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GEOGRAPHIC INTELLIGENCE REPORT

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GEOGRAPHY OF THE STALINGRAD-URDA SECTION OF THE VOLGA-CASPIAN LOWLAND

CIA/RR–G–2

1 November 1952

CENTRAL INTELLIGENCE AGENCY

OFFICE OF RESEARCH AND REPORTS

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Office of Research and Reports

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GEOGRAPHY OF THE STALINGRAD-URDA SECTION OF THE VOLGA-CASPIAN LOWLAND

Summary

The Stalingrad-Urda section of the Caspian Lowland varies greatly in both physical and cultural characteristics. Most of the area lies within the semidesert and desert regions that stretch southward from the grassland belt of European Russia on the north to the Caspian Sea on the south, and eastward from the Volga River to central Asia. Along the western margin of the area are the hills and east-facing escarpment of the Volga Heights (Privolzhskaya Vozvyshennost') and farther south the Yergeni Hills. At the foot of the Volga escarpment in the northwest and extending onto the Caspian Lowland eastward and southeastward from Stalingrad is the fertile oasis-like floodland of the Volga and Volga-Akhtuba valleys, most of which is below sea level. The remainder of the study area includes two sections of the arid, nearly flat Caspian Lowland Plain, separated by the Volga-Akhtuba Floodplain. The smaller section, which is a part of the Kalmyk Steppe, is surrounded on three sides by the Yergeni Hills and the Volga-Akhtuba Floodplain. The second section is much larger, including the vast expanse of desert and steppe east of the Volga and northeast of the floodplain.

Sociologic and economic characteristics of the study area are closely related to local physical conditions. The hub of industrial, political, and transportation activity is at Stalingrad, the only

large industrial concentration within the study area. Population density in the vicinity of Stalingrad is comparable to that in other industrial centers of European USSR. Here Russians represent the main element in the population. On the plains to the east, where Kazakhs are the dominant ethnic group, the population density drops sharply to five or less persons per square mile. Almost all of the larger settlements are located along the banks of the Volga or Akhtuba rivers. Villages are smallest and farthest apart in the driest, the sandiest, or otherwise least productive sections of the Caspian Lowland. From the standpoint of health, the area is one of the most favorable in the USSR. Malaria, the only endemic disease with a high morbidity, is limited to a large extent to the floodplain areas.

A number of forced-labor camps are located within the area, chiefly near Stalingrad. Although practically all of them were originally prisoner-of-war enclosures, many now house civilian prisoners. The majority of the prisoners are employed in construction and maintenance work, but large numbers are also employed in the industrial plants of the Stalingrad vicinity.

The principal economic activities of the area are (a) agriculture, (b) the heavy and light manufacturing of the Stalingrad center, (c) the processing of agricultural produce, (d) the extraction of salt from lakes Baskunchak and El'ton, and (e) the shipping along the Volga and water-rail transshipping at Stalingrad.

The Stalingrad complex, which stretches along the Volga River for 30 miles, is of national importance industrially. As a transportation and transshipping center, it is a focal point for routes to and from the southern Urals, the Donets Basin, the Caucasus, the Caspian Sea area, and the central part of the European USSR. Industrial raw materials are brought in by rail from the west, timber is floated down the Volga from the north, and petroleum is carried by barge from Baku, Makhachkala, and other places. Fish, salt, and agricultural products arrive at Stalingrad from various directions either for consumption, processing, or reshipment.

In salt production, the Lake Baskunchak area alone supplies one-fourth of the USSR total. Other extractive industries are of only local importance. Forestry within the area is insignificant, even in the hilly areas along the western margin.

In the rural economy, animal husbandry is of greatest significance. Much of the plains area is given over to migratory grazing of sheep, cattle, horses, and some camels. Grains are grown wherever possible, mainly on the plains adjacent to the Volga-Akhtuba Floodplain and in small water-retaining depressions farther out on the plains. In the Stalingrad section of the Volga-Akhtuba floodlands, market gardening is important.

Several far-reaching Soviet plans for the development of the agriculture, industry, and transportation of the study area have been adopted. For the improvement of agriculture, shelter belts are

being planted and irrigation is being extended through the construction of a series of canals. The construction of a dam near the northern end of Stalingrad will provide both hydroelectric power for domestic and industrial use and water to irrigate a considerable area on the Caspian Lowland. A canal connecting the Volga and Don rivers has been opened recently.

