union and is connected through tributaries and canals with practically all parts of European USSR. Roads are of minor importance. The highway system, which generally consists of a limited number of hard-surfaced roads, is sparse and inadequate. The main function of airlines is the transport of passengers. Therefore, airlines play a minor role in the economy of the region. Petroleum pipelines are notably deficient in the region.

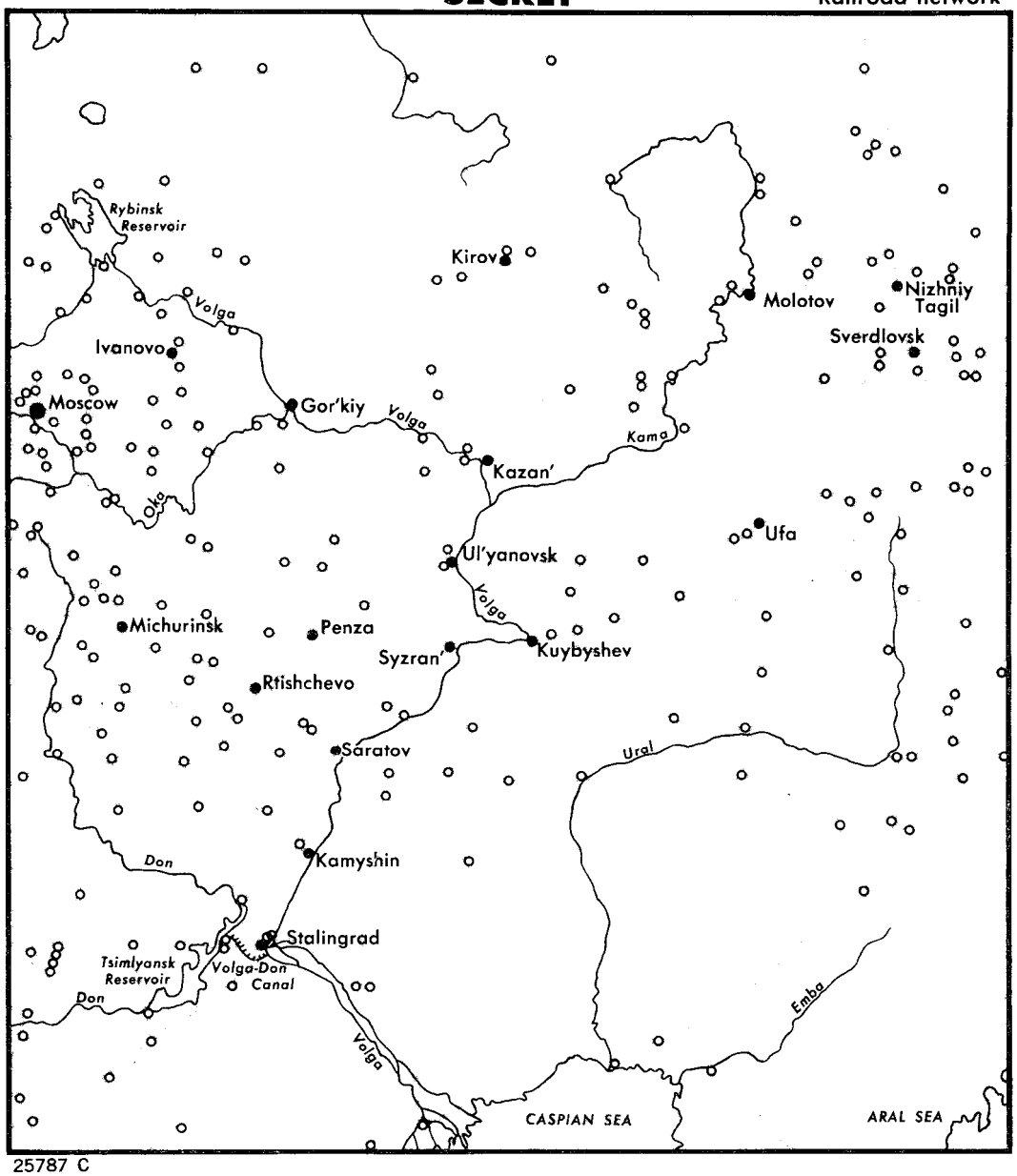
A. Rail Transport

Since the Volga-Ural Region is industrially well developed, an extensive railroad network is especially important to supply the industries with raw materials and to transport their finished products to consumers. From the west, foodstuffs, textiles, and manufactured goods are shipped into the region by rail. Locally produced bulk iron and steel, oil, and machinery are exported eastward and westward by rail.

The rail network of the region is generally good, but it is inadequate in some respects. In the area west of the Volga River, railroad facilities are especially well developed, being a part of the railroad network that radiates from Moscow. Furthermore, these railroads are also integrated with the river transport on the Volga River. Between the Volga River and the Ural Mountains, the rail pattern thins out but is still fairly adequate. Along the slopes of the Ural Mountains, especially in the central Urals, the net again becomes fairly dense. The main area of inadequate rail transport is the Bashkirskaya ASSR. Here the development of railroads has not kept up with the rapidly expanding oil industry. The present situation will be somewhat alleviated, however, when the Magnitogorsk-Sterlitamak-Abdulino line, now under construction, has been completed. This railroad is

*Background material was derived from sources 5 through 9, Appendix B.

Railroad network



25787 C

0 100 200 300 400 500 Statute Miles

0 100 200 300 400 500 Kilometers

Existing railroad

Railroad under construction

Railroad scheduled in 6th 5-year Plan

● Major rail center

○ Selected railroad station

expected to relieve the heavily traveled Chelyabinsk-Ufa-Kuybyshev line, which is currently the only line that crosses the Urals between Sverdlovsk and Orsk. Another deficiency has been the lack of connections between the Ural industrial centers, which are deficient in coking coal, and the Pechora coal basin to the north. To relieve this situation, two new lines have been planned. The first will connect Polunochnoye with the Chum-Salekhard line via the east flank of the Urals, and the second will connect Solikamsk with Ukhta along the west flank of the Urals.

The railroad network of the region includes 10 Soviet railroad systems. Five key lines, all of which radiate from Moscow and cross the Volga River, traverse the region from west to east. These heavily traveled east-west lines are intersected by seven north-south lines. Together, these lines form an integrated railroad network that serves the Volga-Ural Region. The main railroad network is supplemented by many feeder and branch lines throughout the region.

In the north, the region is crossed from west to east by the Moscow-Gor'kiy-Kirov-Molotov-Sverdlovsk line, which continues eastward and connects with the Trans-Siberian Railroad. This line is double tracked from Moscow to Gor'kiy, and the remainder of the route is now being double tracked. Important branches of this line connect Kirov with the Kotlas-Vorkuta line, Yar with Rudnichnyy, and Molotov with Polovinka (in the vicinity of Kizel). The Yar-Rudnichnyy line provides rail connection with the iron-ore and phosphate deposits of the Vyatka-Kama area. This line is scheduled to be extended to Syktyvkar during the period of the Sixth Five-Year Plan, and currently a rail connection is under construction from Sytyvkar to Mikun' on the Vorkuta-Kotlas line. 10/ The Molotov-Polovinka line is an alternate route, its chief function being the transport of coal from the Kizel Basin to Molotov. Somewhat to the south, the single-track Moscow-Kazan'-Sverdlovsk line crosses the region.

Farther south is another line that connects Moscow with Ryazan', Ul'yanovsk, Ufa, and Chelyabinsk. The line is single tracked except for a section of double track between Ufa and Chelyabinsk. Paralleling the western part of this line on the south is the Moscow-Penza-Kuybyshev-Ufa line, which is double tracked throughout most of its course. An important branch of this railroad connects Ufa with the important oil region of Ishimbay and will eventually continue to Chkalov. At Kuybyshev, another single-track line branches to the southeast and connects with Orsk by way of Chkalov. The southernmost of the trunklines is the railroad that leads from Moscow to Saratov, most of which is single tracked. From Saratov the line continues eastward and connects with the Chkalov-Tashkent railroad. The branch of the trunkline that leads northward from Yershov to Pugachev

is at present being extended westward to the construction site of the Saratovskaya GES at Balakovo. With the completion of the Saratovskaya GES, this line will cross the Volga via the dam and will connect with the Saratov-Syzran' line by way of Vol'sk. It is probable that the branch line will also be extended northward from Pugachev to Kuybyshev, thus providing an auxiliary route to the construction site of the Saratovskaya GES.

The north-south railroads of the region are more irregular in pattern since their primary function is to interconnect the main east-west routes. Most of the north-south lines are single tracked because the volume of traffic they handle is generally considerably lower than on the east-west lines. The backbone of north-south railroad transport is a line connecting the industrial centers of Serov, Nizhniy Tagil, Sverdlovsk, Chelyabinsk, and Orsk. This line, although largely outside the region, is of primary importance to the industries of the Volga-Ural Region. Roughly paralleling the key line is a single-track railroad running from Solikamsk in the north via Nizhniye Sergi to Bakal. This line roughly skirts the western slope of the Ural Range.

Two additional single-track lines now under construction will further facilitate north-south traffic. The first leads from Balezino on the Kirov-Molotov line via Izhevsk and Agryz to Bugul'ma, where it joins the Ul'yanovsk-Ufa line. The section between Agryz and Bugul'ma is currently under construction. On the second line, between Pronino (on the Ul'yanovsk-Ufa line) and Surgut (the terminus of a branch line of the Kuybyshev-Ufa trunkline), construction is also under way. On completion, this line will materially shorten the railroad distance between the important oil-producing districts of Bugul'ma and Tuymazy and the major refining center of Kuybyshev.

Of vital importance to transport along the Volga is a single-track, north-south railroad line that parallels the Volga River and connects the major centers along its course. The line begins near Stalingrad; runs through Kamyshin, Saratov, Syzran', and Ul'yanovsk; crosses the Volga River west of Kazan'; and continues somewhat beyond Yoshkar-Ola. Along its route, the railroad crosses four of the east-west trunklines. During the winter when the Volga River is frozen, the line serves the major centers along the river.

In the southwestern part of the region, there are three other important north-south lines. One connects Povorino, on the western margin of the region, with Penza, Gor'kiy, and Kirov. This line is double tracked from Povorino to Penza, and the remainder of the route has a single track. Two other northwest-southeast single-track lines connect Moscow with Kamyshin and Stalingrad. The Moscow-Stalingrad line continues southeastward to Astrakhan'. Stalingrad is also connected by two other lines with the Donbas and the Krasnodar area.

The major rail centers of the Volga-Ural Region are located along the east-west trunklines; centers located where the lines cross the Volga River serve as transshipment points between rail and river transport. Along the Volga and in the western part of the region, the major rail centers are Stalingrad, Kamyshin, Saratov, Syzran', Kuybyshev, Ul'yanovsk, Kazan', Gor'kiy, Kirov, Ivanovo, Michurinsk, Rtishchevo, and Penza. In the Ural part of the region, important rail centers include Nizhniy Tagil, Molotov, Sverdlovsk, and Ufa.

A major current trend in rail transport in the USSR is the conversion from coal to diesel and electrical traction. Although most of the trains operating in the region are coal burning (or, to a lesser extent, diesel), electrification is being extended. According to the Sixth Five-Year Plan, electrification is scheduled for the entire Moscow-Kuybyshev-Chelyabinsk line. From Chelyabinsk, this line is to be electrified as far eastward as Irkutsk. The key north-south line, which lies largely to the east of the region, is now electrified from Chelyabinsk to Kushva, and electrification has been completed on the Kushva-Serov line. From Kushva eastward to Molotov the line has already been electrified, and electrification has been planned for the westward extension of this line to Glazov. Chusovoy and Solikamsk are also connected by electrified railroad, and plans have been made to electrify the Sverdlovsk-Kazan'-Moscow line and its branch leading from Revda to Molotov. During the Sixth Five-Year Plan the Molotov-Polovinka (near Kizel) line is to be electrified, as well as the line from Gor'kiy in the extreme western part of the region to Moscow. The completion of the large hydroelectric power projects in the region will probably accelerate the extension of railway electrification.

Planned railroad extension and construction are centered mainly in the Urals in order to facilitate the import of crucial raw materials. A single-track railroad line from Solikamsk to Ukhta on the Kotlas-Vorkuta line has been proposed and is apparently under construction. 11-14/ This line will connect the iron ore and industrial complex of the Urals with the Pechora coalfield and will supply the Ural area with the coking coal that it now lacks.

The Volga-Ural Region will also benefit from the proposed railroad line along the eastern slope of the Urals from Polunochnoye via Nyaksimvol' to the Chum-Salekhard line, 15,16/ which in turn will connect with the Kotlas-Vorkuta line. Although this line lies completely outside the region, it will facilitate the transport of Pechora coal to industrial centers in the Urals.

Another important railroad development is the line under construction from the industrial center of Magnitogorsk across the central Urals to the oil center of Sterlitamak. From Sterlitamak the line is to continue westward to Abdulino on the Kuybyshev-Ufa line. 17/

Presumably this line is being built to provide Magnitogorsk with a direct rail connection with the oilfield in the Tuymazy area. It will also provide a direct outlet from the South Siberian trunkline to the European part of the USSR, bypassing the heavily traveled Chelyabinsk-Ufa-Kuybyshev-Moscow line. Plans call for the completion of this line during the Sixth Five-Year Plan.

Also scheduled during the Sixth Five-Year Plan is a 320-kilometer (200-mile) line from Kamensk-Ural'skiy to the Moscow-Kazan'-Sverdlovsk line in the vicinity of Krasnoufimsk. 18/ By bypassing Sverdlovsk, this line will facilitate east-west through traffic. Slightly east of the Volga-Ural Region, a line is being built that will run from Miass to Uchaly and eventually to Magnitogorsk. This line will connect the copper and manganese deposits at Uchaly with processing centers in other parts of the Urals.

Considerable double tracking is planned for the region according to the Sixth Five-Year Plan. Double tracking has been planned for the Kinel'-Chkalov, Chkalov--Sol'-Iletsk, Ryazan'-Ruzayevka, Kanash-Agryz, and Molotov-Sverdlovsk-Kurgan routes. 19/

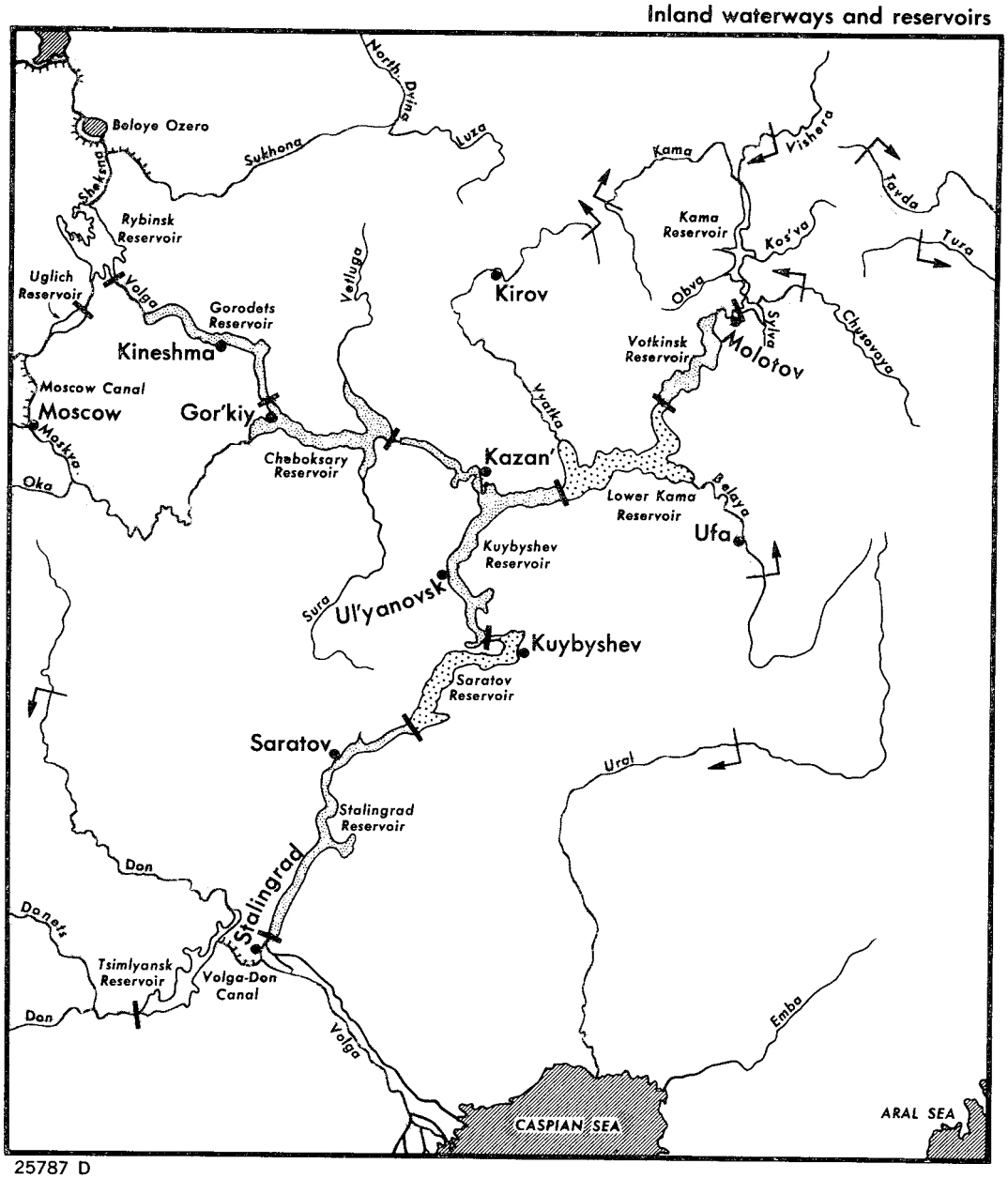
B. Inland Waterway Transport*

Inland waterway transport within the Volga-Ural Region is primarily confined to the Volga River and its chief tributaries, the Kama, Oka, Belaya, and Vyatka Rivers, the major parts of which lie within the region. The Volga system is the most important inland waterway in the Soviet Union, carrying about 50 percent (40 million tons of freight in 1950) of all inland water traffic of the country. 22,p.6/ According to the Fifth Five-Year Plan, the proportion was to have increased by 1955 to approximately 58 percent or roughly 5 percent of the total domestic traffic. 23,p.3/ The Sixth Five-Year Plan calls for an 80 percent increase of freight carried by inland waterways and great improvements in the port and transportation facilities.

The Volga River alone carries about 2.5 times as much freight as the Kama River, which ranks second to it. 24/ The preeminence of the Volga is a result of its position and connections. Through its major tributaries and a series of canals, the Volga River connects a number of the economically most important regions of the USSR. The river and its canals provide continuous water routes from the Caspian Sea to the industrial centers of Moscow and Leningrad and northward to the White Sea, thus cutting across the heart of the European part of the Soviet

*Background information was derived from sources 20 and 21, Appendix B.

Inland waterways and reservoirs



25787 D

0 100 200 300 400 500 Statute Miles

0 100 200 300 400 500 Kilometers

Reservoir under construction
Dam
Reservoir scheduled in 6th 5-year Plan
Inland port
Dam
Canal
Navigable waterway
Existing reservoir
Dam
Head of navigation*

*Head of navigation as shown by *Atlas SSSR*, GUGK, Moscow, 1956

Union. The recently completed Volga-Don Canal links the Volga River with the Black Sea and the Sea of Azov, making Moscow a "port of five seas." Through its left-bank tributary, the Kama, the Volga serves as a traffic route for the industrial heart of the Urals.

The Volga River is navigable for about 3,540 kilometers (2,200 miles) to Rzhev, 25/ west of Moscow.

The Shcherbakov Dam now guarantees a minimum depth of 2.5 meters (8 feet) throughout the Volga-Ural Region. 26/ With the completion of the Volga dams planned and under construction the minimum depth will be greatly increased.* In the past the Kama River was navigable for nearly 1,300 kilometers (810 miles) 27/ to the mouth of the Vishera, just above Berezniki, but the dam near Molotov has extended navigation considerably farther up the river and facilitated shipping on such tributaries as the Obva, Vishera, Kos'va, and Chusovaya. The Oka River, the second largest tributary of the Volga, is navigable beyond the confluence with its chief tributary, the Moskva River.

Ice limits the navigable period of the Volga River system to about 260 days a year in the south and about 200 days in the north. The navigation season is generally from April to November. The average date for the opening of navigation is 7 March at Astrakhan', 7 April at Stalingrad, 16 April at Kazan', and 25 April at Kostroma. 28/ The Kama River is navigable from April to October, and the Oka from April to November.