The transportation network within the study area focuses on Stalingrad. Located on the heavily traveled Volga River, and connected by rail to the Moscow, Ural, and Donets regions and the Black and Caspian seas, Stalingrad has become a major freight transshipment point. In the eastern part of the study area there is only one railroad, the Saratov-Astrakhan' line, crossing from north to south. Roads from all directions converge at Stalingrad and connect it with all of the industrially important parts of the USSR. Aside from the few major highways, however, the roads have unimproved dirt surfaces and many of them are little more than paths or caravan trails. During World War II, a large number of hastily constructed airfields were in operation within the study area. Currently only five airports in the Stalingrad vicinity are in active use.

I. Regional Physical Characteristics (1, 4-10)*

A. General Features

The Stalingrad-Urda section of the Volga-Caspian Lowland includes an area of about 20,000 square miles and extends from 44°15'E to 48°E and from 47°35'N to 49°20'N (see map CIA 11995). The extent of the area under study was arbitrarily defined and consequently is not a unit administratively, physically, or culturally. Administratively it includes parts of three oblasts -- the Stalingrad and Astrakhan' Oblasts of the RSFSR and the West Kazakhstan Oblast of the Kazakh SSR.** The Volga River cuts across the western part of the area, flowing from the northeast to the southwest. At Stalingrad it makes a sharp turn eastward, dividing the Caspian Lowland into a large northern section and a smaller southwestern section, which is actually a northward extension of the Kalmyk Steppe. From Stalingrad eastward, the Volga is roughly paralleled by the Akhtuba River and the floodplains of the two rivers merge, forming a single broad floodplain. South from the river bend at Stalingrad, an abandoned river-bed depression continues in a north-south direction and is occupied by a series of long, narrow lakes, collectively known as the Sarpinsk Lakes. West of the Volga and Sarpinsk Lakes is the Hilly Western Fringe of the study area, which is highest and steepest in the north.

* Numbers in parentheses refer to correspondingly numbered sources in Appendix F-1.

** See Appendix A for more detailed administrative information.

B. The Hilly Western Fringe

The western margin of the study area includes two groups of low mountains and hills, the Volga Heights and the Yergeni Hills, which are separated by a narrow trough just south of Stalingrad. The hills, which decrease slightly in altitude from north to south, are characterized by parallel ridges oriented in northwest-southeast direction and separated by stream valleys. The eastern edge of the hill region is marked by bluffs, which in the north overlook the Volga River and in the south overlook the Sarpinsk Lakes and the Kalmyk Steppe.

In the northern section, which is known as the Volga Heights (Privolzhskaya Vozvyshennost'), the east-facing bluffs rise to a height of about 150 feet above the river. Although the bluffs are nearly continuous, they are interrupted in places by ravines and gullies with steep sides (Figure 1). The souther hill group, the Yergeni Hills, is less dissected and the bluffs are less pronounced. West of the bluffs of the northern section the interfluve areas rise to elevations of 400 to 500 feet within a distance of about 4 miles. The crests of the interfluves are about one-third of a mile in width and in some places are steeply rolling. Their slopes descent abruptly into narrow, deep-cut valleys and are deeply cut by many-branched gullies.

Rivers and streams flowing from the hills to the Volga are relatively small and are spaced about 5 miles apart. Most of the

rivers are 10 to 15 miles long, although the largest measures about 30 miles. The rivers are characterized by steep gradients and very active erosion. Some of the shorter streams, especially in the south, flow only during spring thaws and rainy periods. Most of these descend to the adjacent dry plain and disappear into the parched earth or evaporate. Throughout the hills, streams are dammed to retain some of the spring overflow for agricultural use. The divide between the Volga and Don drainage systems is situated only 8 or 12 miles to the west of the Volga.

Vegetation cover on the Volga Heights and Yergeni Hills is notably sparse. Trees are found only in valleys and ravines or where they have been planted, either as part of shelter belts or in groves. A large proportion of the area is covered with natural grass and bush, including steppe fescue, feather grass, and white wormwood. The area is used primarily for cattle and sheep grazing, but hay and grains are produced along the valley sides and on some of the interfluve crests. Many valley bottoms are intensively cultivated, especially in the vicinity of Stalingrad. Soils in the Hilly Western Fringe area are typically deep loamy chestnuts, black earths, and clays, all of which are fertile. Agriculture is limited primarily by the availability of adequate water supply.

The large, elongated urban area of Stalingrad is situated at the southern end of the Volga Heights, and extends to the indistinct narrow trough that separates these hills from the Yergeni Hills to

the south. The city itself lies on hilly ground cut by many ravines, which make city planning for postwar reconstruction difficult. Villages in the western hills are fairly large and are concentrated along stream valleys where water supply, mainly from ponds and artesian wells, is adequate except in drought years.

Vehicular traffic in the western hills is highly channelized, due mainly to the presence of deep ravines and gullies that are difficult to cross. Movement on foot is also limited by the character of the terrain.

C. The Volga Valley and Volga-Akhtuba Floodplain

1. Terrain

North of Stalingrad, the Volga flows in a south-southwest direction through a floodplain valley not more than 5 miles in width. In this section the valley is characteristically asymmetric. The river, itself, hugs the western edge of the valley and at times even undercuts the bluffs that rise to heights of 150 feet. The main channel, which is locally constricted by large sandy islands, varies from 1/3 to 1-1/2 miles in width. East of the main stream, a strip of land 1 to 5 miles wide is almost completely inundated annually. This area is divided into many small and inaccessible sections by the numerous secondary and seasonal channels of the Volga and by shallow reedy lakes, backwaters, and abandoned river beds. The floodplain immediately adjacent to the river is alternately sandy and marshy and is partly forest-covered. The only

noticeable elevations are the natural levees along the edges of the larger channels, which in places form steep banks. Elsewhere changes in elevation are gradual and few heights exceed 30 feet.

Eastward from the Volga channel, elevations increase slightly and land utilization becomes more intensive. Much of the eastern part of the floodland is cultivated, with lower areas used for grazing when they are not under water. Just east of the normal flood level, a string of small and medium-sized agricultural villages (up to 500 persons) marks the edge of the valley and the beginning of the dry steppe.

At the northern end of Stalingrad the small Akhtuba River diverges from the Volga and flows eastward. The Volga itself continues southward for another 20 miles to the vicinity of Krasnoarmeysk, where it also veers eastward. Between the two rivers is a joint-floodplain that stretches eastward across the semidesert area in a belt over 20 miles wide. Some 60 miles east of Stalingrad the rivers turn gradually to the southeast, and the floodplain narrows to about 10 or 12 miles.

Between the small, seldom-navigable Akhtuba River and the wide, heavily traveled Volga, the terrain is characterized by an interlacing pattern of channels, lakes, backwaters, cut-off meanders, islands, sandbars and dunes, clay banks, irregularly shaped wooded patches, and vast areas of marsh, reed, and meadow. The area in general has a more varied relief than the narrow Volga

Valley north of Stalingrad. Similarly, floodplain features are also greater in number and finer in detail on the broad valley bottom within 20 miles of Stalingrad than they are farther southeast, where the valley narrows.

The Volga River flows through the floodplain in a channel 1/4 to 1-1/2 miles wide. For long stretches, it lies adjacent to the northern margin of the Kalmyk Steppe; in other places the river changes its course abruptly, leaving considerably areas of floodplain between the river and the steppe. South of Vladimirovka the Volga has several large secondary channels up to 1/2 mile wide that flow during all seasons.

Most of the elevated areas on the floodplain are sand dunes, remnants of natural levees, protective earthen dikes, or eroded clay banks, which stretch in narrow bands parallel to the major streams and their secondary channels. Elevations are most pronounced along the Volga River side of the valley. Ridges are usually wooded and, because they lie slightly above normal flood level, they are the sites of the few small villages of the floodplain area. In the flatter middle section of the floodplain and in the narrower stretch farther east, the land above normal flood level is limited to a few small, scattered strips. Woods and villages are correspondingly few. Most of the shallow branch channels and elongated lakes in the floodplain are bordered by sand and grass, or are reed-covered marsh or meadow. In many places the channels have been clogged by silt or vegetation, and the water has become stagnant.