Bulky commodities are the principal cargoes transported on the Volga system. Timber, oil, grain, and construction materials comprise the principal cargoes; of secondary importance are coal, salt, cement, and manufactured goods (Figures 11 and 12). Upstream traffic consists largely of oil from Baku and Kuybyshev and grain from Soviet Central Asia and the areas along the Volga. Timber from the Upper Volga and Kama areas and manufactured products from the Urals and the industrial centers along the Volga comprise most of the downstream traffic. According to goals set by the Fifth Five-Year Plan, 14 percent of the Volga River traffic was to be oil and 54 percent timber. 29/

Ports along the Volga system are numerous. Among the most important are Stalingrad, Saratov, Kuybyshev, Ul'yanovsk, Kazan', Gor'kiy, and Kineshma. Molotov is the most important port on the Kama River; Kirov, on the Vyatka; and Ufa, on the Belaya River. Few of the ports on the Volga system have extensive permanent quayage and mechanical loading and unloading facilities because the great fluctuations in

*These projects are discussed in greater detail on pages 55-57.

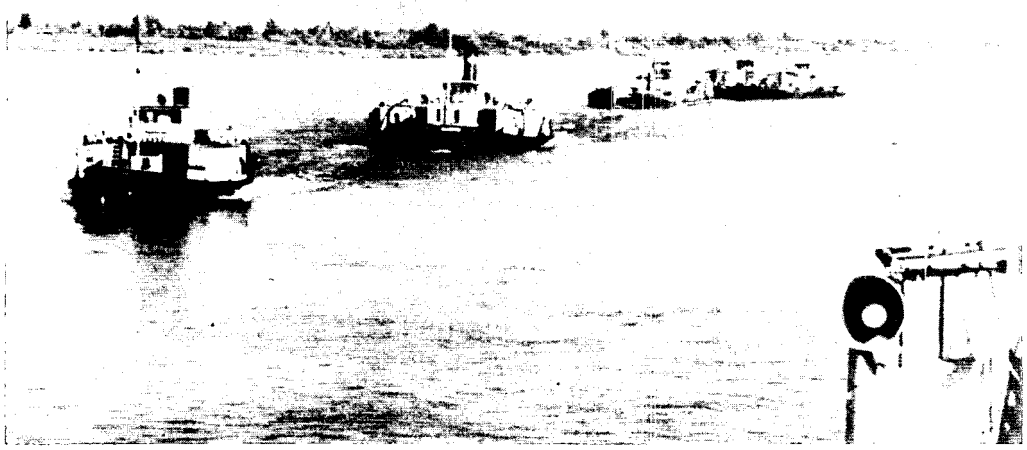


Figure 11. Grain Barges on the Volga near Stalingrad. (1947)

Figure 12. Log rafts and a passenger ship on the Volga near the Zhiguli Mountains.

water level necessitate the use of pontoons and temporary piers. When the dams projected and under construction along the Volga system have been completed, the water level will be relatively stable and the construction of permanent facilities will be possible.

The most commonly used craft for river traffic are freight-passenger steamers, tugs, and barges. The freight-passenger steamers are generally side-wheelers or diesel screw driven. They vary in size and in freight and passenger capacity according to the stretch of the river on which they operate. In 1946, basic standards for river vessels were officially established in relation to the waterway on which they were to operate. New standard tanker barges for the Volga are of 2,000-, 4,000-, 6,000-, 8,000-, and 12,000-ton capacity. The total carrying capacity of the Volga-system fleet, including oil tankers, is estimated at 4,240,000 tons. 30/ When the improvements on the Volga and Kama Rivers have been completed and these rivers have been transformed into a series of reservoirs, many of the vessels currently operating on these rivers will have to be replaced or reconstructed to meet the new navigation conditions.

The Volga River system is being improved on an enormous scale. Along the Volga River, eight power dams will create a series of almost continuous reservoirs stretching from the Upper Volga to Stalingrad. On the Upper Volga, dams have been completed at Shcherbakov, Uglich, and Ivan'kovo, but the reservoirs of the latter two are small. Four dams are under construction along the lower and middle courses of the Volga -- at Gorodets, Cheboksary, Kuybyshev (Figure 13), and Stalingrad -- and another dam is scheduled for Balakovo.* The Kuybyshev reservoir will be about 600 kilometers (375 miles) long and 5 to 35 kilometers (3 to 20 miles) wide; 31/ the other reservoirs will be of roughly comparable size.

On the Kama River, dams that will provide power and create extensive reservoirs are under construction near Molotov and at Votkinsk. The reservoir near Molotov has already been filled. It extends 250 kilometers (155 miles) upstream and in some places is as much as 30 kilometers (19 miles) wide (Figure 14). Another dam is scheduled to be built at Nizhne-Kamskaya in the near future. The completion of these dams will transform the Kama River also into a series of reservoirs.

The completion of the improvements on the Volga River system will greatly increase its freight capacity. By insuring a constant water

*Located near Vol'sk, although the dam is generally referred to by the Soviets as the Saratovskaya GES.

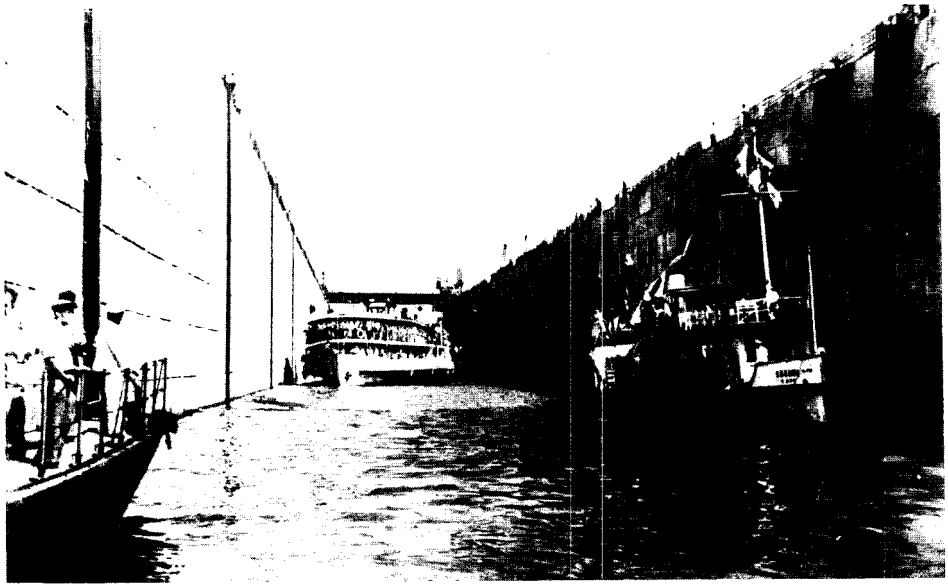


Figure 13. Lower navigation lock at the Kuybyshev hydroelectric project, with passenger ship in the background. (1955)

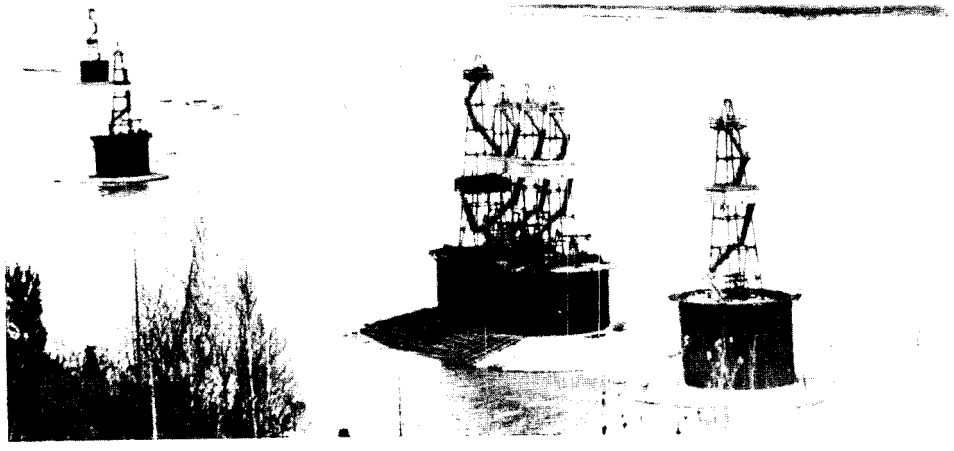


Figure 14. View of the Kama Reservoir. In the foreground are oil derricks. (1954)

level, the constructions eliminate some of the chief obstacles to navigation, such as shallowness in late summer (especially in the upper courses) and the constant shifting of the channels resulting from the deposition of silt.

C. Highway Transport*

Since road transportation has a low priority in the Soviet economy, the road network of the Volga-Ural Region is generally sparse and inadequate. Most of the roads have two lanes and surfaces of dirt or gravel-improved dirt. They serve primarily as feeder routes to railroads and waterways and as connections between agricultural settlements and towns (Figure 15). Commonly only roads in the vicinity of or connecting major cities are paved (Figures 16 and 17). In the Bashkirskaya ASSR, however, there is a rather extensive system of asphalted roads. This can be accounted for by the proximity of asphalt deposits. Dirt roads are trafficable in the winter when they are frozen and in summer when they are dry but very dusty. In the winter, roads are often blocked by snow. During the spring and autumn rains, dirt roads become impassable. Trafficability on improved roads varies, depending upon the degree of improvement and the efficiency of maintenance.

Traffic on the roads of the region is generally light. Motor traffic consists chiefly of trucks, which operate between and in the vicinity of the major cities; automobile traffic is generally light. Although the larger cities are connected by bus, intercity truck and bus traffic is limited somewhat by the poor condition of the roads and by snow during the winter.

Only the larger centers are connected by improved roads. A main east-west trunk route leads from Moscow through Vladimir, Gor'kiy, and Kazan' to Ufa. An important branch of this road connects Vladimir with Ivanovo and Kostroma; farther to the east another branch leads to Ul'yanovsk. Kazan', an important road junction, is connected by an improved road with Kuybyshev on the left bank of the Volga. Another interregional road leads from Kazan' via Molotov to Solikamsk, and a branch of this road continues from Malmyzh to Kirov. The central Volga area is connected with Moscow by another east-west road that leads through Penza to Kuybyshev (Figures 18 and 19). In the Ural area an improved road runs northward from Chkalov via Sterlitamak, Ufa, and Izhevsk to Igra, where it connects with the Kazan'-Solikamsk road. Other improved roads lead from Sterlitamak via Beloretsk to Chelyabinsk and from Sverdlovsk to Nizhniy Tagil and Molotov.

*Background information was derived from sources 32 and 33, Appendix B.

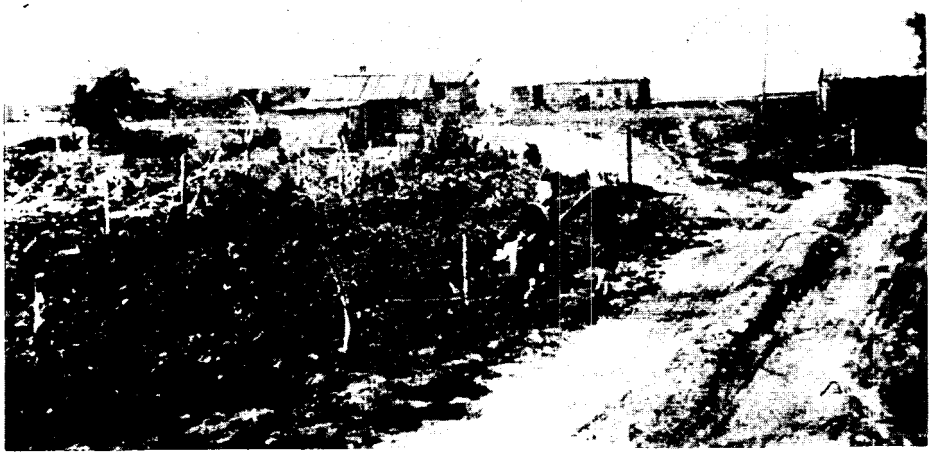


Figure 15. Unimproved dirt road leading to a village near Orsk. (ca. 1944-46)

Figure 16. Improved road in the suburbs of Michurinsk in Tambovskaya Oblast'. (1955)

Figure 17. Improved road leading from Syzran' to Kuybyshev. (1955)

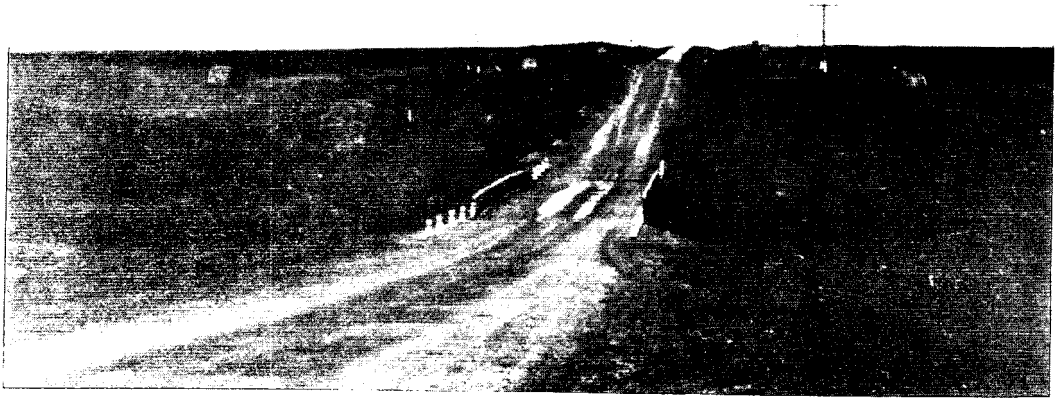


Figure 18. Improved road west of Penza. (1955)

Figure 19. Improved road west of Penza. (1955)

A current trend toward improvement in the Soviet road network is designed to increase long-distance truck traffic. The Sixth Five-Year Plan calls for a doubling of the amount of freight carried by automotive transport. 34/ Since the Volga-Ural Region plays an important role in the Soviet economy, extensive improvement in its road network can be expected in the near future.

D. Air Transport

Air transport in the Volga-Ural Region is limited mainly to passenger traffic; aircraft are not important carriers of freight. As with other branches of transport, Moscow is the center for scheduled airline connections with the major cities in the region, but many cities are interconnected by airlines. Among the major cities served by air are Stalingrad, Vladimir, Gor'kiy, Penza, Saratov, Kazan', Kuybyshev, Chkalov, Ufa, Izhevsk, Kirov, and Molotov. Daily air connections are generally available to these cities. The operating efficiency of these airlines has been rising in recent years.

E. Pipelines

Up to the present time, pipelines have played a relatively insignificant role in the transportation pattern of the Volga-Ural Region. Although the existing pipelines were constructed to connect the major oilfields with refining centers, they are not the region's most important medium for the transportation of petroleum. Pipeline construction has lagged far behind the very rapidly growing oil industry. Most of the petroleum in the region is transported by rail and water, even though the railroads are overburdened and the cost of rail transport is high. In the past few years, however, increasing emphasis has been placed on the construction of pipelines.

According to the Fifth Five-Year Plan, the amount of petroleum transported by pipeline was scheduled for an increase of 400 percent by the end of 1955, whereas the increase scheduled for rail and water transport varied from 75 to 95 percent. 35,p.24/ The Sixth Five-Year Plan calls for a "six-fold increase" in the amount of petroleum carried by pipeline.

Existing petroleum pipelines are primarily in the Bashkirskaya ASSR, Kuybyshevskaya Oblast', and the Tatarskaya ASSR. 36/ Four lines reportedly will connect the Bashkirskaya ASSR with Western Siberia. The first, a recently constructed oil pipeline 1,332 kilometers (830 miles) long, connects Tuymazy with the Omsk refinery in Western Siberia 37/ via Chelyabinsk and Petropavlovsk; a second pipeline paralleling it is

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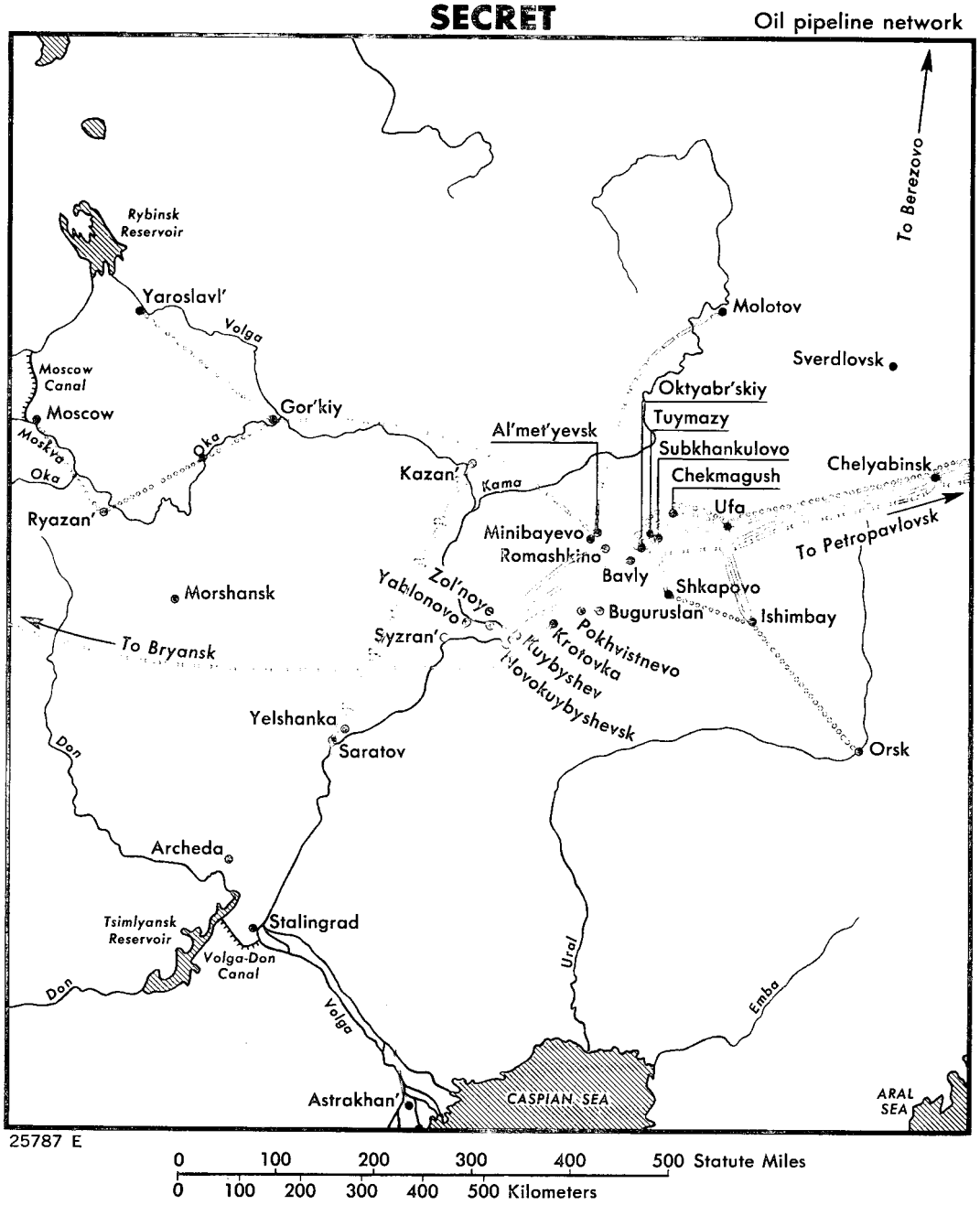

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currently under construction. The third line, which follows the same route, connects the refining center of Ufa with Omsk. The fourth line, paralleling it, is scheduled for completion during the Sixth Five-Year Plan. From Omsk, a double line is being extended via Novosibirsk to Irkutsk. In western Bashkirskaya ASSR the refining centers of Ufa and Ishimbay are connected with the producing areas of Oktyabr'skiy and Tuymazy by a double pipeline. Another line leads from Subkhankulovo near Tuymazy to Shkapovo, a distance of 94 kilometers (58 miles), and is to be extended to Ishimbay in the near future. The refinery at Chernikovsk, a suburb of Ufa, is currently being connected with Chekmagush, and plans have been made to connect Ishimbay with refineries at Orsk.