Along both flanks, the limits of the Volga-Akhtuba Floodplain are marked by stretches of steep banks. The right bank, along the Volga itself, is over 80 feet high in the vicinities of Svetlyy Yar and Raygorod but decreases to 70 feet near Solenoye Zaymishche and to 40-50 feet at the southern end of the study area. This high right bank, however, is interrupted in many places, and between Staritsa and Zubovka the break is about 9 miles long. During floods the river frequently undercuts its banks, causing crumbling and the formation of mounds or shoals at the base of the slopes. The left bank of the floodplain is much lower than the right, but bluffs or sharp slopes 15 to 18 feet high are not uncommon. Deep, steep-walled gullies that cut far back into the steppe zone are typical of the western part of the left bank. Except for the rocky bank at Kamennyy Yar, the bluffs along both sides of the valley are composed of clay.

2. Hydrography

The outstanding feature of the hydrography in the Volga-Akhtuba Floodplain is its seasonality.* During the height of the spring flood season the region becomes a huge lake with isolated hills protruding a few feet above the water level, late

* Because of the continuous changes in the Volga-Akhtuba Floodplain, any given statistics represent the situation only for a specific place and date. The width, depth, and location of channels, the shape and location of islands, and the amount of area inundated vary not only from year to year but also from season to season. Maps and photographs of the area must be judged accordingly.

in the summer the streams are slow and sluggish and much of the land is dry enough to be cropped or mown for hay, and in winter all the rivers and marshes are solidly frozen. Small, flash floods occasionally interrupt the normally dry summer and fall seasons.

Nearly all of the water flowing through the Volga Valley comes from the more humid regions far to the north. The only perennial tributaries of the Volga within the study area are a few that flow from the Volga Heights. Elsewhere, the adjacent steppes are cut by numerous gullies that carry water only during the spring thaw and after showers. The flow of the Volga varies greatly from year to year, the volume being determined by the amount of snow cover, the rapidity of thaw, and the rainfall in the northern source regions. At Stalingrad the volume of water carried during the year with the greatest recorded flow was one and one-half times that of an average year and two and one-third times that of the lowest year. Seasonal flow of the Volga is also highly variable, but generally the volume carried in April, May, June, and July amounts to 50 to 65 percent of the annual total.

The spring flood normally begins in late May or early June and lasts from 4 to 6 weeks or more. Waters are highest in the second half of June, when over 90 percent of the dual-valley region is under water. Some years the water level rises as much as 3 feet per day in the area just north of Stalingrad. The average rise in water level at Stalingrad, measured from the beginning of flood to the

peak, is about 27 feet, but during exceptional floods the rise may exceed 40 feet. Along the northern section of the Volga, where the valley is most constricted, the rise in water level is greatest. In the Volga-Akhtuba section, where the water is divided among many channels, the rise is considerably less, but areas up to 30 feet above the normal winter level of the river are flooded.

Widespread changes annually follow the spring floods. Each year, new channels are formed and old ones are blocked with mud and sand. Similarly, new levees and shoals are built up and old ones are eroded away. Redredging of the Volga channel is a big job, which must be continued throughout the navigation period. By mid-summer, most sections of the Volga are restricted to a single channel with an average width of 1/2 mile. The channel southeast of Stalingrad is usually dredged to a depth of only 7 feet. To the north the water is somewhat deeper. In both sections, however, there are many places with depths up to 40 feet or more. In contrast to the navigable Volga, the Akhtuba River, at the point where it diverges from the Volga, may dry up completely during periods of extremely low water. At such times the lower Akhtuba is fed by a net of shallow channels between it and the Volga. The period of lowest water level for the area as a whole is early September to mid-October.

During summer and fall sudden storms cause minor floods of short duration. Usually there are one to three and sometimes as

many as a half dozen minor floods each year. At Stalingrad they raise the water level an average of about 6 feet, but some of the summer storms are not heavy enough to fill completely the shallow channels that parallel the main channels. Late floods cause considerable damage because of their unexpectedness and because they occur when hay has been stacked in the fields, grains are almost ripe, and lumber and other supplies and equipment are stacked along the river banks.

The average date for formation of ice at Stalingrad is 21 November. Solid ice covers the main channel and its branches by December and lasts through March. The Volga normally remains frozen for about 110 days. Although the average date of clearing is 20 April, navigation usually begins by 7 April.

3. Trafficability, Vegetation, and Soils

Trafficability in the Volga-Akhtuba Floodplain is essentially dependent on the seasonal conditions of vegetation and soils, which in turn are closely related to the hydrography of the area. Ease of movement and availability of cover vary inversely from spring to winter. When the surface of the lowland is solidly frozen, movement on foot is unrestricted, but cover is sparse. During the spring and early summer, travel by foot is practically impossible, and even with the aid of a small boat it is very difficult to cross the area. Middle and late summer offer the best combination of trafficability and cover. In this period the valley

is a labyrinth of thickly covered green islands. Movement is still difficult, however, due to sticky, mucky soils and the complicated water network.

During and after the recession of the flood waters, the streams are heavily burdened with karsh, the local name for the combination of trees and other heavy growth that has been washed out by the high waters and carried along by the rivers. After the floods, trails and roads across the lowland must be restored or relocated, and, in years of unusually high flood, port and landing facilities must be repaired and protective earth embankments rebuilt.

As the floods recede from the moisture-saturated meadows in early summer, the lush vegetation that follows includes many varieties of grasses, ranging from short fine-textured Kentucky bluegrass to tall coarse reeds. Sedge grasses are the dominant vegetation of the meadow marshes, along with flowering rush, fescue, couch grass, yellow lucerne, water plantain, arrowhead, and quackgrass. On the slightly higher areas that are inundated for the shortest period, grasses usually are of higher quality; these are the areas most often used for crops and hay mowing. Areas of medium flood duration are predominantly covered with couch grass and weeds such as brome grass. The rootstalks frequently form hummocks that are filled with stagnant water and covered with water hemlock, swamp fern, and field flowers. These small mounds, which interrupt the surface of the meadow land, are

not fit for mowing. The hummocks are a common feature, particularly in the central and eastern parts of the Volga-Akhtuba lowland. The lowest areas in the floodplain retain swamp vegetation throughout the summer, and many of the small reed-covered lake areas are impassable at all times. Tall reeds and rushes, which in some places attain heights of 10 to 20 feet, also border the winding channels that separate the many partially wooded islands. The larger rivers are bordered by long stretches of meadow covered with quackgrass or by sandy mounds that support rush-like beach grass and wild rye.

Most of the wooded areas in the Volga-Akhtuba Floodplain are discontinuous arc-shaped strips and patches of dense, leafy, deciduous thickets. The predominant trees are white willow and black poplar, which are intermixed with several varieties of elm and oak and some mulberry and tamarisk. Strips of woodland that are generally less than 1,000 feet wide, follow many of the natural levees, which are higher and drier than surrounding areas. Many other slightly elevated patches, small islands, and inaccessible areas are also wooded, but nowhere do the woods exceed 3 miles in width. In the larger wooded areas, trees usually grow to a height of somewhat over 20 feet. Most of the wooded patches are bordered by narrow zones of dwarfed trees and a dense tangle of undergrowth. The hops, bindweed, and ivy that entwine themselves around the shrubs and trees after the spring flood contribute to the formation of a barrier that is difficult to penetrate. Scattered individual trees and isolated clumps are not uncommon in the floodplain.

The predominant soils in the Volga-Akhtuba Floodplain are sand, silty clay, muddy recent alluvium, and meadow bog. Sand is most prevalent along the river banks and on islands along the channels. In the south there are several areas of dunes, some of which are partly stabilized by a growth of willows. Almost everywhere the ground is extremely wet during the March thaws and after the floods that follow. Although the sandy areas drain most rapidly and soon become trafficable on foot, they are difficult to traverse in vehicles except when frozen.

Movement for more than a couple of miles in the Volga-Akhtuba Floodplain requires the crossing of water bodies. Most of the roads and paths in the area have fords across the minor rivers. Although the majority of the rivers are shallow, many are too deep for motor vehicles to ford. According to available maps the depths of fords range from 1/2 foot to 4-1/2 feet at normal water level, most of them being a little over a foot in depth.