In Kuybyshevskaya Oblast', a petroleum pipeline connects the Buguruslan oilfields with the refining center of Kuybyshev. A short distance to the west, across the Volga River, pipelines run from Yablonovo to Syzran' and from Zol'noye to Kuybyshev. To the east, Krotovka is connected to Novokuybyshevsk by another pipeline. Farther south is the longest pipeline in the region, which leads from Astrakhan' to Saratov (bypassing Stalingrad) and possibly northward via Ul'yanovsk (bypassing the city of Kuybyshev) to Kazan'. A petroleum pipeline 1,200 kilometers (745 miles) long from Kuybyshev westward to Bryansk is under construction. 38/

In Tatarskaya ASSR, a pipeline is under construction from Al'met'yevsk, north of Bugul'ma, to Gor'kiy. This line will cross the Kama and Volga Rivers and then follow the right bank of the Volga to Gor'kiy, where a large oil refinery is being built. From Gor'kiy, branches will continue in two directions -- to Yaroslavl' and to Moscow via Ryazan'. 39/ Large refineries are to be constructed at both Yaroslavl' and Ryazan'. Another pipeline is being laid from Al'met'yevsk northward to Molotov, where a large oil refinery is now being built. Pipelines also lead from Bavly and Romashkin to Novokuybyshevsk.

The Volga-Ural Region contains seven known natural-gas pipelines, 40/ all of which lead to industrial centers. The routes of these pipelines are as follows: (1) Saratov to Moscow, (2) Morshansk to the Saratov-Moscow line, (3) Yelshanka to Saratov, (4) Kuybyshev to Kazan' via Pokhvistnevo, Buguruslan, and Minibayevo, (5) Yablonovo to Kuybyshev, (6) Archeda to Stalingrad, and (7) Ufa to Oktyabr'skiy via Tuymazy. The Sixth Five-Year Plan calls for the construction of a natural-gas pipeline from Kazan' to Gor'kiy. Slightly to the east of the Volga-Ural Region, another pipeline has been planned, which will connect Sverdlovsk with the gas deposit at Berezovo on the lower Ob'.

IV. Industry*

Industry is a major branch of the economy of the Volga-Ural Region. Particularly noteworthy are the metallurgical, machinery, chemical, textile, forest, and food-processing industries. For the most part, the industrialized areas are concentrated (1) in the extreme eastern portion of the region in close proximity to the industrial raw materials of the Ural Mountains; (2) along the Volga River, a major artery for the flow of raw materials; and (3) in the northwestern sector, which lies within the highly industrialized Moscow-Gor'kiy area. (See Maps 25406 and 25407.)

Although most of the industries of the region are based on local raw materials, some are supplied with raw materials from other areas. In the Ural area the base for the metallurgical industry is local ore, limestone, and to some extent fuel. The chemical, food-processing, and forest industries are also based on local raw materials. On the other hand, the metallurgical, metal working, and textile industries along the Volga depend upon imported raw materials. Donbas coke and iron ore are shipped to the small Volga metallurgical centers, and some Donbas iron and steel is used in the metalworking centers. The textile industry of the Upper Volga imports raw cotton from Soviet Central Asia.

Although the prewar five-year plans stimulated industrial development in the Volga-Ural Region, the greatest expansion was an outgrowth of the relocation of industry that occurred during World War II. When the western areas of the Soviet Union were occupied by the Germans, many factories farther west were moved eastward to the Volga and Ural areas. During the four war years, gross industrial production increased about 3.5-fold in both the Volga Economic Region and the Ural Economic Region.** 45,p.284/

Expansion of industry was limited mainly to metallurgy and machine construction. Along the Volga the growth of the machine industry was especially notable. In the Urals the emphasis was on ferrous metallurgy. The metallurgical plants of Nizhniy Tagil and Magnitogorsk (slightly east of the region) were greatly expanded; iron and steel processing

*Background material was derived from sources 41 through 44, Appendix B.

**"Economic Region" refers to the Soviet division of the USSR into 12 regions for the purpose of economic planning and exploitation. The Soviet Economic Regions are discussed in CIA/RR-GR-70, September 1955. For a graphic presentation of the regions, see CIA Map 13702.

plants and machinery plants were established in the Urals. The oil, coal, and natural-gas industries of the region were also greatly expanded during the war.

The industrial future of the Volga-Ural Region as a whole is closely linked to the major hydroelectric developments under construction along the Volga and Kama Rivers and, to a lesser degree, to the smaller projects in the Urals. These projects will supply a large amount of hydroelectric power that should provide the energy base for new industrial enterprises throughout the region.

A. The Metallurgical Industry

Metallurgy is of considerable significance in the Volga-Ural Region, particularly along its eastern fringe where the region penetrates the highly important Ural metallurgical district. Iron, steel, and to a lesser degree ferroalloys comprise the products of ferrous metallurgy; the chief nonferrous products are copper and magnesium.

Ferrous metallurgy is concentrated in the extreme eastern portion of the region in close proximity to the major iron deposits, and to a lesser degree along the Volga River. Most of the coking coal for these enterprises is supplied by the Kizel and Karaganda coal basins, but some comes from the Donbas. Charcoal also is used for smelting iron and steel. In the part of Sverdlovskaya Oblast' that falls within the region, cities with iron and steel plants are Nizhniy Tagil, Kushva, Bilimbay, and Nizhniye Sergi. By far the most important of these is Nizhniy Tagil (Figure 20), which is one of the leading iron and steel producers in the Soviet Union. In Molotovskaya Oblast', ferrous metallurgy is represented mainly by the recently modernized iron and steel mills at Molotov, Chusovoy, and Lys'va; but smaller iron and steel plants are located at Pashiya, Dobryanka, Teplaya Gora, Chermoz, Nytva, Yugo-Kamskiy, and Maykor. Metallurgical centers of Chelyabinskaya Oblast' include Kusa, Satka, Asha, and Katav-Ivanovsk. The Izhevsk iron and steel works in Udmurtskaya are of local importance, and iron and steel are produced from local ore at Omutninsk, Peskovka, and Kirs in Kirovskaya Oblast'. Novotroitsk in Chkalovskaya Oblast' also produces a small quantity of iron and steel. In the Volga area, there are several metallurgical centers whose industries are based on Krivoy Rog iron ore, scrap, and Donets coal -- notably Gor'kiy, Vyksa, Kulebaki, and Tashino in Gor'kovskaya Oblast' and Stalingrad farther to the south.

Ferroalloys are produced at Chusovoy (ferrovanadium and ferromolybdenum), Nizhniy Tagil (ferrochrome and ferromanganese), Orsk and Khalilovo (chrome-nickel steel), and Aktyubinsk (nickel and ferrochrome).

Figure 20. Iron and steel plant at Nizhniy Tagil. (1955)

Raw materials for the ferroalloy industry are primarily of local origin. Chrome is obtained from Kempirsay and Sarany; nickel from the Orsk-Khalilovo-Novotroitsk area; vanadium from Pervoural'sk; and manganese presumably from the Polunochnoye deposit east of the region. Cobalt is produced as a byproduct of nickel refining in the Orsk district.

Also important to the region are metallurgical centers that lie slightly beyond its limits. To the east are the large iron and steel centers of Magnitogorsk, Chelyabinsk, Sverdlovsk, and Serov, whose products gravitate to the region. From the Donbas to the west, some iron and steel is sent to the metalworking centers along the Volga.

Nonferrous metallurgy is focused on the production of copper, and the industry is concentrated along the eastern fringe of the region. The principal centers of copper smelting within the region are Revda, Baymak, and Mednogorsk. Copper is also smelted a short distance east of the region at Krasnoural'sk, Kirovgrad, Karabash, Pyshma, Kyshtym, and Orsk. Magnesium is produced at Solikamsk and Berezniki. These plants are especially important because the bulk of Soviet magnesium production is centered in the Urals. 46/ Although the industries are not represented within the region, zinc and aluminum are processed at several places just beyond its eastern border.

B. The Machinery Industry

The machinery industry of the Volga-Ural Region, although somewhat more widely distributed than metallurgy, is also concentrated primarily along the Volga River and in the Urals. The industry is well developed and produces a large variety of products, including electrical, transportation, agricultural, and heavy machinery, as well as machine tools. Electrical machinery is produced at Kuybyshev, Tambov, Saratov, Gor'kiy, Syzran', Molotov, and Ufa.

Products of the transportation machine industry include automotive vehicles, locomotives, railroad cars, aircraft, and river vessels. Automobiles and trucks are produced at Gor'kiy (Figure 21) and Ul'yanovsk. Gor'kiy is the largest Soviet producer of automotive vehicles and accounts for about one-third of the total Soviet output. The 1950 production at Gor'kiy has been estimated at 200,000 vehicles. 47,p.30/ Trucks are produced in Ul'yanovsk. Vladimir, Saratov, and Kuybyshev produce automobile parts, and Kirov is an important producer of tires and inner tubes. The principal centers of locomotive and railroad-car construction are Nizhniy Tagil, Gor'kiy, Saratov, and Ust'-Katav. Nizhniy Tagil, accounting for about 35 percent of the total Soviet output, is the largest producer of railroad cars in Europe. Ust'-Katav also is a nationally important center for the production of railroad cars, and Gor'kiy is a significant producer of locomotives. The Volga area is considered the most important inland shipbuilding area in the Soviet Union. Shipyards and ship-repair facilities have been established all along the Volga and Kama Rivers. The most important centers of river shipbuilding are Zelenodol'sk, Krasnoarmeysk, Gor'kiy, Kuybyshev, Molotov, and Kostroma. The aircraft industry is represented in the Volga-Ural Region by the two leading aircraft-producing centers of Kuybyshev (Figure 22) and Kazan'. Also of importance in the production of aircraft and aircraft parts are Gor'kiy, Saratov, Chkalov, Ufa, and Molotov.

The agricultural-machine industry is well developed in the Volga-Ural Region. Two of the largest tractor plants in the Soviet Union are located at Stalingrad and Vladimir, and Kuybyshev is a leading producer of combines. A wide variety of other agricultural implements are manufactured at various centers throughout the region, including Saratov (Figure 23), Yugo-Kamskiy, Molotov, Sim, Ocher, Gor'kiy, Kamenka, Chapayevsk, Syzran', Penza, and Kazan'.

The principal centers of the machine-tool industry in the region are Gor'kiy and Kuybyshev. Among the minor machine-tool centers are Izhevsk, Chkalov, and Saratov.

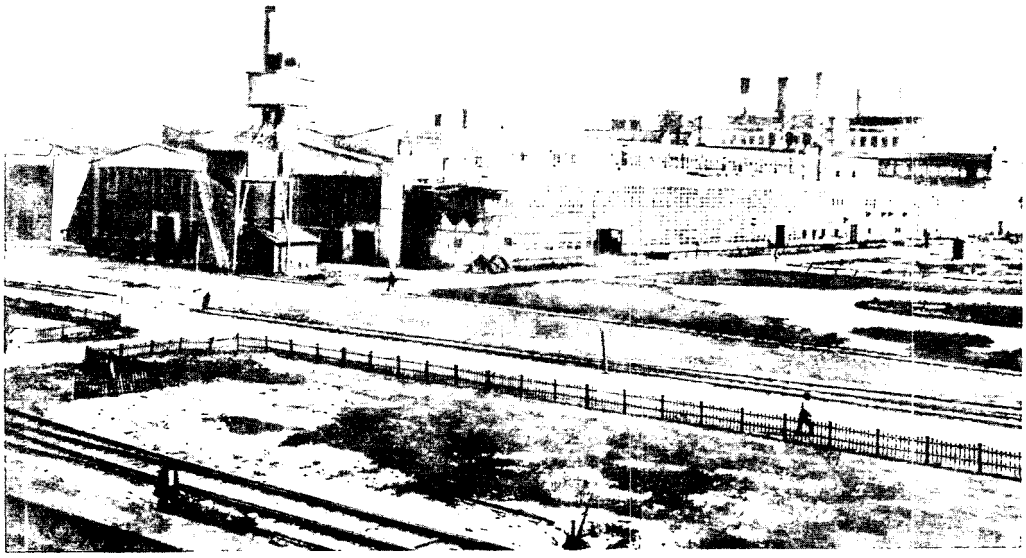


Figure 21. Molotov automobile plant in Gor'kiy. (1955)

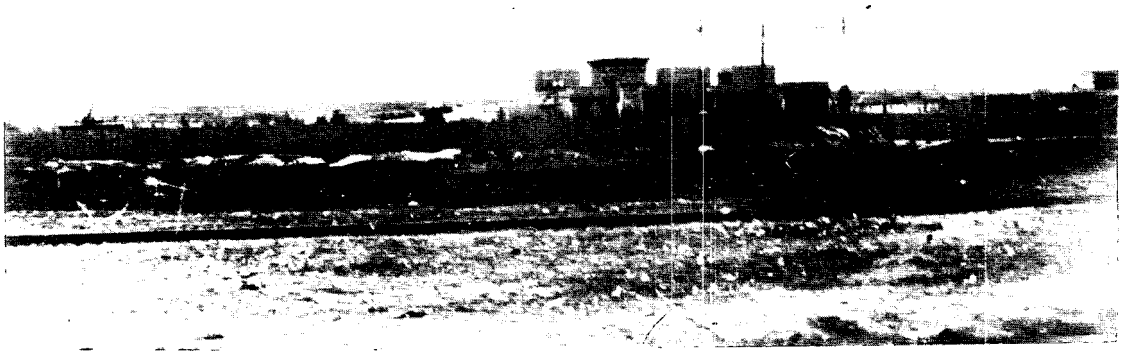


Figure 22. New engine test stand under construction at Kuybyshev Aircraft Engine Plant No. 24 imeni Frunze. (1955)

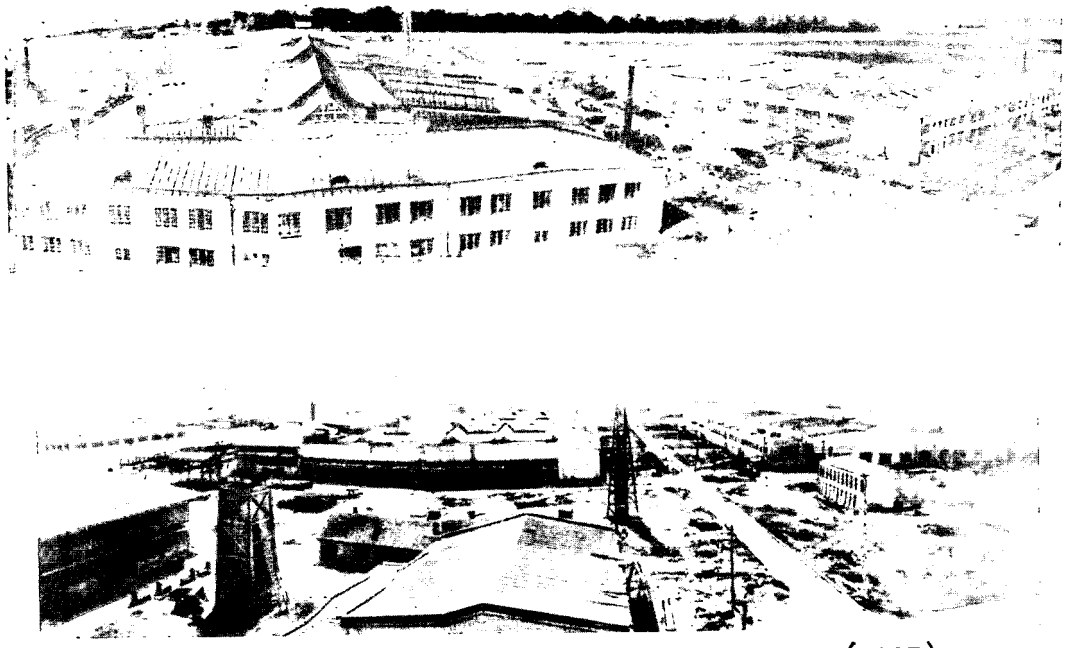


Figure 23. The combine plant at Saratov. (1935)

Although the fabrication of heavy machinery is concentrated for the most part outside the area, some segments of this industry are represented in the Volga-Ural Region. For example, Ivanovo is one of the most important producers of machinery for the textile industry, Izhevsk is a significant producer of equipment for the woodworking industry, and coal-mining equipment is produced at Votkinsk. Notable among the cities producing equipment for the petroleum industry are Gor'kiy and Kungur.

C. The Defense Industry

The Volga-Ural Region contributes materially to the defense industry of the Soviet Union. Gor'kiy, Votkinsk, and Molotov are leading producers of heavy-caliber guns, and Nizhniy Tagil manufactures about 20 percent of the total Soviet output of armored combat vehicles. 48/ Kuybyshev is an outstanding producer of small and automatic arms, and ammunition and explosives are produced at Berezniki, Molotov, Kazan', Zelenodol'sk, and Ul'yanovsk.

D. The Chemical Industry

The chemical industry of the region is varied and is of considerable national significance. Probably the most important chemical center in the Soviet Union is Dzerzhinsk in Gor'kovskaya Oblast'. 49/ The six chemical plants in this city account for all of the known Soviet nylon production; three-quarters of the country's tetraethyl lead; strategically important amounts of plastics, chemical cellulose, phosphorus, high explosives, poison gases, hydrogen peroxide, and phosphate and nitrate fertilizers; and many other chemical products. Textile chemicals are produced at Ivanovo; and Kineshma in Ivanovskaya Oblast' is a center for the manufacture of sulphuric acid, dyes, ethyl alcohol, and lacquer solvents. Vladimir is of moderate importance in the field of plastics. Tambov produces aniline dyes, sulphuric acid, chlorine, and caustic soda, and in the surrounding area there is a large wood-chemical industry.

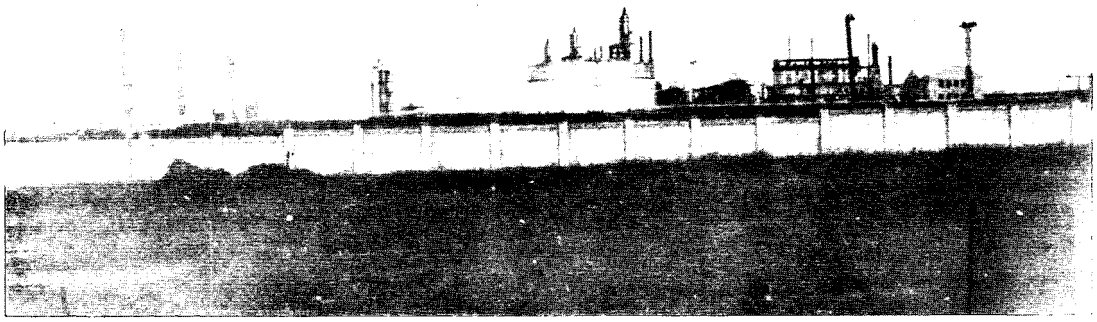
The manufacture of synthetic rubber is centered in Tambov and Kazan', each of these cities accounting for about 11 percent (30,000 metric tons) of the Soviet total. 50/ In the future the synthetic-rubber industry is expected to move from the potato-growing areas to areas of wood processing (European North, Urals, Siberia) and oil refining (Ural and Volga areas).

In the Volga Valley south of Kazan' the chemical industry is in the early stages of development. Three centers, however, are of some significance: (1) the area around Chapayevsk for sulphuric acid, chlorine, caustic soda, and aniline; (2) Kazan' for plastics; and (3) Beketovka near Stalingrad for chloride, phosphorus, and caustic soda.

The Ural section of the region is one of the most important areas for the coke-chemical industry and for the production of sulphuric acid and nitrogenous and other mineral fertilizers. The chemical industry in the Ural area is based on a favorable combination of chemical raw materials and fuel, including Kizel coal and coke, Upper Kama phosphorites, Ural pyrites, and large local potassium, limestone, and salt deposits. Nizhniy Tagil and Gubakha are major centers of the coke-chemical industry, the Nizhniy Tagil plant being the second largest in the Soviet Union and accounting for 8-1/2 percent of the total national production. 51/ At Mednogorsk, sulphuric acid is derived from waste gases of the copper-refining industry. Berezniki is the site of the largest synthetic ammonia plant in the Soviet Union and is also a leading producer of nitrates, phosphorus, sulphuric acid, and soda. Solikamsk is an important center for potash fertilizers, caustic potash, and chlorine and Molotov for phosphate fertilizers manufactured from raw materials from Kirovskaya Oblast'. Soda is also produced at Sterlitamak.

Oil refining is an increasingly important branch of the Volga-Ural chemical industry. The total annual crude-oil capacity of the refineries in the region in 1953 was estimated at 19,295,000 metric tons, or roughly 35 percent of the total Soviet refining capacity. 52/ During the period 1951 and 1953, 80 percent of all new Soviet distillation capacity (12.6 million metric tons) was installed in the Volga-Ural Region. Even so the processing capacity was still inadequate to handle the local output of crude oil, and considerable quantities were shipped out of the area for processing.

The most important centers of oil refining in the region in the order of their importance are Saratov, Ufa, Kuybyshev (Figures 24 and 25), and Syzran'. Secondary centers include Ishimbay, Krasnokamsk, Gor'kiy, and Stalingrad. Large oil refineries are currently under construction at Gor'kiy and Molotov and will be supplied with crude oil by the Al'met'yevsk-Gor'kiy and the Al'met'yevsk-Molotov pipelines.



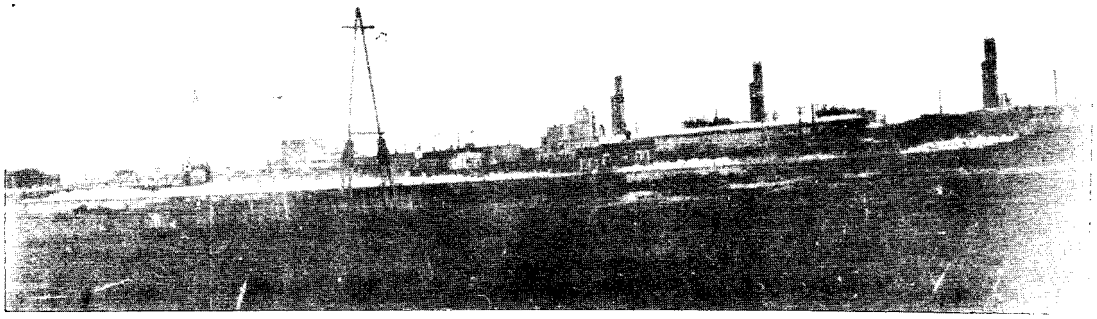


Figure 24. Oil refinery at Novokuybyshevsk. (1955)

Figure 25. An unidentified petroleum installation northeast of Pokhvistnevo, probably a stabilizer. (1955)

Plans call for the expansion of the oil refineries at Syzran', Kuybyshev, and Ufa. Shale oil is processed at Syzran'.

E. The Textile Industry

The textile industry of the Volga-Ural Region is concentrated in Ivanovskaya Oblast', which ranks second in production to Moskovskaya Oblast'. Cotton milling, based on raw cotton from Soviet Central Asia and the Caucasus, is the principal branch of the textile industry. The cotton mills are clustered around Ivanovo (Figure 26), Kineshma, Teykovo, Shuya, Rodniki, Vichuga, and Furmanov. Linen weaving, which ranks second, is based on locally grown flax, and the main centers of the industry are Kostroma on the Volga River and Vyazniki on the Klyaz'ma River. Other centers of the linen textile industry include Gor'kiy, Puchezh, Yur'yevets, Privolzhsk, and Nerekhta. Locally grown hemp is milled at Reshetikha, near Gor'kiy, and farther to the south at Kasimov, Sasovo, and Melekess. The woolen industry is centered along the middle Volga at Kukmor, Yazykovo, Rumyantsevo, Rasskazovo, Krasnyy Tekstil'shchik, and Morshansk, and farther to the north at Tolokontsevo. In the Ural sector of the area, the textile industry is of little importance; cotton is milled only at Ufa, wool at Chkalov, and linen at Ust'-Kishert'. At present, three large cotton combines are being built along the Volga -- at Kamyshin, Engel's, and Cheboksary.

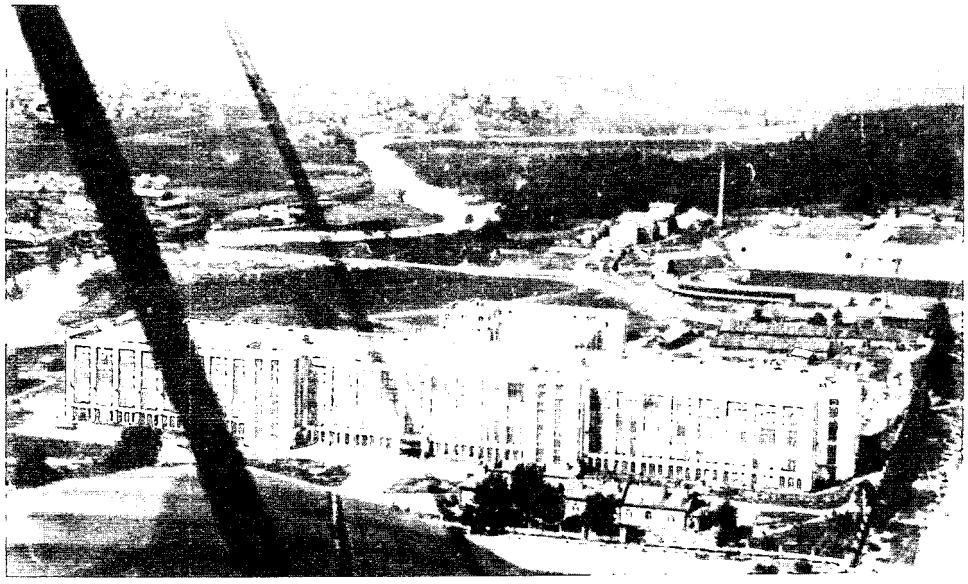


Figure 26. Dzerzhinskiy textile mill in Ivanovo.

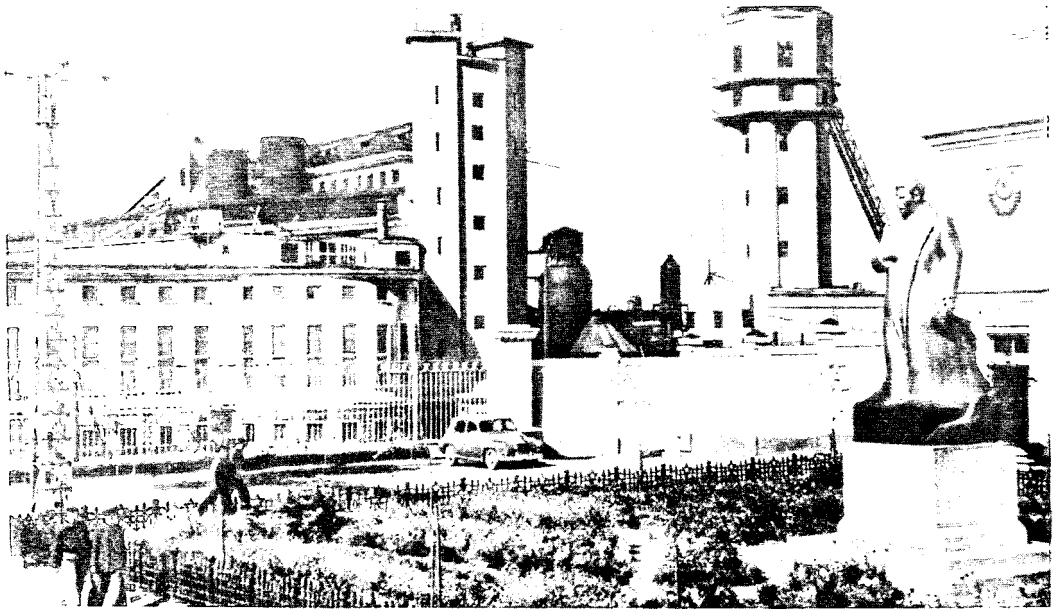


Figure 27. Paper mill in Borovsk. (1951)

F. The Forest Industries

The coniferous forests of the Upper Volga and the Ural areas supply the raw materials for the lumber, paper, and associated industries in the Volga-Ural Region. Cut timber from these areas is floated downstream to processing centers. The wood industries are located chiefly in the northern part of the region. Two of the largest paper mills in the Soviet Union are at Pravdinsk (near Gor'kiy) and at Krasnokamsk. Other notable paper-making centers include Penza, Gor'kiy, Temnikov, Sokol, Kazan', and Borovsk (Figure 27). Sawmills of significant capacity are located at Stalingrad, Saratov, Kuybyshev, Melekess, Alatyr', Kirov, Ufa, Molotov, Uva, Votkinsk, and Nizhniy Tagil. Matches are manufactured at Nizhniy Lomov, Kirov, and Ufa; veneer is produced at Kostroma amd Murom; and Asha, Mozhga, and Morshansk are centers of the wood-chemical industry.

Fur processing is an important industry in Kirov and Kazan', but it is of minor importance to the economy of the region.

G. The Food-Processing Industry

Although the food-processing industry is distributed throughout the Volga-Ural Region, the greatest concentration is found along the middle and lower stretches of the Volga. Flour milling is the most important of the industries, and the principal centers are Kineshma, Dzerzhinsk, Gor'kiy, Melekess, Kuybyshev, Saratov, Sebryakovo, Filonovo, Buturlinovka, Millerovo, Chkalov, Sterlitamak, Abdulino, Davlekanovo, and Bugul'ma. In the north and in other areas where wheat is not grown, flour milling centers are generally located along navigable rivers where cheap transportation is available.

Other food-processing industries tend to be localized. Sugar is refined from locally grown sugar beets in the southwest part of the region at Elan'-Kolenovskiy, Zherdevka, Bekovo, Zemetchino, Sotnitsyno, and Timashevo. Although some meat is processed throughout the region, the principal centers are Engel's, Kuybyshev, and Kirov. The lower Volga is an important area for the production of vegetable oil from sunflower seeds. The principal processing center is Saratov, but many other cities are of considerable importance in this field. One of the largest margarine factories in the Soviet Union is located at Ivanovo, and the area north of Ivanovo is important for butter and milk processing. Since the Volga-Ural Region is not an important fruit and vegetable producer, the canning industry is of only local importance.

V. Mineral Resources*

The Volga-Ural Region is well endowed with a great variety of minerals, ranging from fuels to construction materials, concentrated primarily in the Ural part of the region. The Urals as a whole comprise the most important mining district of the Soviet Union. The eastern boundary of the Volga-Ural Region bisects this mineral district, and the industries of the region draw upon the minerals to the east; for example, the deposits of asbestos, bauxite, zinc, and manganese just to the east compensate for the shortage of these minerals within the Volga-Ural Region. Also important to the region are the large and easily accessible Donets coal and iron-ore deposits to the southwest. (See Maps 25406 and 25407.)

A. Fuels

The fuel resources of the region include petroleum, oil shale, peat, natural gas, and coal; the region, however, is deficient in coal of coking quality. In the last 20 years, the petroleum industry of the region has been expanding rapidly, and at present the Volga-Ural is the leading Soviet oil-producing region.

The exploitation of petroleum in the region is of comparatively recent origin, petroleum having been discovered there in 1929. Since the 1930's, petroleum production has increased steadily, and all signs indicate that the increase will continue. In 1938 the region accounted for 4 percent (1.2 million metric tons) of the total Soviet crude-oil production of 30.1 million metric tons and in 1950, for 29 percent. Since 1952 the Volga-Ural Region has been the leading Soviet oil-producing region. 67,p.11/ In 1955 it contributed 57 percent of the total production of 71 million metric tons. 68/ According to Soviet forecast, the region will provide 75 percent (101 million metric tons) of the Soviet crude-oil output by 1960. 69,p.2/ Although production has increased rapidly, the potential resources of the region have barely been tapped. It is estimated that only 1.9 percent of the potential resources had been exploited in 1954, and that 14 percent will have been exploited by 1970. 70,p.2/ The potential crude-oil resources are estimated to range from 5.5 to 7.6 billion metric tons, but only 12.6 percent of this total has been proved. 71/

In 1955 the Bashkirskaya ASSR was reported to be the leading Soviet oil-producing area 72/ within the Volga-Ural Region, and significant oilfields are concentrated around Ishimbay and Tuymazy. The oilfields in the vicinity of Tuymazy extend westward into the Tatarskaya

*Background material was derived from sources 53 through 66, Appendix B.

Figure 28. Pumps and derricks in an oilfield near Mukhanovo, east of Kuybyshev. (1955)

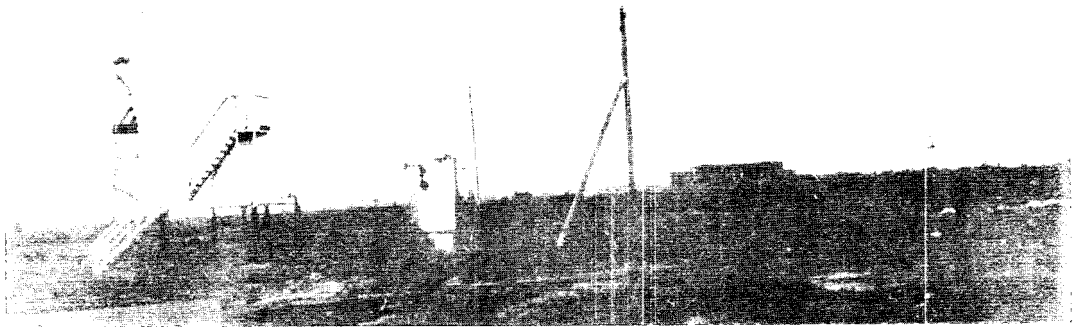


Figure 29. Well-site tank in an oilfield near Mukhanovo.

ASSR. At Shkapovo in southwestern Bashkiriya, oil has recently been discovered and exploited. By 1960, according to Soviet estimates, this area will produce as much crude oil as the Tuymazy area, the leading producer in the Bashkirskaya.ASSR.

Kuybyshevskaya Oblast' ranks second in the production of oil in the Volga-Ural Region and third in the USSR. The oilfields in Kuybyshevskaya Oblast' extend almost uninterruptedly from the Samara Bend of the Volga eastward to the oilfields of the Bashkirskaya ASSR and the Buguruslan oilfields in Chkalovskaya Oblast' (Figures 28, 29, and 30). Most of the oilfields, however, are concentrated in the Samara Bend within an area 60 kilometers (37 miles) long and 20 kilometers (12 miles) wide.

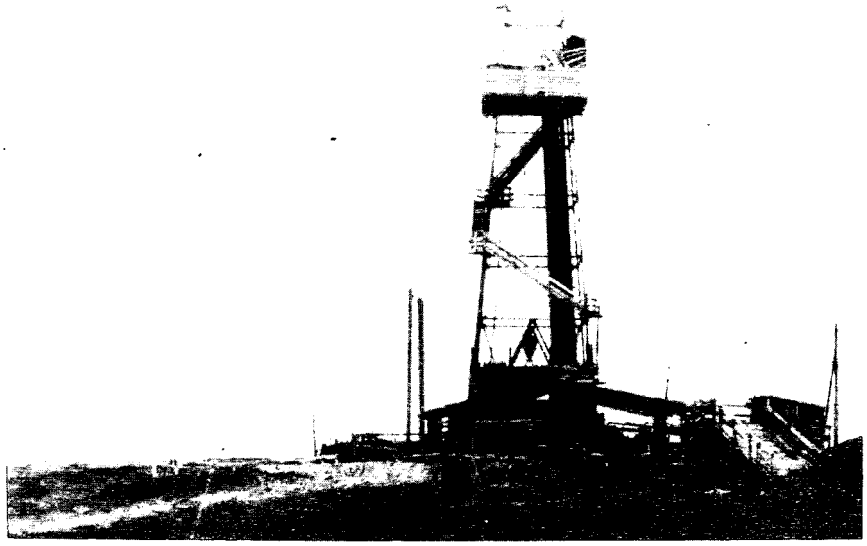


Figure 30. Well-drilling rig in an oilfield in the vicinity of Mukhanovo. (1955)

Oilfields are also located in Molotovskaya Oblast' in the vicinity of Molotov, and a limited amount of oil is produced near Saratov in Saratovskaya Oblast'.

Natural gas in commercial quantities is present in the Volga-Ural Region, but detailed information as to production and reserves is not available. One of the most important gas-producing areas in the USSR is located in the vicinity of Saratov. The exact production of this area is not known, but it must be considerable since it justified the construction of the 800-kilometer (500-mile) Saratov-Moscow natural-gas

pipeline, which has a daily capacity of 1,350,000 cubic meters (47,674,000 cubic feet). 73,p.203/ Natural gas is also found at Archeda, 150 kilometers (95 miles) northwest of Stalingrad; at Shostovka, 80 kilometers (50 miles) west of Stalingrad; and reportedly in the Penza-Ruzayevka area. 74/ In Kuybyshevskaya Oblast', natural-gas deposits are located at Pokhvistnevo, Satki, and Sultangulovo and in Chkalovskaya Oblast', at Tarkhanov. Natural gas is also found in conjunction with oil at Ishimbay, Buguruslan, Krasnokamsk, Severokamsk, Polazna, Tuymazy, Syzran', and Yablonovyy Ovrag; and a limited amount is available at the Melnikov gas field near Pugachev.

It may be assumed that the major gas fields are at Saratov, Pokhvistnevo, Buguruslan, Yablonovyy Ovrag, and Archeda, since they are connected by pipelines with urban centers.

The major coal deposits of the Volga-Ural Region are in the Kizel Basin on the western slope of the Central Ural Mountains in Molotovskaya Oblast'. This coal-bearing area stretches from the Yayva River on the north to the Vil'na River on the south and is about 95 kilometers (60 miles) long and 16 kilometers (10 miles) wide. The principal mines are located near Kizel, Polovinka, and Gremyachinsk. In 1937, reserves for the Kizel Basin were placed by the Soviets at 3,435 million metric tons. 75,p.59/ No current data for the Kizel Basin are available, but 1950 production was estimated at 12,000,000 metric tons. 76/ The Kizel coals are mainly bituminous and have high ash and sulphur contents. Although not of coking quality, the Kizel coals are blended with higher grade coals to make coke. Some anthracite is found in the southern portion of the Kizel Basin. All of the Kizel coal comes from underground mines.

In addition to coal, there are some lignite deposits in the northern part of the Kizel Basin. Of less importance are the lignite deposits in the Bashkirskaya ASSR, where reserves are estimated at several million metric tons. The principal deposits are at Babayevskoye and Al'sheyevskoye. These deposits are suitable for open-pit mining since they lie close to the surface, 77,p.34/ but they are not yet being exploited. Recently, large deposits of coal comparable in quality to that of the Kizel Basin have reportedly been discovered in the southeastern parts of the Tatarskaya ASSR. According to optimistic Soviet estimates, the reserves amount to several billion tons. 78/ If this is correct, the amount of coal imported into the Volga area could be reduced materially.

The Volga-Ural Region also receives coal from nearby deposits. Immediately to the east in the Ural Mountains are important lignite and anthracite deposits, and immediately to the southwest of the region are the extensive anthracite and bituminous deposits of the Donbas.

Although the Volga-Ural Region includes the extreme northeast portion of the Donbas anthracite district, no important mines are located within the region.

Despite its fairly widespread distribution, peat plays a relatively minor role as a fuel in the Volga-Ural Region. In 1935, peat represented only 11.4 percent of all the fuel consumed in the Volga Economic Region, 18.9 percent in Gor'kovskaya Oblast', and 15.6 percent in Kuybyshevskaya Oblast'. 79/ In the Urals alone, there are 1,540 known peat bogs with an estimated reserve of 4 billion metric tons. 80,p.32/ Other deposits are located in Ivanovskaya, Gor'kovskaya, Kirovskaya, Sverdlovskaya, Chelyabinskaya, Kuybyshevskaya, Saratovskaya, and Voronezhskaya Oblasts; and in Mordovskaya, Chuvashskaya, Mariyskaya, Tatarskaya, and Bashkirskaya ASSR's. According to the 1941 plan, the region was to provide approximately 25 percent of the total Soviet peat production -- with Ivanovskaya, Gor'kovskaya, and Sverdlovskaya Oblasts being the chief producers. 81/

Oil-shale deposits are also widely distributed throughout the region -- in Kuybyshevskaya, Saratovskaya, Chkalovskaya, Ivanovskaya, Gor'kovskaya, Kirovskaya, and Sverdlovskaya Oblasts, as well as in the Bashkirskaya, Udmurtskaya, Tatarskaya, Chuvashskaya, and Mordovskaya ASSR's. 82/ The two most important deposits in the region are the Kashpir field near Syzran', and the Obshchesyrtovsk field north of Ural'sk.

No postwar production figures on oil shale are available; but, according to the 1941 plan, 540,000 tons of oil shale were to be mined in the southeast part of the RSFSR, presumably in Kuybyshevskaya and Saratovskaya Oblasts and possibly in the Chuvashskaya ASSR and Chkalovskaya Oblast'. 83/

Reliable data on the oil-shale reserves of the region are also lacking, but a 1940 Soviet source placed oil-shale reserves at 800 million tons in Gor'kovskaya Oblast', 2 billion tons in Kirovskaya Oblast', 5 billion tons in Kuybyshevskaya Oblast', 4 billion tons in Saratovskaya Oblast', 400 million tons in Chuvashskaya ASSR, and 70 million tons in Tatarskaya ASSR. 84/

B. Iron Ore and Ferroalloy Minerals

The Volga-Ural Region is especially rich in iron ore and ferroalloys, possessing extensive deposits of iron ore and chromite, as well as cobalt, nickel, and vanadium. The amount of manganese, however, is limited, and the region is deficient in molybdenum, titanium, and tungsten.