D. The Caspian Lowland

1. Terrain Features

a. General Characteristics

The Caspian Lowland forms a seemingly endless expanse of salty, almost lifeless semidesert, which is nearly devoid of outstanding relief features. Elevations generally range from about sea level to 90 feet, with only a few isolated higher spots. South and west of the Volga-Akhtuba Floodplain, altitudes

of over 35 feet are rare. To the north and east the highest zones are (a) the inconspicuous divide paralleling the southern section of the floodplain at a distance of 11 to 15 miles, (b) the sandy plain to the north and west of Lake Baskunchak, and (c) a low ridge south of Lake El'ton. None of these zones are more than 50 feet higher than the general surface of the plain, and their rise is almost imperceptible. In the entire Caspian Lowland area, only three hills stand out conspicuously above the surrounding land -- Bol'shoye Bogdo Mountain (499 feet) along the steep southwest shore of Lake Baskunchak, Maloye Bogdo Mountain (112 feet) about 30 miles to the northeast of Bol'shoye Bogdo, and Ulagan Mountain (219 feet) just northeast of El'ton.

Over most of the Caspian Lowland the monotonous landscape is broken only by the countless minor depressions of various sizes and shapes that collect and retain moisture and seasonally support vigorous vegetational growth. In the early summer these "dips" stand out in sharp contrast to the surrounding dry clay surface that is commonly cracked by the summer heat.

The lowest parts of the plain are marked by large salt lakes or salt-mud marshes. East of the Volga River the most important depressions contain Lakes Baskunchak, El'ton, and Batkul', and the huge, impassable Shor Khaki salt-mud flat. At the foot of the Yergeni Hills in the west are the Sarpinsk Lakes. All of these depressions except Lake Batkul' are below sea level.

Surface streams are found only along the Volga Valley and in the immediate vicinity of the largest depressions, but in most cases even these rivers are dry for long periods each year. Along the edges of the Volga-Akhtuba Floodplain the intermittent streams have formed deep gullies that extend far back into the plains. A gully near Leninsk, for example, has eaten its way 26 miles back into the plain.

The Sandy Naryn, which covers an area of over 850 square miles along the east side of the Shor Khaki on the eastern edge of the study area, is a unique physical feature of the area.

b. Minor Depressions

The characteristic depressions or "dips" that dot the surface of the lowland and play a critical part in the utilization of the area vary greatly in size, shape, and surface conditions, but most of them are less than 12 feet in depth and have such gradual slopes that they are barely perceptible to the eye. The smallest depressions are only a few inches below the level of the surrounding ground and several square yards in extent; larger depressions cover many thousands of acres and often have swampy spots near their centers. According to their size, the depressions are given the local names padiny, plavni, lopatiny, rostoshy, zapadiny, and limany. Limany are the largest and the most important since they not only provide patches of agricultural land but also are sources of drinking water and areas of possible

settlement. Most of the limany cover areas of over 500 acres and at their centers they are 5 to 7 or more feet below the surrounding plain. The limany are most prominent (a) in the northwest part of the plain, (b) in the area adjacent to the southwest bank of the Volga-Akhtuba Floodplain, and (c) in the area north and west of Lake Batkul'. In some places the depressions are linked together in chain-like groups; other depressions are completely isolated. The majority are elongated in shape, but some are round or irregular in outline.

Following the spring rains and thaw, water flows toward the center of the depressions. Where the ground is sufficiently permeable, the seeping waters leach the surface soils of their salts and then accumulate underground, forming a high water table. Where hardpan underlies the center of a liman, water collects at the surface and forms a temporary lake or swamp. In the spring and early summer the washed slopes of the limany are covered with non-saline grasses. With the intense summer heat, the highly mineralized ground waters are drawn to the surface and evaporated, and salt gradually accumulates. Although the vast majority of the temporary lakes dry up rapidly, sufficient moisture is generally left in the ground to support some vegetation until middle or late summer.