Iron ore is found mainly in the eastern part of the region in the Ural Mountains. Important deposits are at Bakal, Komarovo-Zigazinsk, Pervoural'sk, Kusa, and Khalilovo, as well as at Gora Lebyazhka, Gora Vysokaya (Figure 31), and Gora Blagodat' in the vicinity of Nizhniy Tagil. In 1938, the iron content of these eight iron-ore deposits was given as about 515 million metric tons. 85/

Production data for the deposits located within the region are incomplete, but a total of 15.8 million metric tons of iron ore, or about 36 percent of the total Soviet production, were mined in 1950 within the Volga-Ural Region and the area immediately beyond its eastern boundaries -- notably at Gora Magnitnaya and Alapayevsk. A 1955 estimate places the production of the same area at 29.9 million metric tons. 86/

The only other iron-ore deposits of importance in the region are located at Khoper in Saratovskaya Oblast' and near Omutninsk in Kirovskaya Oblast'. In 1938 the Khoper deposit was estimated to have a total reserve of 716 million metric tons, 87/ but the iron content of the ore is low and the phosphorus content is high. As recently as 1955 the exploitation of this deposit apparently had not been started. In Kirovskaya Oblast', the Omutninsk deposit is being exploited as a source of supply for the local metallurgical industry. The reserves are large and the metal content is 20 to 40 percent, but the ore occurs in many shallow layers.

The Soviet Union is one of the world's leading producers of chromite ore. Virtually the entire USSR production is supplied by two fields in the eastern part of the Volga-Ural Region. These key deposits are located at Kimpersay in northern Kazakhstan and at Sarany in the Central Urals.

The Kimpersay deposit, the more important of the two, was discovered in 1937. It is the principal Soviet source of ore of metallurgical quality (up to 54.6 percent chromic oxide). According to a Soviet estimate made in the late 1930's the deposit covers an area of 1,000 square kilometers (about 400 square miles) and has an estimated reserve of 10,000,000 metric tons, or roughly 40 percent of the total Soviet chromite reserves. 88/

The Sarany deposit, located in the Central Urals northwest of Nizhniy Tagil, has low-quality ore. Although the chromic oxide content ranges from 30 to 40 percent, the ore apparently cannot easily be concentrated and its main use is for chemical and refractory purposes. In the 1930's, a Soviet estimate placed the Sarany reserves at 13,748,000 metric tons or slightly over 50 percent of the total Soviet reserves of chromite. 89/

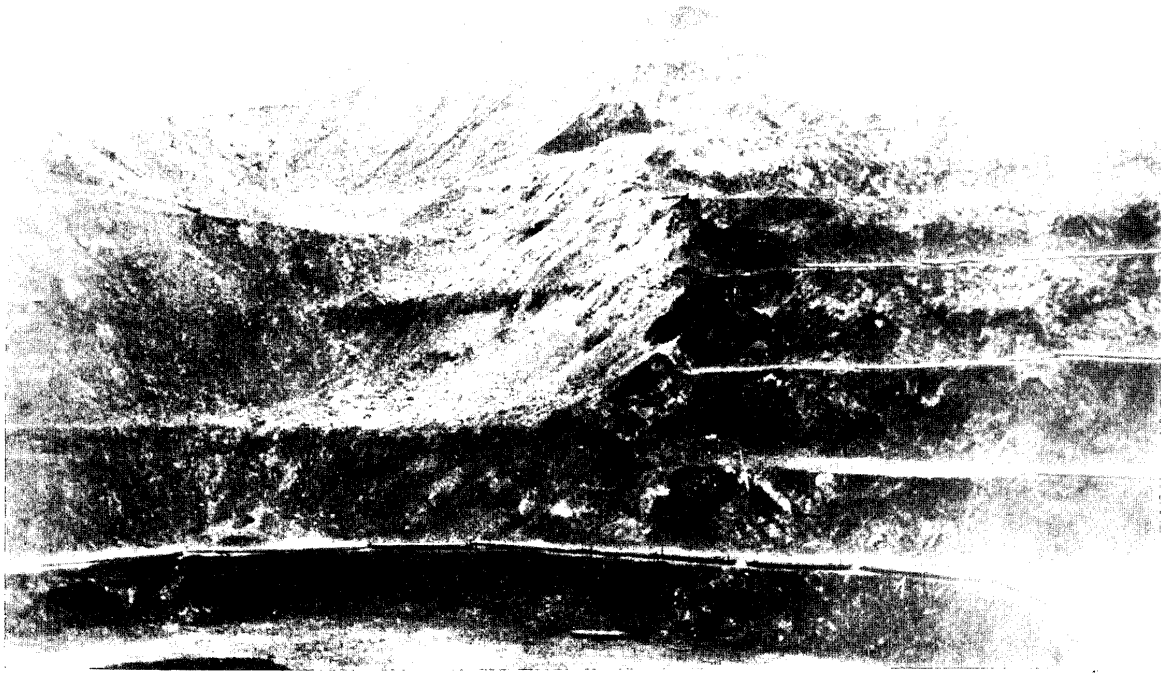


Figure 31. Iron-ore strip mine at Gora Vysokaya north of Nizhniy Tagil.

S-E-C-R-E-T

Several minor deposits of chromite are found in the region, the most important of which are located at Khabarnyy and Khalilovo in Chkalovskaya Oblast' and at Menzhinskoye in Bashkirskaya ASSR. The production from these deposits is insignificant, and the combined reserve of the three deposits is approximately 1,000,000 metric tons according to Soviet estimates. 90/

Although data on recent production in the region are inadequate, the Kimpersay deposit accounted for 60 percent of the total Soviet production of chromite ore in 1942 and the Sarany deposit for 39 percent. 91/ By the period 1943-44 the production pattern had changed, and the Kimpersay deposit conbributed 83 percent of the total production, with the Sarany deposit supplying the remaining 17 percent. 92/

Vanadium in the Volga-Ural Region is found in conjunction with the titano-magnetite iron ore at Pervoural'sk and Kusa. The processing of this ore results in a naturally alloyed pig iron. The proved vanadium reserves of these two deposits are about 54,000 metric tons. 93/

Nickel deposits are located in the extreme southeast of the region at Kimpersay, Buranovo Shelekta, and Novotroitsk, and in the Orsk-Khalilovo area. In 1953 the total proved reserves for these deposits and the Aydyrlinskiy deposit, which is located slightly east of the region, amounted to 315,000 metric tons of metallic nickel or approximately one-third of the total Soviet proved reserve. The ore occurs in the form of nickel silicate, but it has a low nickel content, ranging from about 0.3 to 1.8 percent. Of less importance are the deposits located in the Central Urals -- at Revda, within the region, and at Rezh and Verkhniy Ufaley, just to the east of it. The 1939 proved reserves for these deposits amounted to 100,000 metric tons of metallic nickel.

No information is available concerning nickel production in the region, but the nickel refining plant at Orsk produced an estimated 15,000 metric tons of nickel in 1953, or approximately one-third of the total Soviet nickel production for that year. 94,p.11/

Minor deposits of manganese ore are found in the Central Urals in the vicinity of Baymak and Ulu-Telyak. In 1937 the total reserve of the Baymak deposits was estimated at 1,667,000 metric tons of ore, ranging up to 56 percent manganese content. The reserves at Ulu-Telyak are unknown, and the deposits are probably not currently being exploited since larger deposits are available elsewhere. To the east of the region, manganese is found at Marsyaty, Polunochnoye, Beloretsk, and Uchaly. These deposits have a combined estimated reserve of 7 million metric tons. 95/

Cobalt in the Volga-Ural Region, as in the rest of the Soviet Union, is produced primarily as a byproduct of nickel refining. In northern Kazakh SSR, cobalt is found in conjunction with nickel silicate at Kimpersay and Buranovo Shelekta. In 1939 the estimated cobalt reserve for these deposits was 6,000 metric tons out of a total reserve of 49,000 metric tons for the entire USSR. 96/ Cobalt in commercial quantities is also found at Orsk, Novotroitsk, and Khalilovo. The combined reserves for these deposits and of the Aydyrlinskiy deposit just east of the region was estimated at 15,000 metric tons in 1939. Cobalt is also found in conjunction with nickel ores in the Central Urals, mainly at Revda, within the Volga-Ural Region, and at Verkhniy Ufaley and Rezh, slightly to the east of it. The combined reserve for these deposits was estimated at 2,500 metric tons in 1939. 97/

The nickel refinery at Orsk produced an estimated 600 metric tons of cobalt in 1953, or approximately one-third of the total Soviet cobalt production, and an additional 60 metric tons was produced at Verkhniy Ufaley. 98/

C. Other Metals

The most important nonferrous metals in the Volga-Ural Region are copper, magnesium, bauxite, gold, and platinum. These minerals are present in quantities sufficient to supply the present industrial requirements of the region, but there is a deficit of lead, zinc, tin, and radioactive minerals, as well as of the minor nonferrous minerals such as arsenic, beryllium, bismuth, mercury, colombium, cerium, zirconium, and cadmium.

Copper ore is mined in the Ural Mountains at Nizhniy Tagil, Baymak, and Blyava (near Mednogorsk). The combined reserves of these deposits are estimated at approximately 1,100,000 metric tons of metallic copper. 99/* Slightly east of the region are the copper deposits at Degtyarka, Karabash, Krasnoural'sk, Turya, Serov, Pyshma, Novo Sibay, Uchaly, and Kirovgrad. Since the reserves of the Urals are becoming depleted, copper mining is shifting southward to the Kazakh SSR.

Raw materials for the production of magnesium are found in abundance in the Volga-Ural Region in the form of carnallite and magnesite. The only carnallite deposit in the Soviet Union is around Solikamsk and Berezniki. The reserves here are almost inexhaustible, being estimated at 18 billion metric tons of ore with an average magnesium

*No date of information was supplied by source 99, Appendix B.

chloride content of 22 to 25 percent. The 1942 planned output of these deposits was 8 million metric tons. 100,101/

Magnesite is mined at Satka and at Khalilovo. In 1937, these two deposits accounted for 100 percent (846,000 metric tons) of the Soviet production of magnesite. 102/ According to available information, they are still the sole producers of magnesite in the USSR. In 1933 the combined measured reserve for these two deposits was approximately 230 million metric tons of ore.

In the Ural sector of the region, bauxite is found at Novaya Pristan' and Pervomayskiy in the Bashkirskaya ASSR and at Kysylsai and Pervolochenk in the vicinity of Orsk. 103/ Clay deposits at Shuravlinskoye near Molotov also reportedly contain a good proportion of aluminum. 104/

The Soviet estimate of the bauxite reserves in the Orsk area is 10,000,000 metric tons of ore containing 48.7 percent alumina,* and the estimate for Novaya Pristan' is 700,000 metric tons of ore containing 57.9 percent alumina. No data are available concerning reserves at Pervomayskiy and Shuravlinskoye. Current production within the region is negligible; but immediately to the east, on the east slope of the Ural Mountains, there are very important bauxite deposits, notably at Krasnaya Shapochka and Sokolovskoye. 105/

Only fragmentary information is available on platinum mining in the Volga-Ural Region. Platinum is mined from placer deposits in the Nizhniy Tagil-Visim-Baranchinskiy, Izov, and Kytlym-Kos'va areas and from the Nizhniy Tagil lode deposits at Gosshakhta, Aleksandrovskiy Log, and Krutoy Log. 106/ No information as to platinum reserves or production is available for the region. Prior to World War I, Russia was the world's largest platinum producer, and the Ural deposits accounted for almost the entire production. Since 1913, however, platinum production in this area has declined steadily.

Information on gold mining in the region is fragmentary. The most important gold deposit is at Baymak-Tanalyk. The reserves of this deposit are unknown, but production in 1925 amounted to 1.9 metric tons. 107/ In addition, the smelting combine in Blyava near Mednogorsk reportedly produces approximately 1.3 metric tons of gold annually, presumably from polymetallic ore. 108/

*Although listed in source 105 as a comparatively large deposit, this information cannot be corroborated by any other source.

D. Nonmetallic Minerals

A variety of nonmetallic minerals are found in the Volga-Ural Region. Construction materials include limestone, sandstone, marble, chalk, limy chalk, gypsum, clay, asphalt, and slate. Potash and phosphate provide the raw materials for mineral fertilizers. Among the other minerals are salt, sulphur, pyrite, bromine, and diamonds. The region, however, is deficient in fluorspar, graphite, mica, asbestos, barite, boron, and corundum, as well as a number of other minor nonmetallic minerals.

Limestone, sandstone, marble, chalk, limy chalk, gypsum, clay, asphalt, and slate are the chief construction materials in the region. Limestone and sandstone quarries are numerous along the western slopes of the Ural Mountains. Limestone, for example, is quarried at Krasnovishersk, Chusovoy, Nizhniy Tagil, Kungur, Birsk, Sterlitamak, and Khalilovo; sandstone is quarried at Chusovoy, Sterlitamak, and Davlekanovo. Marble quarries are located at Nizhniy Tagil, Chernoistochinsk, and Satka. Cemented volcanic ash and deposits of slate are found throughout the Ural Mountains, but they are not exploited to any considerable extent. Gypsum is particularly abundant on the west slope of the Urals -- at Kungur-Yergachinskoye (where reserves total 319 million metric tons) and Ufa, and in the vicinity of Chkalov. 109/ Gypsum is mined at Ust'-Kama, Syukeyevo, and Alekseyevskoye; and just east of the region are the large Nizhniy Baskunchak deposits. Clay suitable for burned brick, tile, and sewer pipe occurs throughout the region. Chalk, limy chalk, jasper, and glass sand are found in the Urals. Asphalt is found mainly in the Volga area and is abundant in the Syzran'-Stavropol' area and between Sugushla (54°31'N-52°18'E) and Buldyr' (55°25'N-50°55'E). 110/ These two areas account for most of the Soviet asphalt production.

Industrially significant nonmetals found in the Volga-Ural Region include salt, magnesium salts, fertilizer raw materials, industrial diamonds, sulphur, pyrite, and bromine. Salt is mined at Sol'-Iletsk in Chkalovskaya Oblast' and just east of the region at Lake Baskunchak in Astrakhanskaya Oblast'. The reserves at Lake Baskunchak amount to 3.5 billion metric tons. In 1932, this deposit accounted for 23 percent of the total Soviet salt output. 111/ The Iletsk deposit, about 72 kilometers (45 miles) south of Chkalov, has reserves totaling 1.5 billion metric tons of very pure salt. Magnesium salts are obtained from the carnallite deposits at Solikamsk. No production data are available, but magnesium salts from this source are presumably adequate and stable.

Raw materials for fertilizer are present in the form of potash and phosphate. The outstanding potash deposit, and one of the world's greatest, is that at Solikamsk. Reportedly, it has a reserve of 18.5 billion metric tons of potassium oxide. 112/ Potash was also discovered

in 1937 at Ozinki in Saratovskaya Oblast'. In Kirovskaya Oblast', phosphate is found in the Vyatka-Kama region, where reserves of the Fosforitnaya group of phosphorite deposits were estimated at 880 million metric tons in 1937. 113/

Industrial diamonds are found in the Central Urals at Krestovozdvizhinskiy Priisk. In 1938, these placers yielded 42 stones aggregating 12 carats. This area is expected to provide a minute but reasonably continuous output. 114/

Substantial quantities of sulphur and pyrite are found in the Volga-Ural Region, notably at Vodinsk and Alekseyevskoye in the central Volga area. Together, these deposits account for 80 percent of the total sulphur reserves of the USSR and for 12 to 13 percent of the output (1947). Pyrite reserves, both natural and as a copper byproduct, appear to be associated exclusively with Ural copper pyrite deposits. In 1937, the reserves at Blyava were estimated at 13 to 16 million metric tons of pyrite. 115/

Bromine is produced as a potash byproduct at Solikamsk. Solikamsk carnallite averages 0.15 to 0.20 percent bromine, and reserves of bromine in this deposit alone amount to more than 100 million metric tons. 116/

The region is deficient in the following important nonmetals: asbestos, barite, boron, corundum, fluorspar, graphite, and mica.

VI. Electric Power*

The Volga-Ural Region is at present inadequately provided with power-generating and transmission facilities. The extent of the deficiency in current-generating capacity is indicated by the fact that projects now under construction will more than double the present installed capacity. Although half of this additional power will be transmitted out of the region, a large amount of it will be available for local use.

Although the industrial development resulting from the Soviet five-year plans and the World War II relocation of industry have intensified the power shortage of the region, the most critical industrial requirements are probably being satisfied, since industry receives a high priority in the allocation of resources by Soviet planners. Because much of the available power is generated by powerplants associated with industrial installations, the shortages that exist probably chiefly affect the individual Soviet citizen, both in the city and on the farm. The additional power from the hydroelectric stations planned and currently under construction on the Volga and Kama Rivers will no doubt continue to be used largely for the expansion of industry, but increasing amounts will probably be channeled to rural and urban electrification. The existing capacity plus the future increments should satisfy the immediately foreseeable power requirements of the region.

At present, most of the generating facilities are thermal, but this situation will change considerably as the large hydroelectric projects under construction are completed (See Maps 25406 and 25407).

The installed generating capacity of the region is estimated at about 5 million kilowatts,** concentrated primarily in the larger industrial centers along the Volga and in the northeastern part of the region. Sixteen cities with installed capacities of 100,000 kilowatts or more account for approximately 3.2 million kilowatts, or three-fourths of the installed capacity. Molotov, Nizhniy Tagil, Stalingrad, and the Kizel-Gubakha areas each have generating capacities slightly in excess of 300,000 kilowatts; and Balakhna (20 kilometers, or 12 miles, northwest of Gor'kiy), Kazan', and Kuybyshev have capacities ranging from 200,000 to 300,000 kilowatts. Nine cities -- Berezniki, Krasnokamsk, Ufa, Gor'kiy, Gorodets, Komsomol'sk, Saratov, Krasnyy

*Background material was derived from sources 117 through 127, Appendix B.

**This figure was derived from sources 128 through 131, Appendix B, and should be considered as only a rough estimate.

Sulin, and Dzerzhinsk -- have capacities of between 100,000 and 200,000 kilowatts. Scattered throughout the area are 37 more cities that have generating capacities between 10,000 and 100,000 kilowatts and altogether account for about 1.2 million kilowatts of the remaining 1.4 million kilowatts. Fifteen of these cities are located in the Ural sector and the others near the Volga River. The remaining 200,000 kilowatts are distributed among towns with capacities of less than 10,000 kilowatts.

The region is also deficient in transmission lines. Except in the extreme northwestern and northeastern parts of the region, which are connected with the Moscow-Gor'kiy and the Ural networks, there are no extensive transmission systems in the region. Hydroelectric projects currently under construction, however, have already stimulated the construction of new transmission lines, and even more are planned.

The Moscow-Gor'kiy network covers only a comparatively small part of the Volga-Ural Region. The grid includes Kostroma, Komsomol'sk, Ivanovo, Vladimir, Dzerzhinsk, Gor'kiy, and Balakhna, as well as many intermediate points. Within the region the transmission network has single- and double-circuit, 110-kilovolt lines. When the Gor'kiy hydroelectric station is completed, its power will probably be channeled into the Moscow-Gor'kiy grid.

Most of the Ural network lies east of the Volga-Ural Region, but the northeastern part of the region and several cities in the Southern Urals are connected to the network. In the northeastern part of the region, Solikamsk, Berezniki, Kizel, Chusovoy, Krasnokamsk, Molotov, Kushva, and Nizhniy Tagil are connected to the Ural network by single- and double-circuit transmission lines, primarily 110-kilovolt. Recently, a 220-kilovolt electric transmission line connecting the Kama hydroelectric powerplant with Sverdlovsk has been completed, and the power generated at this installation is now being transmitted into the Ural network. 132/ In the Southern Urals, Ufa, Satka, and intermediate points are connected to the Ural network by single-circuit 110-kilovolt lines. The remainder of the region has no long-distance transmission lines. However, cities such as Kuybyshev, Saratov, Stalingrad, Ishimbay, Kazan', and Tuymazy are connected with nearby localities by transmission lines, and another line has recently been completed from Salavat to Shkapovo, a rapidly developing crude-oil-producing center in southwestern Bashkirskaya ASSR.

Transmission facilities of the region will be greatly improved by the lines now under construction or planned. The new lines are centered around the Stalingrad and Kuybyshev hydroelectric projects. A 400-kilovolt line is under construction from Kuybyshev to Moscow, a distance of 1,000 kilometers (620 miles) and will be completed in the

near future. According to plans, this line will furnish the Moscow area with 600,000 kilowatts on each of its two circuits. 133/ This amount will be more than half of the total capacity of the Kuybyshev GES (2.1 million kilowatts). Another 1,000-kilometer (620-mile), 400-kilovolt, double-circuit powerline is scheduled to be constructed from Stalingrad to Moscow. Almost half of the 2.3-million-kilowatt installed capacity of the Stalingrad GES will be transmitted to Moscow over this line, which will also supply an additional 250,000 kilowatts to the cities along its route. 134/ A 220-kilovolt transmission line is scheduled to be built from Kuybyshev to Stalingrad via Saratov; at present, this line is under construction from the Kuybyshevskaya GES southward to the construction site of the Saratovskaya GES at Balakovo. Another 220-kilovolt line is planned from Stalingrad to Astrakhan'. 135/ This future network along the Volga will also be connected with the Dnepr-Donets network by a planned 200-kilometer (125-mile), 220-kilovolt line from Stalingrad to Tsimlyanskiy. 136/ Soviet planners have proposed the construction of 400-kilovolt transmission lines connecting Kuybyshev with Molotov and with Sverdlovsk via Chelyabinsk, thereby effecting a link with the Ural network. 137/ In connection with this, a high-tension line is currently under construction from Kuybyshev to Bugul'ma and will probably be extended to Ufa. After the completion of the hydroelectric plants at Gor'kiy and Molotov, other transmission lines may be built from Molotov to Kirov and then to Gor'kiy. In this way the Ural transmission system would be connected to the Moscow-Gor'kiy system. With the completion of these connections, a European USSR-Ural power transmission network would become a reality.

The power potential of the Volga Basin, which includes most of the region, is approximately 12 million kilowatts. 138/ To utilize this potential, the so-called "Volga Plan" has been devised. The plan calls for the creation of a chain of multipurpose dams and associated reservoirs along the Volga and Kama Rivers, which will supply power, improve navigation, and provide water for irrigation. Eight dams will form the Great Volga Cascade, a series of reservoirs stretching almost uninterruptedly from Stalingrad to Ivan'kovo on the upper course of the Volga. The Ivan'kovo, Uglich, and Shcherbakov dams and associated power stations, which are located slightly west of the region, have been completed, and together they have a total capacity of approximately 580 kilowatts. 139/ Three larger power projects farther downstream -- at Gorodets (about 50 kilometers, or 30 miles, northwest of Gor'kiy), Kuybyshev, and Stalingrad -- are in the final stages of construction (Figure 32). The combined capacity of these three installations will amount to about 4.8 million kilowatts. The construction of a dam and hydroelectric power station is reportedly under way at Cheboksary (800,000 kilowatts), 140/ and Balakovo is the site of another proposed dam (1,000,000 kilowatts).

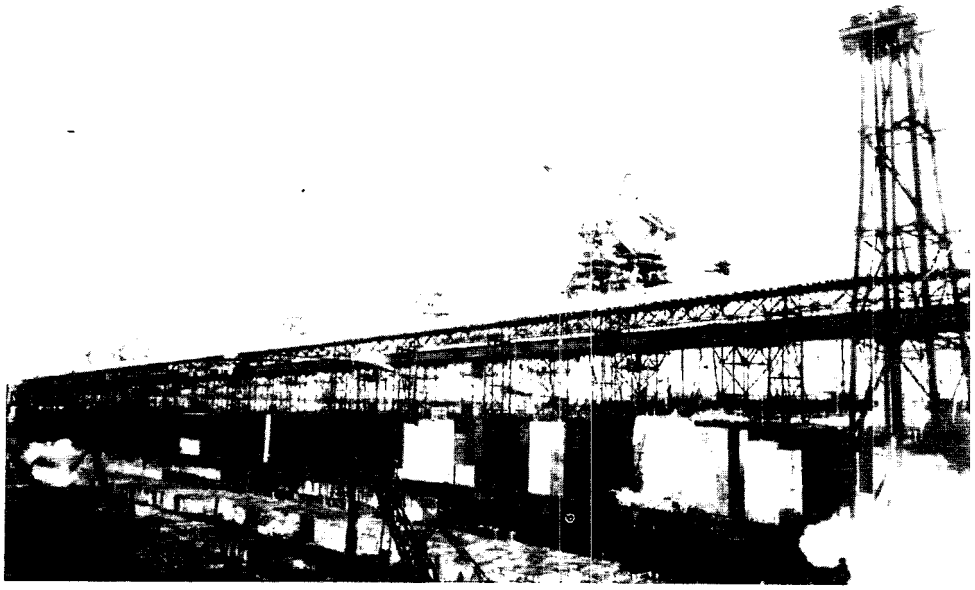


Figure 32. Powerhouse under construction at the Kuybyshev hydroelectric power project. (1955)

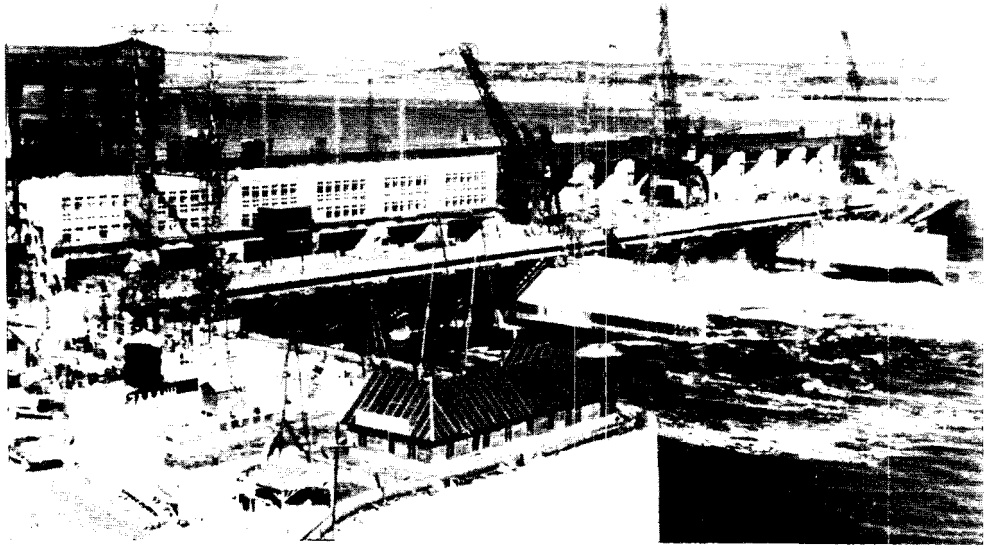


Figure 33. The Kama hydroelectric power project at Levshino. (September 1954)

Three hydroelectric power stations will be located along the Kama River -- at Levshino (400,000 kilowatts), about 11 miles north of Molotov, at Votkinsk (540,000 kilowatts), and at Nizhne-Kamskaya (900,000 kilowatts) on the lower course of the Kama River. 141/ The power station at Levshino, called the Kamskaya GES, has been completed and has begun producing (Figure 33). Construction of the hydroelectric power station at Votkinsk was started in mid-1955, 142/ and work on the power station at Nizhne-Kamskaya will be initiated during the Sixth Five-Year Plan. Another dam was planned at Solikamsk, but it has not been mentioned in recent Soviet publications and its status is unknown. When all the projects on the Volga and Kama Rivers are completed the installed capacity of the region will be increased by about 9 million kilowatts.

In addition to the hydroelectric developments along the Kama River, the Soviet Government has worked out a long-range plan to exploit the water-power potentials of the smaller rivers of the Ural Mountains. This plan envisages the construction of 49 small and medium-sized power dams within the Volga-Ural Region. 143/ There are to be 4 power dams on the Kos'va River, 6 on the Us'va, 6 on the Chusovaya, 7 on the Ufa, 11 on the Ay, 4 on the Bol'shaya Satka, 2 on the Yuryuzan', 3 on the Inzer, 5 on the Sakmara, and 1 on the sector of the Ural River that lies within the region. Capacity figures are available for only 3 of the 10 power dams to be built on the Kos'va and Us'va Rivers. The total for these three stations will be 25,000 kilowatts. The combined installed capacity of the remaining 39 planned hydroelectric installations will be 624,000 kilowatts, of which approximately 330,000 kilowatts are to be installed on the Ufa River, about 120,000 kilowatts on the Chusovaya River, and about 100,000 kilowatts on the Ay River. In 1945, 8 of the 49 projected power dams were under construction or completed; by 1954, only one more is known to be under construction on the Ufa River. Presumably, these dams would provide power for local use only and would contribute little to the Ural grid. The development of local sources of power would make it unnecessary to connect remote localities with the main transmission network and would reduce the need of transporting coal long distances to these areas.

At present, over 90 percent of the power capacity in the Volga-Ural Region is thermally generated. In the Ural Economic Region, which extends somewhat beyond the limits of the Volga-Ural Region, 95 percent of the electric power is thermal. 144/ In the Volga Economic Region, virtually 100 percent of the power is thermal, 80 percent being produced from coal. 145/ Present emphasis, however, is on the development of hydroelectric power. With the completion of the hydroelectric installations now under construction, the thermal and hydroelectric capacities will be about equal.

Although the shift to hydroelectric power in the region seems to be the dominant trend, some conditions favor further development of thermal-power facilities, particularly in the Ural sector of the region where extensive coal deposits are easily accessible. Of especial importance to the Ural transmission network is the Kizel Basin, where expansion of thermal facilities may be expected. The largely unexploited lignite deposits of the Bashkirskaya ASSR are also a potential source of power. Furthermore, power generated from coal and lignite deposits slightly east of the region could be channeled through the Ural network into the Volga-Ural Region. New facilities would probably be located near the coal deposits. Most of the expansion of thermal-electric facilities in the area astride the Volga will probably be in the form of small powerplants with capacities under 10,000 kilowatts (Figure 34), which will be located in remote areas not connected to a

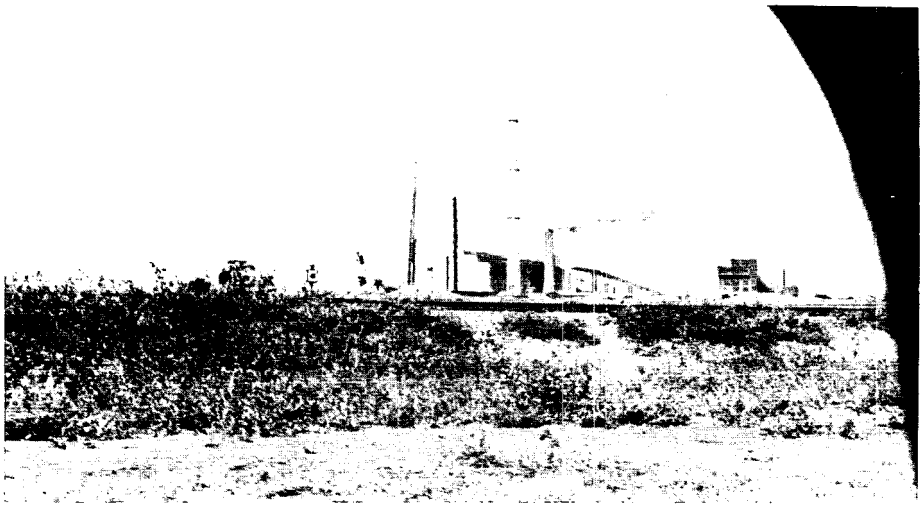


Figure 34. A small powerplant just south of Syzran'.

grid. The new thermal powerplants probably will use local oil, oil shale, peat, or natural gas as fuel.

In making greater use of local power resources, Soviet planners hope to eliminate long railroad hauls of bulky fuel. This is more significant for the Volga area than for the Urals, where long hauls are generally not necessary because of the availability of local coal. At present, local fuels are used to only a limited extent in the Volga area in the production of electric power. The main source of electric power, however, is coal, but it must be transported into the area, in some instances over long distances. Coal from the Donbas supplies the southern and central Volga area; and the Pechora, Moscow, and Kizel Basins apparently are the sources of supply for the northern Volga area.

VII. Agriculture*

A. The Current Situation

Since prerevolutionary times the Volga-Ural Region has been one of the important grain-producing areas of the Soviet Union. At present, over 75 percent of the cultivated area is planted in grain crops. The region has earned the reputation of being a breadbasket of the USSR, largely because of the extensive areas of fertile chernozem soil. (See Maps 25406 and 25407.)

Agriculturally the region can be divided into three major zones, whose general characteristics and dominant crops vary in relation to climatic conditions.

Northwest of a line drawn from Tambov to Molotov is a humid, forested, triangular-shaped area well suited to the cultivation of grains such as rye and oats. Some barley is grown, especially in the extreme north. Wheat production, however, is gradually expanding northward at the expense of the acreage of rye. In Kirovskaya Oblast', for example, the wheat acreage increased from 9,500 hectares (23,500 acres) in 1913 to 200,000 hectares (494,000 acres) in 1953. 155/

Industrial crops, such as flax, hemp, and makhorka (a type of coarse tobacco) are also increasing in importance in the northwestern zone. Flax, which is well adapted to the cool humid climate, is the chief industrial crop of the zone as a whole, but hemp outranks it in the west. Makhorka is becoming more important as a secondary crop. The production of vegetables and potatoes, which are generally grown near the centers of population, is also expanding to keep pace with the growth of urban centers. The needs of the urban population for dairy products and meats in the northwestern zone, in combination with the high proportion of meadowland, have encouraged the growth of the livestock industry and, with it, the planting of fodder crops. Hogs are raised wherever potatoes and grains are produced.

The second agricultural zone is a transitional belt approximately 300 kilometers (190 miles) wide that separates the zone of rye production from the dry wheat zone farther to the southeast. The transitional zone is only partly forested. Buckwheat, although only a secondary crop, is a distinctive feature here. Rye is still the dominant crop, but wheat (chiefly spring wheat) runs a close second, followed by oats and barley. Although flax is less important than in the northwestern zone, it is still the leading industrial crop, with hemp ranking next. Potatoes are important as both an industrial and a fodder crop.

*Background material was derived from sources 146 through 154, Appendix B.

Livestock production and truck farming have been stimulated by the growing needs of the urban population. In the western part of this zone, the sugar belt acreage has been increasing in recent years.

Southeast of a line connecting Saratov and Ufa is the southernmost agricultural zone. It is an important grain-producing area, with approximately 80 percent of the cultivated land in grain. Although most of this zone is subject to periodic drought and crop yields vary from year to year, the southern zone normally contributes a very important share of Soviet agricultural production. Spring wheat is definitely the major crop, particularly in the southwest, where it covers extensive areas in Kamenskaya, Voronezhskaya, and Stalingradskaya Oblasts. In an area along the extreme western margin of the Volga-Ural Region, the winter wheat acreage is expanding. Millet is frequently sown as a "drought-insurance" crop to reduce the impact of a failure of the wheat crop. Over most of the southern zone, sunflowers are the major industrial crop, followed by mustard (grown chiefly in Stalingradskaya Oblast'), castor beans, makhorka, and some cotton. Truck farming, viticulture, and the growing of fruit trees are important, particularly near settlements. The livestock industry is also significant. In the more humid north and in the hilly areas to the east, cattle and hogs predominate, whereas farther south sheep are raised for both meat and wool.

Although collective farms predominate in the Volga-Ural Region, state farms are also found in considerable numbers. Approximately 17 percent of the 94,000 kolkhozes in the USSR are in this region. The kolkhozes vary in number and size from area to area, as a rule being smaller and more numerous in the forest areas than in open steppe country. In Chkalovskaya Oblast', for example, there are approximately 477 kolkhozes in comparison with 1,355 in Molotovskaya Oblast'. With the consolidation of the kolkhozes in 1950-51, many of the small village kolkhozes were combined into large multivillage units. Commonly two to five kolkhozes were consolidated into a new unit, but in some cases the number was considerably larger. In Gorkovskaya Oblast', for example, the new "Timiryazeva" kolkhoz was created from 30 small village kolkhozes. Sizes range between 600 and 20,000 hectares (1,500 and 49,500 acres), with the southern kolkhozes having the larger acreages. Sovkhozes are considerably larger, ranging from 20,000 to 150,000 hectares (49,500 to 370,000 acres) in size.

Machine tractor stations (MTS's) also vary in number according to location. In the north, for example, Kostromskaya Oblast' has approximately 64 MTS's, while Penzenskaya Oblast' (Figure 35) and Kuybyshevskaya Oblast' to the south have 122 and 99, respectively. 156,157/

Figure 35. A machine tractor station in Penzenskaya Oblast'.

The mechanization and electrification of Soviet agriculture has progressed rapidly during recent years, largely as a result of increased production of tractors, grain combines, and other heavy farm machinery since World War II. As might be expected, mechanization has progressed further in grain production than in any other branch of agriculture. Nevertheless, mechanization of processes associated with the cultivation and harvesting of other crops, such as flax, sugar beets, and potatoes, has increased considerably, though at a much slower rate than in the case of grain.

Terrain and climate present some obstacles to efficient mechanized farming, particularly with respect to grain. In the more humid north, where the land is rolling to hilly, conditions are much less favorable for combine harvesting than on the level steppes of the dry southern area. Even here, however, some difficulties are experienced, especially in the spring wheat belt, where the late harvest often coincides with wet weather.

The electrification of farming in the Volga-Ural Region, as in the rest of the Soviet Union, has received special emphasis during recent years. According to Soviet sources the application of electricity affords especially good opportunities for increasing efficiency in pumping water for the livestock industry. The electrification of milking and sheep shearing have also increased yields. In the case of sheep shearing, electrification has not only saved considerable time, but it also has reduced wool losses due to the delays formerly associated with hand shearing. 158/

In order to overcome the limitations of periodic droughts, impoverished soils, and desiccating winds, several long-range programs have been proposed by the Soviets. Among these are irrigation schemes, fertilization plans, and the development of shelterbelts.

Much of the southern part of the Volga-Ural Region is characterized by shortage of water. The Soviets have made elaborate plans to relieve this situation by building huge reservoirs on the Volga at Kuybyshev and Stalingrad. Both are to be used jointly for irrigation and power. The Kuybyshev project, now under construction, was planned to provide water for irrigating 1 million hectares of land east of the Volga. Plans have been made to use water from the Stalingrad reservoir for eventually irrigating 1-1/2 million hectares on the left bank of the Volga, including large sections of the northern Caspian semidesert.

One of the major agricultural obstacles, especially in the northern part of the area, is the low productivity of the depleted soils. To overcome this handicap and increase crop yields, the utilization of commercial mineral fertilizers is being strongly recommended. Raw materials for commercial fertilizers are more than adequate in the Volga-Ural Region. Reserves of potash at Solikamsk in Molotovskaya Oblast' and of phosphate in the Vyatka-Kama region of Kirovskaya Oblast' amount to millions of tons. Some mineral fertilizers are also produced as by-products of coke and pig-iron production. Nevertheless, inertia and the lack of sufficient producing plants has, for the time being at least, limited the use of commercial fertilizer to industrial crops. If the Soviets expand their fertilizer-production facilities and educate agricultural workers to the advantages and proper methods of fertilization, yields could be increased considerably.

In the dry southern areas, a grandiose scheme of planting tremendous shelterbelts to reduce soil erosion, conserve soil moisture, and protect the agricultural areas from the hot, dry, summer winds that blow from Kazakhstan and Central Asia was formulated in 1948. On the whole, little has been done to implement this plan, chiefly because the enormous costs of setting up the shelterbelts completely overshadow the limited returns.

B. Problems and Future Outlook

In spite of the ambitious plans for improvement and the undenied progress along some lines, agriculture in the Volga-Ural Region is confronted by a number of problems.

One of the major difficulties has been the lack of trained personnel, particularly of workers with sufficient technical training for work in the machine tractor stations. Breakdowns of equipment and the

ensuing harvesting delays, which cause considerable grain losses, have frequently been attributed to a lack of trained workers. As a result, authorities are attempting to recruit from the cities and industry those workers who have had previous agricultural experience. In Kirovskaya Oblast', for example, more than 70 former agricultural-machine operators returned to the farms during the first 10 months of 1953. 159/ This type of migration from industry back to agriculture is taking place on a limited scale throughout the Volga-Ural Region.

Poor organization and planning and an inflexible control by state authorities have resulted in problems such as inadequate quantities of seed for planting and arbitrary assignment of crops without regard to local growing conditions.

In order to help overcome some of these problems, a new plan that increases the independence of the individual collective farm has been announced. In the future, state authorities are to retain responsibility for long-term planning but will leave detailed decisions as to choice of crops and livestock to the individual collectives. This greater freedom might, in the long run, increase production by enabling each collective farm to produce crops that are most in demand and are best suited to its land and climate.