c. Salt Lakes

Of the four large salt lakes of the study area, Lake Baskunchak is the best known and economically the most

important. It supplies about one-fourth of all salt production of the USSR. The lake covers an area of 41 square miles in the southeastern part of the study area. It is 12 miles long from north to south and 6 miles wide. The basin lies considerably below the level of the surrounding steppe, with the lake surface about 66 feet below sea level. The descent to the lake is steepest on the southwest, where the drop from the adjacent sand plain is about 150 feet. The western and southwestern banks are deeply cut by gullies and ravines. Along the eastern side of the lake the more gradual rise is interspersed with marsh areas. The edge of the lake bed itself is marked by a 6 foot bank, at the base of which is a narrow strip of muddy clay. During the spring and autumn the brine may completely cover the muddy clay. During the summer the water evaporates almost completely, leaving only a small patch of lake about 4 inches deep in the southwestern corner of the basin. Most of the lake bed then becomes a snow-white plain covered by a hard crusty salt surface. The slopes that surround the lake consist of layers of gypsum and other readily soluble minerals. Minor cave-ins are common and sink holes of various sizes and depths pockmark the entire circumference of the lake, being especially numerous in the north. In the higher western area there are many long and spacious caves. Mt. Bol'shoye Bogdo at the southwestern corner of the lake is also noted for its caves and for the weird, deep nitches and protrusions that have been carved

on the steep, denuded eastern and southern slopes of the mountain by sand-bearing winds. The top of this small isolated mountain stands 564 feet above the level of the lake.

Lake El'ton is the largest salt lake in the Soviet Union. It covers an area of 59 square miles and is 13 miles long from east to west and 9 miles wide. The lake is located in the northern part of the study area, just west of the Saratov-Astrakhan' Railroad. Like Lake Baskunchak, this lake is exploited for salt, although to a much lesser degree. Valuable deposits of gypsum are also found in the vicinity. The structure of the lake is somewhat similar to that of Lake Baskunchak. It is about 83 feet below the level of the surrounding plain, and its surface is about 50 feet below sea level. The banks along the western and northeastern shores are fairly steep and are deeply gullied. The northwestern and southeastern sections merge more gradually into the plains and contain most of the small salt streams that flow into the lake. A zone of deep, black, salty mud about 1/4 mile wide surrounds the lake. In the northwest and southeast, where this belt is widest, there are swamps and marshes. The outer edge of this zone is drier and crusty. In addition to the 8 streams that flow into the lake, it is also fed by several powerful springs. In the springtime the inflow from all of the water sources increases the depth of the lake to a little over 3 feet. Fairly dependable sources of fresh water are found in three areas near Lake El'ton -- (a) in the small ravines along the

southeastern shore, (b) along the northeastern shore and at the pond near the El'ton Railroad station, and (c) at a liman area about 2-1/2 miles northwest of the lake. The area surrounding the lake basin is made up primarily of sandy clays. White chalk, marl, and limestones are also present, especially in the vicinity of Ulagan Mountain, which lies just east of the lake, and around the numerous small hills east and west of the lake.

Twenty miles south of Lake El'ton, straddling the Stalingrad Oblast-Kazakh SSR boundary, is Lake Batkul'. The level of this oddly shaped lake is subject to such fluctuation that estimates of its area range from 15 to 25 square miles. The shoreline is characterized by peninsulas, isthmuses and small elongated islands, and a muddy beach, which in many places is covered with a thin salty crust. The bottom of the lake itself is mud-clay and does not have layers of salt. Particularly along the northern and southern shores, there are disconnected high banks cut by gullies and ravines that extend 2 or more miles back into the plain. The banks reach a height of 13 feet in the north and more than 20 feet in the south. Estuary-like streams up to 8 miles long enter the lake from the northwest and south. The Solenaya River in the west flows through an area of almost completely bare saline soils. A notable feature of Lake Batkul' is the strong odor of hydrogen sulphide given off by the highly mineralized waters.

The elongated string of lakes and marshes of the Sarpinsk system parallels the foot of the Yergeni Hills south of Stalingrad. They are remnant lakes that follow the north-south valley of a former river. Most of the lakes contain fresh water in the springtime, but become somewhat saline by mid-summer. Those in the north, closest to the Volga River, are the largest and deepest. They are of low salinity and are exploited for their large fish reserves. The northernmost and longest lake is about 15 miles long and 1-1/4 miles wide. Several of the southern lakes are completely overgrown with reeds and marsh vegetation. On the east the Sarpinsk Lakes are bordered by dark-colored highly saline soils. The narrow western zone, between the lakes and the Yergeni Hills, is somewhat more productive. This zone is crossed by the large number of streams that flow from the Yergeni Hills and feed the Sarpinsk Lakes.