Reports in the Russian press have indicated that another agricultural problem is a lack of control over the labor force in some of the kolkhozes. To correct this situation, new obligatory work-day minimums, with penalties for noncompliance, have been established. An attempt is also being made to increase party control by replacing many of the present collective-farm chairmen with experienced party workers from the cities who have received special training for agriculture.

A problem of a different sort that has tended to limit production is the result of animal diseases. Travelers in the Kuybyshev area in the fall of 1955 report having seen evidence of an epidemic of foot and mouth disease. 160/ Cattle plague is also reported to have had serious effects in some parts of the region.

Since 1913, there has been a considerable expansion of crops into the forested belt to the north, where black earth gives way to podzolic soils, and into the dry areas to the south. Wheat, traditionally concentrated in the central oblasts, has pushed farther northward and southward. The southward expansion has emphasized the need for drought-resistant crops such as sunflowers and millet. The southeastern part of the Volga-Ural Region falls within the area of the highly publicized New Lands program. In the past 2 years, this program has greatly accelerated the extension of grain production into the semiarid steppe areas, but there is considerable doubt about the long-term stability of grain production in such marginal areas.

Although Soviet agriculture as a whole is making progress, it remains a moot point whether agricultural production in the Volga-Ural Region can keep up with, let alone surpass, the needs of the rapidly growing population. Even as recently as 1955, breadlines were common sights in this area. 161/

VIII. Physical Elements

A. Relief*

The vast European Plain that extends across European USSR to the Ural Mountains encompasses the major portion of the Volga-Ural Region. The only other outstanding relief feature of the region is the comparatively low Ural Mountains, which form the eastern boundary. The gently rolling plain averages about 170 meters (550 feet) in elevation. Its otherwise uniform surface is interrupted by numerous hills, ridges, and plateaus ranging from 185 meters (600 feet) to over 300 meters (1,000 feet) in height, but the characteristics of a plain predominate. (See Map 25546.)

In the extreme northwestern part of the region, roughly between Vologda and Kirov, are the Severnyye Uvaly (Northern Swells). The swells are a broad east-west belt of low hills that forms the divide between the Caspian and Arctic drainage systems. Elevations within the swells range from 250 to 300 meters (820 to 1,000 feet). These low hills are cut by many transverse valleys with gentle valley slopes.

South of the Severnyye Uvaly is the Upper Volga Lowland, which extends southward roughly to the parallel of 55°N. Its eastern limit is the Vyatskiy Uval, which extends northward from Kazan'; westward the swells continue to the Valday Hills beyond the limits of the Volga-Ural Region. The surface of the Upper Volga Lowland is predominantly level, and only rarely are the elevations more than 150 meters (500 feet) above sea level. The chief features of this lowland are the valleys of the rivers tributary to the Volga and occasional islands of gently rounded hills.

Flanking the Volga River, the Pre-Volga Upland forms a triangle with its apexes at Gor'kiy, Kazan', and Stalingrad. The western portion of the upland is hilly, with elevations ranging from 180 to 310 meters (600 to 1,000 feet). The eastern part of the Pre-Volga Upland is characterized by a series of north-south trending plateaus occasionally cut by narrow, steep-sided valleys. These plateaus continue to the Volga and form the characteristically steep right bank of the river. The highest point, at the Samara Bend, is 370 meters (1,214 feet) above sea level (Figure 36).

West of the Pre-Volga Upland is the Oka-Don Lowland. This nearly level lowland is about 110 meters (350 feet) above sea level and is interrupted in the extreme south by the Kalach Upland, where elevations rise to 245 meters (800 feet).

*Background material was derived from sources 162 through 164, Appendix B.

Figure 36. The Zhiguli Mountains at Samara Bend.

East of the Volga River, the Trans-Volga Hills rise gradually from the comparatively broad Volga flood plain in low but clearly defined terraces, continue eastward, and finally merge with the Ural foothills. This area is characterized by low hills underlain by hard, crystalline rock. The surface is dissected by numerous rivers, such as the Kama, Vyatka, Belaya, and Samara. Three hill groups comprise the Trans-Volga Hill area.

The northern group includes the Upper Kama Upland between the Vyatka and Kama Rivers and the Vyatskiy Uval north of Kazan'. This area is bounded by the Upper Volga Lowland on the west, the Severnyye Uvaly on the north, and the foothills of the Ural Mountains in the east. The Vyatskiy Uval is a narrow series of low hills that extends in a roughly north-south direction for about 320 kilometers (200 miles). Elevations range up to 275 meters (900 feet). In the east is the Upper Kama Upland, an area of hills with nearly level summits that give it a plateaulike appearance. A few broad, shallow-terraced valleys, such as the valley of the Cheptsa River, cross the area. Elevations range up to 340 meters (1,100 feet).

Between the Kama and Samara Rivers is the second hill group of the Trans-Volga area, the Bugul'minsko-Belebeyevskaya Highland, which rises gradually eastward and merges with the foothills of the Southern Urals. Characteristic features in this area are the numerous flat-topped hills separated by relatively deep valleys. Elevations range to 350 meters (1,500 feet), and slopes are gentle except along the steep valley walls.

The southernmost hill group is the Obshchiy Syrt, which extends roughly from Saratov eastward to the foothills of the Southern Urals. The landscape of the Obshchiy Syrt consists of gently sloping swells that rise gradually toward the east and are often topped by small, dome-shaped summits. Slopes are generally less than 5 percent and the highest elevation is slightly over 260 meters (850 feet).

A small part of the Caspian Lowland lies within the Volga-Ural Region south of the Obshchiy Syrt. The predominant feature of this lowland is its uniformly low surface and almost imperceptible slopes. The shallow elongated depression of the lower Volga Valley is the most conspicuous relief feature of the lowland. Near Stalingrad the valley is 32 kilometers (20 miles) wide, and its lower stretches are below sea level. Within the Volga Valley, extensive marshes and sand dunes are the chief relief features.

The Central and Southern Ural Mountains form the eastern boundary of the region and consist of a series of parallel, roughly north-south ranges that are separated by longitudinal troughs. The Central Urals extending from the northern border of the region to about 56°N are the lowest part of the Ural Mountains. This area, which continues southward to the middle course of the Ural River at about 51°N is the broadest part of the Urals. From the west, the ascent to the watershed is gentle, since the western foothills of the Urals rise gradually from the East European Plain. The average elevation of the Urals is comparatively low, roughly 910 meters (3,000 feet). Wide longitudinal valleys and short, narrow, latitudinal gaps cutting through the intervening ridges are characteristic features of the Urals.

The Central Urals south of Nizhnyaya Tura consist of ranges of low hills, which in some areas resemble a peneplain (Figure 37). North of Nizhnyaya Tura, two or three discontinuous ranges rise above the hill country and the trend toward parallel ranges and troughs becomes apparent. Elevations range from 410 meters (1,345 feet) west of Sverdlovsk to 1,560 meters (5,120 feet) in the north. On the south the foothill zone is an exceptionally flat plateau with elevations ranging from 310 to 370 meters (1,000 to 1,200 feet); on the north the foothill zone is an upland with broad, deeply etched river valleys and short broken ridges.

In the Southern Urals, the ranges become longer and higher. The northern sector of the Southern Urals consists of many parallel ranges and ridges that trend northeast-southwest (Figure 38). From the Central Urals southward, elevations increase to 1,638 meters (5,374 feet) at Yaman-Tau, the highest point in the Southern Urals. In the southern sector the parallel ranges run almost due north-south. The ridges gradually decrease in elevation and eventually merge with the rolling

Figure 37. Gora Blagodat' in the low area north of Nizhniy Tagil.

plain. However, elevations from about 350 to 610 meters (1,600 to 2,000 feet) are maintained and the rivers are deeply etched into the surface. A series of parallel ridges with elevations decreasing to the west forms the foothills of the Southern Urals (Figure 39).

B. Hydrography*

Most of the Volga-Ural Region is drained by the extensive Volga River system, which empties into the landlocked Caspian Sea. In the extreme southwest, however, a small part of the region is drained by the Don River system, and the southeastern corner of the region is drained by the Ural River system. The Volga, on the basis of the size of its basin and length, is the largest river in Europe. Its principal tributaries are the Kama and the Oka.

Since most of the rivers of the Volga Basin originate in areas of rather low elevation, generally less than 300 meters (1,000 feet), and flow through plains, the gradients are slight. The Volga drops only 240 meters (800 feet) over a course of 3,700 kilometers (2,300 miles). The gradients of the other rivers of the basin are roughly

*Background material was derived from sources 165 through 169, Appendix B.

Figure 38. Landscape in the southern Urals in the vicinity of Zlatoust. In the background is the Taganay Range.

Figure 39. View along the Yuryuzan' River near Ust'-Katav.

comparable; only the rivers that rise in the Ural Mountains have steeper gradients. As a rule, gradients are the greatest in the upper courses and decrease in the middle and lower courses. The rivers are characteristically slow flowing and meandering, with numerous shallow areas, islands, and sandbars. Many streams, especially those in the north, are paralleled by marshes, swamps, lakes, and lateral channels, some of which are abandoned. Land along the streams is generally covered with water during the spring floods. Most of the major rivers have a high right bank and a low left bank. With the construction of huge reservoirs, however, the hydrographic regime of the Volga and its tributaries are undergoing considerable change.

In the moister northern areas the drainage pattern is fairly dense, but it becomes sparser to the south. Below its junction with the Kama River, the Volga has no important tributaries. Isolated areas of marsh are found in the northern part of the region, especially on the valley floors, in isolated lowlands, and in some of the more poorly drained longitudinal troughs of the Ural Mountains. In some northern sections, marshes cover sizable areas; but there are no extensive marshy areas in the region. Marshiness decreases to the south, and in the extreme south marshy areas are limited to the river flood plains.

Except along its upper course, the Volga River has a wide valley floor. Near Gor'kiy, it ranges from 11 to 16 kilometers (7 to 10 miles) in width, and below Stalingrad it ranges from 11 to 32 kilometers (7 to 20 miles). In its upper reaches, between the western border of the region and Gor'kiy, the channel of the Volga widens to over 300 meters (1,000 feet), and the water attains a depth of 6 meters (20 feet) or more. The river has few meanders; the right bank is high and the left bank low. Near Gor'kiy, the Oka River flows into the Volga from the south and the Unzha and Kostroma from the north.

Between the mouth of the Oka and Kazan' the Volga is generally more than 610 meters (2,000 feet) wide (Figure 40), the channel meanders considerably, and islands and abandoned stream channels are numerous. In this stretch the main tributaries are the Vetluga and Sura Rivers. Poorly drained swampy lowlands parallel the Volga for approximately 160 kilometers (100 miles) downstream from Gor'kiy; this area is usually flooded in spring.

Between Kazan' and Stalingrad, the Volga River has a continually shifting, meandering channel that ranges in width from 1/2 to 1-1/2 kilometers (1/3 to 1 mile) (Figure 41). Islands up to 10 kilometers (6 miles) long are numerous. The depth of the river in this stretch averages from 5 to 8 meters (16 to 26 feet) and in some places reaches 15 meters (50 feet). The velocity at floodtime is about 5 kilometers

Figure 40. The Volga River near Cheboksary.

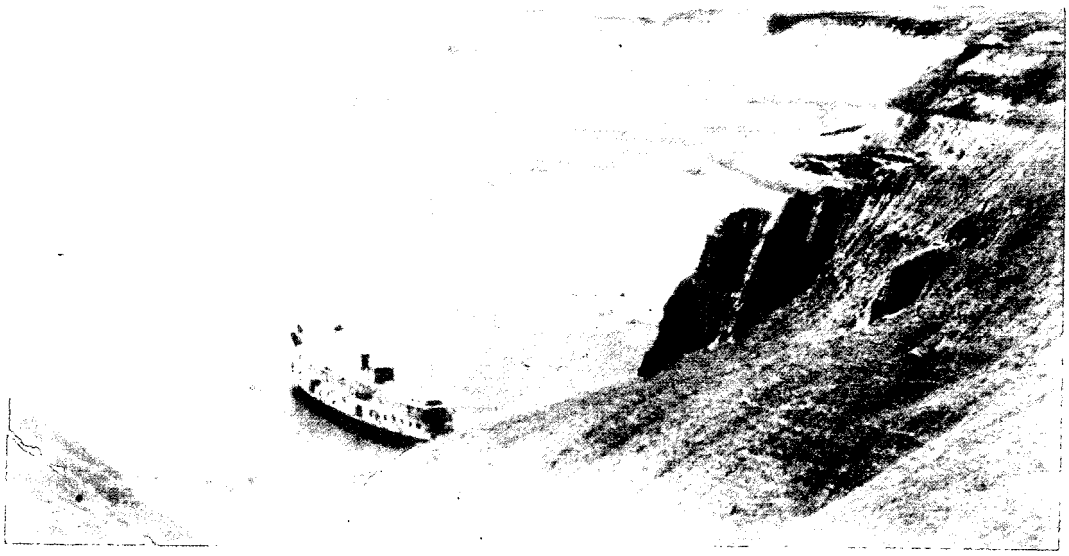


Figure 41. The Volga River north of Stalingrad.

(3 miles) an hour and at low water about 1.5 kilometers (1 mile) an hour. South of Kazan' the Kama River joins the Volga from the east. Below the confluence with the Kama, the Volga has no sizable tributaries. An outstanding feature of this section of the river is the exceptionally high right bank, which averages between 60 and 180 meters (200 to 600 feet) in height and in some places exceeds 300 meters (1,000 feet) (Figure 42). Below Saratov the right bank gradually becomes lower.

Figure 42. The high right bank of the Volga at the Samara Bend.

The water level of the Volga fluctuates greatly. During spring floods, caused by melting snow, the water level is generally 13 meters (43 feet) higher than the mean water level at Kazan', 14.3 meters (47 feet) at Kuybyshev, and 11.5 meters (39 feet) at Stalingrad. The greatest fluctuation occurs near the mouth of the Kama, where the water rises 16.7 meters (55 feet) at flood stage. Spring is the period of maximum flow. About 54 percent of the annual flow occurs in the spring at Yaroslavl', 60 percent at Cheboksary, and 64 percent at Kuybyshev. Summer and autumn normally account for only 20 to 25 percent of the annual flow on the lower Volga, and the period December to March, 10 to 15 percent. The period of high water on the Volga becomes progressively later from north to south. At Gor'kiy it occurs in the first part of May and at Stalingrad, the last of May. The length of the flood period also increases to the south, lasting from

60 to 70 days in the upper course, up to 90 days in the middle course, and 95 to 105 days in the lower course.

In winter the Volga is frozen over on an average of 140 days in its upper course and from 90 to 100 days in its lower course. Freezing begins at the end of November in the north and in the middle of December in the south. Thawing starts at the beginning of April in the south and in the middle of April in the north.

The Kama River, the largest tributary of the Volga, is 1,880 kilometers (1,170 miles) long and rises in the Udmurtskaya ASSR. Recently the characteristics of this river have been changed radically by the construction of a huge reservoir and a power dam at Levshino just above Molotov. The reservoir stretches northward for 250 kilometers (155 miles) to the vicinity of Solikamsk and varies in width from 1.5 to 40 kilometers (1 to 25 miles). Upon completion of the dam the water level of the upper Kama and its tributaries was raised considerably, and the streamflow in the lower course of the river has been regulated proportionally. The regime of the river will be further changed after the completion of the Votkinsk dam, which is now under construction, and the Nizhne-Kamskaya dam, which is to be built in the near future. The Kama River will then have three contiguous reservoirs stretching from the mouth of the river to Solikamsk.

Before the building of the dam at Levshino, the Kama River had the following characteristics: (1) the width of the channel ranged from 37 meters (120 feet) in the upper course to 915 meters (3,000 feet) at its confluence with the Volga; (2) the depth of the channel varied from 1 to 2 meters (3 to 6 feet) in the upper course to about 5.5 meters (18 feet) in its lower reaches; (3) the valley was 3 kilometers (2 miles) in width near Molotov and 5 kilometers (3 miles) in width below the confluence of the Belaya River; (4) the spring flood period lasted from 1.5 to 2 months; and (5) 58 percent of the annual flow occurred in spring, when the Kama rose as much as 9 meters (30 feet).

The main tributaries of the Kama are the Vishera, Chusovaya, Belaya, Ik, and Vyatka. The left-bank tributaries flow from the Ural Mountains and have the characteristics of mountain streams, whereas the right-bank tributaries originate at lower elevations and have wider valleys, slower velocities, and meandering courses. Characteristically the Kama has high, firm banks, but in scattered stretches -- especially in the upper course -- the banks are low and swampy. The right bank is generally somewhat higher than the left.

Only the lower course of the Oka River, the second largest tributary of the Volga, lies within the Volga-Ural Region. Near its junction

with the Volga at Gor'kiy, the river attains a width of about 460 meters (1,500 feet) and a depth of up to 12 meters (40 feet). Shallow areas and sandbars are characteristic of its meandering channel, and the depth of the river varies from 0.6 to 15 meters (2 to 50 feet). In its lower course the valley of the Oka ranges from 1.5 to 20 kilometers (1 to 12 miles) in width and contains many abandoned channels, back waters, and lakes. During the spring, floodwaters rise about 13 meters (45 feet) near Gor'kiy. The river is frozen from the end of November until the beginning of April. Within the Volga-Ural Region, the main tributaries of the Oka are the Moksha and Klyaz'ma.

The construction of large hydroelectric stations and the formation of huge reservoirs on the Kama and Volga Rivers is changing the hydrography of the Volga River system. When the Volga plan has been completed, eight almost contiguous reservoirs will extend from Stalingrad to the upper course of the Volga, and three or possibly four dams will be constructed on the Kama. At present the Gor'kiy and Kuybyshev reservoirs are filling, and the Stalingrad reservoir should be completed in the near future. As a result of the dams and reservoirs the channel of the Volga will be widened greatly, the depth of the river will be greatly increased, and the flow will be regulated. The Kuybyshev dam and reservoir, for example, will raise the river level about 20 meters (65 feet) as far north as Ul'yanovsk. Such changes will greatly improve navigation on the river and provide new sources of hydroelectric power.

C. Natural Vegetation*

The predominant types of natural vegetation in the Volga-Ural Region are forest and steppe. Four east-west trending belts of vegetation extend across the plains area and into the Ural Mountains. From north to south the zones are: coniferous forests, mixed forests, forest steppe, and steppe. Forests are also the characteristic vegetation of the Ural Mountains.

North of 57°N, dense coniferous forests prevail from the western border to the Ural foothills. The chief species in this area are spruce and pine, but fir occurs in the eastern part of the belt, and many of the forests throughout the region have an admixture of birch. The coniferous forests are underlain by podzolic soils that are leached and have sandy upper horizons.

South of 57°N is a zone of mixed forests. The southern boundary of this zone runs along the Oka to Gor'kiy; from there a narrow forest

*Background material was derived from sources 170 through 172, Appendix B.

belt extends eastward to the Ural Mountains. There are also two isolated areas of mixed forests in the Pre-Volga Uplands, and a narrow strip of mixed forest extends from Gor'kiy to Tambov. The mixed forests include both coniferous and deciduous trees, with spruce and oak predominating. Conifers, such as fir and pine, are also widespread; deciduous species include linden, aspen, elm, maple, and ash. Although the soils are podzolic, some are modified and approach chernozems in character.

South of the mixed forest zone is the forest steppe, the southern limits of which extend roughly from Voronezh eastward to Saratov, up the Volga to Kuybyshev, and then almost due eastward, with only one minor protrusion southward in the vicinity of Buzuluk. The forest steppe is a zone of transition between the forests to the north and the steppe to the south. In the characteristic forest-steppe landscape, large masses of deciduous forests alternate with vast sections of steppe, or patches of woods are scattered throughout a steppe landscape. In the forested areas, oak predominates, but it is intermixed with linden, aspen, birch, ash, elm, European filbert, and maple. In the intervening areas of steppe, dense, tall herbaceous vegetation, becoming shorter and sparser to the south, is characteristic. From north to south the soils of the forest steppe change from gray forest soils, to degraded chernozems, leached chernozems, and finally deep, rich chernozems.

South of the forest steppe is the true steppe, which is unforested and well drained. It is covered throughout the vegetative season with a more or less dense herbaceous vegetation, the height and density of which decrease to the south. The predominating soils are middle and southern chernozems and dark chestnut soils. Trees are found only in the river valleys.

A small area of semidesert is located south of Kamyshin on the east side of the Volga River. This area has a very sparse cover of herbaceous vegetation growing on light chestnut soils.

The Ural Mountains are forest covered, and the basic soils are podzols. In the Central Urals, the dominant vegetation of all slopes and most of the crests is a dense spruce-fir forest with occasional admixtures of other species such as pine, larch, beech, and birch (Figures 43 and 44). Above 855 meters (2,800 feet) are lush treeless alpine meadows. In the Southern Urals, forests extend south to about 52°N and up to elevations of 1,460 meters (4,800 feet). The prevailing species in this area are fir, spruce, birch, larch, and pine (Figure 45). South of 52°N, forest steppe predominates. On the eastern slopes, birch-forest steppe prevails and on the western slopes, oak-forest steppe. The southernmost ranges of the Urals extend into the steppe grasslands of the East European Plain and the West Siberian Plain.

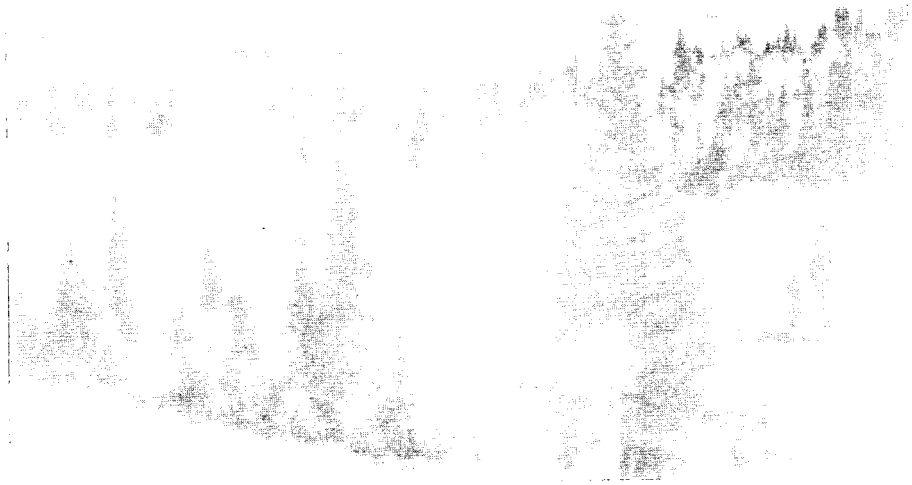


Figure 43. Mixed forest of conifers and beech along the Kizel River.

Figure 44. Open valley in the central Urals with scattered birch trees. In the background are coniferous forests.

Figure 45. Coniferous forest along the Sim River between Sim and Min'yar.

D. Climate*

The climate of the Volga-Ural Region is continental, with long, severe winters and short, moderately warm summers. Spring and autumn are brief transitional seasons. Seasonal changes in climate are great and abrupt, but climatic differences within the region are small and changes are gradual.

Both continental and maritime air masses influence the climate of the region. Although continental air prevails throughout the year, masses of maritime air penetrate the region during all seasons. In the winter, dry, cold, continental air from the Asiatic interior to the east predominates; but occasional incursions of moist maritime air from the Atlantic Ocean and adjoining bodies of water raise the temperature and result in cyclonic activity and precipitation. The meeting of these contrasting air masses causes considerable low cloudiness during the winter. Dry, warm, continental air from the southeast prevails throughout the region in the summer. Although maritime air masses penetrate the area from the west in summer, they have generally assumed a continental character by the time they reach the Ural Mountains.

*Background material was derived from sources 173 through 175, Appendix B.

Mean annual precipitation ranges from 430 to 635 millimeters (17 to 25 inches) except in the lower Volga area where it averages between 255 and 380 millimeters (10 and 15 inches). Precipitation is highest in the northern quarter of the region and in the Ural Mountains, where over 510 millimeters (20 inches) are recorded annually. Precipitation decreases somewhat to the south. Although precipitation occurs more frequently in winter, a greater amount falls in the summer. Precipitation data for 8 representative stations are listed below:

Mean Monthly and Annual Precipitation
(in inches)

Station	J	F	M	A	M	J	J	A	S	O	N	D	Annual
Vologda	1.3	1.1	1.2	1.3	2.2	2.7	2.9	3.0	2.6	1.9	1.4	1.3	22.9
Kirov	1.5	1.5	1.3	1.1	2.0	2.3	2.5	3.0	2.4	2.0	2.0	1.6	23.2
Molotov	1.3	1.6	1.3	1.0	1.8	3.2	3.0	2.7	2.4	2.0	2.7	1.6	24.5
Penza	1.2	0.9	1.0	1.1	1.9	2.2	2.2	2.0	1.8	1.7	1.4	1.3	18.7
Kazan'	0.9	0.9	0.8	1.0	1.2	2.5	2.3	1.9	1.7	1.6	1.3	1.0	17.1
Ufa	1.6	1.5	1.2	1.0	1.6	2.4	2.8	2.1	1.8	2.2	2.4	2.5	23.1
Stalingrad	0.7	1.0	0.6	0.6	1.1	2.0	0.8	0.8	0.6	1.0	1.2	1.4	11.8
Chkalov	0.9	0.8	0.9	1.0	1.2	2.1	1.5	0.7	1.1	1.0	1.6	1.8	19.7

Winter in the Volga-Ural Region is long and severe and generally lasts from October to April. Winter temperatures are low throughout the region, and variations from day to night and from place to place are small. In winter, mean daily minimum temperatures are generally below freezing. Temperatures decrease from southwest to northeast.

Mean monthly winter precipitation ranges from less than 1 inch to over 2 inches. Snow occurs frequently and accumulates on the ground until late winter. The duration and depth of the snow cover decrease from the northeast to the southwest. In the extreme northeastern part of the region the ground is snow covered about 180 days annually and in the extreme southwest, about 100 days. The average depth of the snow cover at Kirov for the first 10 days of March is 710 millimeters (28 inches), while at Stalingrad it is about 200 millimeters (8 inches) for the same period. The mean monthly relative humidity is high during the winter, generally above 80 percent, but the actual moisture content of the air is low.

The prevailing winter winds are southwesterly or southerly, except in the lower Volga area, where they are easterly or southeasterly. Although mean winter wind velocities are not high, generally not over 20 kilometers per hour (12 m.p.h.), they exceed those of summer.

Listed below are temperature data for 10 representative stations:

Mean Daily Minimum Temperatures (in °F)

Station	J	F	M	A	M	J	J	A	S	O	N	D	Absolute Minimum
Vologoda	3	6	14	28	41	49	54	50	42	32	20	9	-42
Gor'kiy	4	8	16	32	46	54	58	55	44	34	20	7	-39
Kirov	-2	2	12	28	41	50	55	51	41	29	15	3	-43
Molotov	-3	1	11	26	42	41*	55	52	42	31	12	-1	-47
Kazan'	0	4	13	20	46	53	58	54	44	13	18	5	-44
Ufa	-3	3	13	29	46	54	58	54	44	32	15	3	-42
Penza	2	6	15	31	46	54	58	55	44	34	19	8	-35
Kuybyshev	0	5	15	32	49	57	60	57	46	34	20	7	-37
Stalingrad	8	12	21	38	52	61	66	62	51	38	27	16	-30
Chkalov	-5	-1	11	29	47	55	59	56	45	32	17	3	-41

*Figure probably incorrect.

Mean Daily Maximum Temperatures (in °F)

Station	J	F	M	A	M	J	J	A	S	O	N	D	Absolute Maximum
Vologoda	12	16	26	42	57	66	70	65	53	41	26	14	93
Gor'kiy	11	17	27	43	61	68	73	69	55	42	25	14	96
Kirov	6	12	24	40	57	65	71	65	52	38	21	10	92
Molotov	5	12	24	39	58	64	70	66	54	39	20	7	--
Kazan'	9	14	25	43	63	70	75	71	57	43	25	13	103
Ufa	6	14	25	43	62	71	74	70	57	41	23	11	98
Penza	11	17	27	44	64	72	76	73	59	45	27	16	98
Kuybyshev	9	16	26	44	66	73	77	76	61	46	28	15	104
Stalingrad	14	24	32	52	70	78	84	83	69	54	34	23	106
Chkalov	7	12	24	44	68	75	78	77	64	47	28	14	98

Summer includes the months of June, July, and August. These months are moderately warm and adequately humid, with only a small degree of cloud cover. Summer temperatures decrease progressively to the north, and variation in temperature is slight throughout the region. The frost-free period ranges from about 120 days in the north to 180 days in the south. The highest temperatures are recorded in the lower Volga area. Summer is the rainy season. Most stations receive from 25 to 75 millimeters (1 to 3 inches) of precipitation per month in the summer, except in the lower Volga area where summer monthly precipitation ranges from less than 25 to 50 millimeters (1 to 2 inches). Thunderstorm

activity is high, as generally from 10 to 20 thunderstorms occur in the warm season, the number increasing to the east. Strong gusty winds accompany thunderstorms; otherwise summer winds are generally light and from the west. The mean monthly relative humidity decreases to the south and ranges between 60 and 80 percent.

Spring and autumn are short, transitional seasons with considerable climatic instability. The most pronounced feature of these transitional seasons is an abrupt thermal upswing in the spring and a somewhat more gradual downswing in the fall. Spring generally includes the month of May and part of April, but the dates vary from year to year. In some years, spring is sunny and warm, much like summer; in other years, the season is cold, rainy, and overcast. Autumn generally includes the month of September and part of October. Characteristic features of the season are increased cyclonic activity, decreasing temperatures, and a shifting of the prevailing winds from westerly to southwesterly.

IX. Regional Recapitulation

The covariation of raw materials, the Volga River, and the favorable location is the dynamic factor underlying the development of economic cohesiveness within the Volga-Urals Region. Although the exploitation of petroleum is a relatively recent activity, it may well become a dominant unifying factor since the region is now the leading Soviet oil-producing area.

In the past the transportation arteries provided by the Volga River and its tributaries have attracted a great variety of goods, people, and industries, which have been instrumental in laying the foundation for the present economic structure.

The Volga system has also provided power resources for industry, and the proposed development of its power potential into an integrated net is designed to bolster the now lagging power supply and to create a surplus for new industries and for transmission to deficit regions. The net will link eight power dams and an almost continuous chain of reservoirs from Stalingrad to beyond Ivan'kovo on the upper course of the Volga with a series of three large dams on the Kama.

A relatively uniform settlement distribution pattern is punctuated by a number of sizable urban centers such as Gor'kiy, Kazan', Stalingrad, and Kuybyshev which form the nuclei for an industrial population of substantial size.

An inland location, less vulnerable to enemy invasion than other areas, has brought defense industries to the region. The value of such location was demonstrated on a large scale during World War II, when numerous plants were moved to this region.

The position of the region astride major routes connecting other important industrial regions has given it a well-developed railroad net which not only unites its parts but also connects it with other regions.

Although agriculture is of importance to the region, it is a region of extensive cultivation adapted to mechanization. Since natural conditions do not favor further expansion or intensification of agriculture, it does not compete with industry for the labor supply. The population has been moving from rural areas to urban centers. The movement of population has been gradual with little disruption to the developing regional economy.

APPENDIX A

GAPS IN INTELLIGENCE

Although much textual information is available on the Volga-Ural Region, much of it is out of date and lacking in statistical data. Specific phases of the study on which current statistical data are meager include mineral resources, population, agriculture, industry, and power. The scarcity of recent statistical data occasionally made the assessment of the relative importance of these subjects difficult.

Information on the flow of goods both within the region and to neighboring areas is almost nonexistent. This deficiency made it difficult to determine the interrelationship of industrial areas and areas producing raw materials. Information on the roads of the region is also insufficient.

Scant data are available on the changes that will occur in the regime of the Volga River system as a result of the construction of the large hydroelectric power stations. Detailed information on land utilization is also limited.

Because of the expanding economy of the region, additional information is being received almost daily. All information available up to December 1956 has been incorporated into the report.

APPENDIX B

SOURCE REFERENCES

An adequate amount of descriptive information on the region is available, both in Russian and in English. Material for the report was taken about equally from classified and unclassified sources. Information in general was derived from Soviet scientific texts, Soviet maps and atlases, intelligence reports, [redacted] 25X1C intelligence studies, and miscellaneous American and Soviet publications, such as magazines and newspapers.

On the whole, the source materials used can be considered accurate as of the date of publication. Soviet scientific and academic works are generally reliable and free of bias. In Soviet publications for popular consumption and radio and press releases, however, facts are often intermingled with plans, exaggerations, and propaganda, and disproportionate emphasis is given to minor achievements.

The bibliography is selective and does not include all the items used as background material, among them some general articles in Soviet and U.S. newspapers and periodicals, FBIS reports, FDD summaries, and Treasure Island translations.

Evaluations following the classification entry have the following significance:

Source of Information	Information
A - Completely reliable	1 - Confirmed by other sources
B - Usually reliable	2 - Probably true
C - Fairly reliable	3 - Possibly true
D - Not usually reliable	4 - Doubtful
E - Not reliable	5 - Probably false
F - Cannot be judged	6 - Cannot be judged

Evaluations not otherwise designated are those appearing on the cited document; those designated "RR" are by the authors of this report. No "RR" evaluation is given when the author agrees with the evaluation of the cited document.

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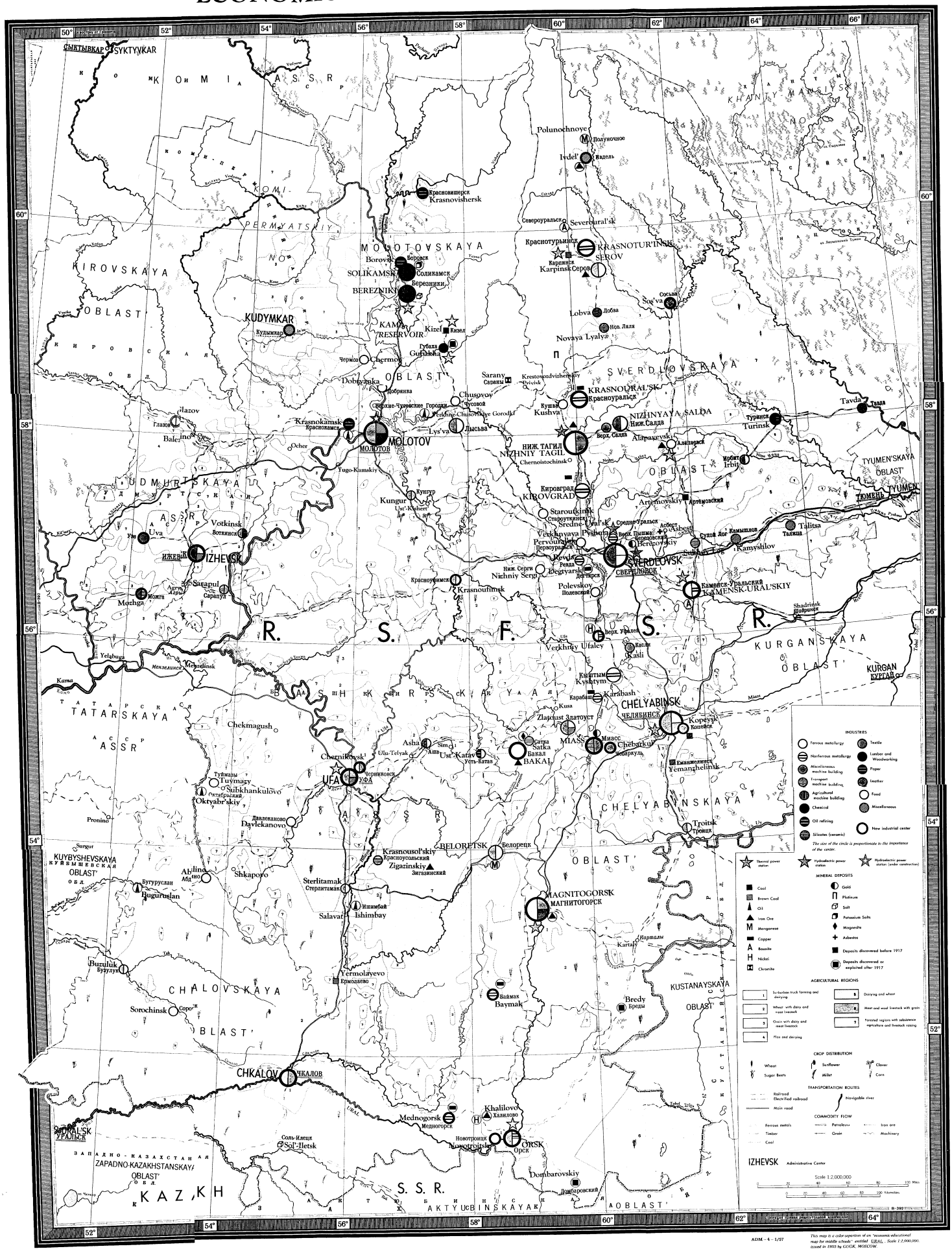
ECONOMIC MAP OF THE URAL REGION



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This map is a color separation of an "economic educational map for middle schools" entitled URAL, Scale 1:2,000,000, issued in 1955 by GUGK, MOSCOW.

ECONOMIC MAP OF THE VOLGA REGION

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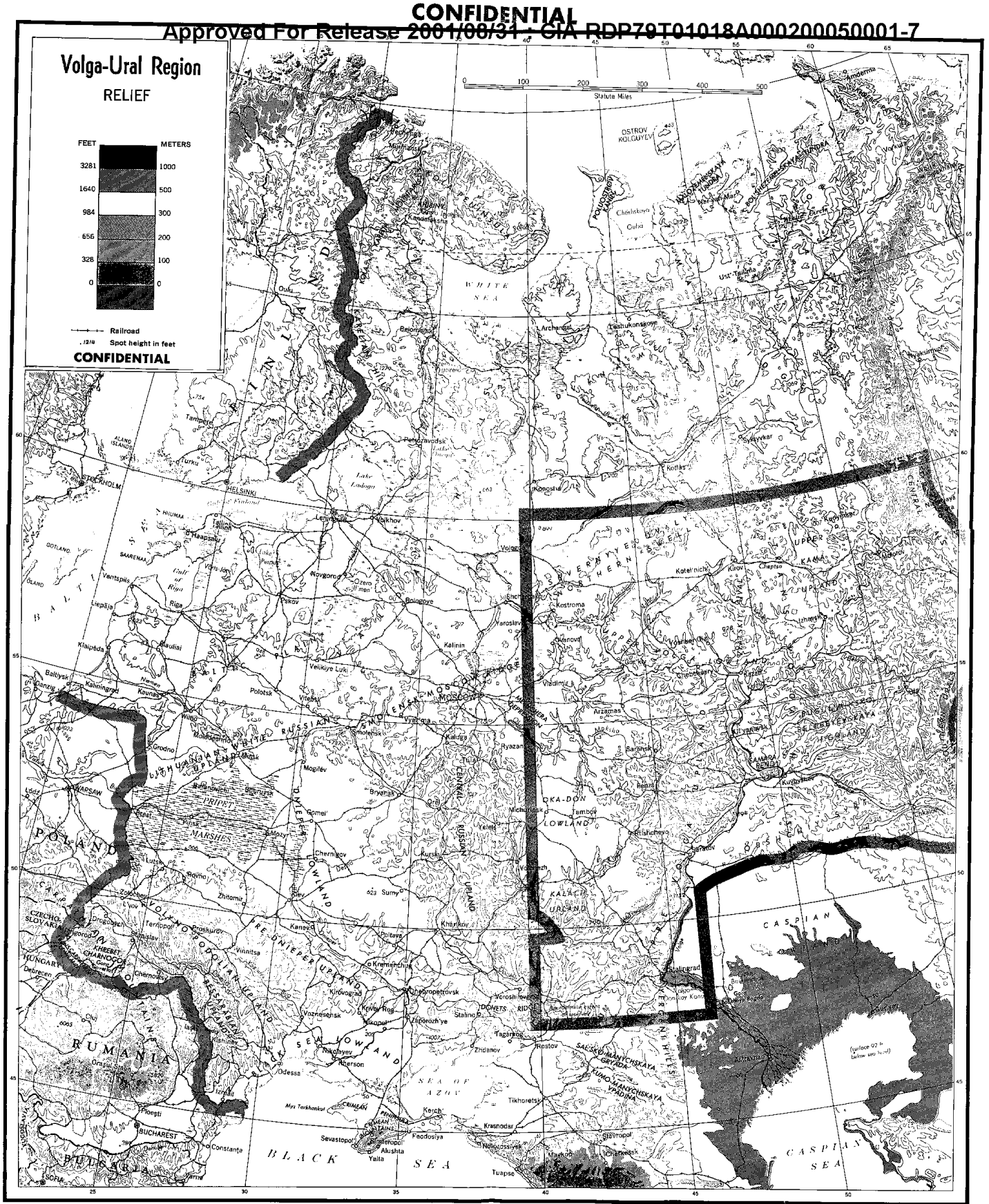

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