There are several other large depressions on the Caspian Lowland in which there are salt lakes in various stages of formation or disintegration. Lakes that are currently little more than seasonal marshes with boggy soils are found in the following four locations: (a) the area now called Bol'shoy Liman, about 9 miles northeast of Srednyaya Akhtuba, (b) the Khak-Bersh-Aral at the northeastern tip of the study area, (c) the area of scattered sands between Lake Baskunchak and Azgir settlement in the southeastern corner of the study area, and (d) the Great and Small Karakul' area

along the boundary of the Kazakh SSR and 20 miles northeast of Vladimirovka. In the last area, several concentric benches indicate conspicuously the locations of beaches formed during periods in the past when the lake was much larger. The area now covered by marshy terrain in these lakes varies from 12 to 60 square miles.

d. Salt-Mud Flats

The arc-shaped Shor Khaki (salt-mud flat) lies in the eastern section of the study area. It covers an immense area stretching for 60 miles from northwest to southeast. The average width of the flats is 6 to 9 miles. This vast area occupies the largest depression in the study area. It is nearly devoid of animal and vegetable life. The layers of soft saline silts that cover the bottom are periodically covered with a thin layer of dense brine. In the summer, small pools of stagnant water remain in the depression, and a number of small saline streams flow into them through the mud. The surface of the Shor Khaki is generally smooth, but especially near the outside edges the flat contains a number of mud hillocks capped by clumps of salt-tolerating vegetation. Between the hillocks the surface is normally completely devoid of vegetation. The drier margins are covered with a silver-white crust of salt, under which there is a considerable depth of black salt mud.

A number of coves and ravines open into the Shor Khaki at the northern end. The banks of the slow-flowing rivers in this area are lined with reed and other tangled vegetation. The main supply of moisture comes from the north. In most places the ascent from the Shor Khaki to the Caspian Lowland is smooth. There are, however, two clearly distinguished terrace-like ledges on the western slopes within a short distance of the flats. The entire length of the eastern side is bordered by the Sandy Naryn.

e. Sand Areas

Within the study area, sands are concentrated primarily in the south. Except for the distinctive Sandy Naryn region, scattered patches of sands occur (a) in ridge-like formations between Lake Baskunchak and the southern part of the Shor Khaki, (b) in the slightly elevated sand plain to the west and north of Lake Baskunchak, and (c) in dune-like hills 50 to 65 feet high near Chernyy Yar on the right bank of the Volga River. In most of the areas bordering Lake Baskunchak, sand mounds and drifting dunes are the most conspicuous features of the landscape. Interspersed among the sands east of Lake Baskunchak there are numerous large but unexplored sinkhole-like formations that are probably associated with karst conditions.

The Sandy Naryn region is composed primarily of alternating strips of sand dunes and level, sandy steppes with a pronounced northeast-southwest orientation. The two contrasting landscapes

extend for more than 30 miles in winding parallel bands that vary in width from 3 to 6 miles. Because of the relative abundance of fresh groundwater and absence of soil salinity, this region is particularly significant and is far more favorable to human activity than the areas surrounding it.

In the dune strips, most of the individual dunes are 20 to 25 feet in height, but a few reach 50 feet. They are normally flat-topped, with moderately steep slopes. Shallow interdunal hollows of various shapes and strings of hollows occupy 20 to 30 percent of the area within the dune strips. Many of the larger interdunal depressions are covered with thick growths of trees, bushes, and grass, but some have been over-grazed and have become dusty, lifeless basins surrounded by shifting sand.

Along the margins of the dune strips are narrow transitional zones with rolling terrain and low dunes that seldom exceed 12 feet in height. As distance from the dune belt increases, the amount of turf cover and agricultural utilization becomes greater. Much of the transitional area is used for grazing and hay cutting, but garden areas and orchards are numerous. Despite successful but limited afforestation efforts, shifting dunes and dust storms still present a hazard to agriculture and grazing.

The smooth-surfaced steppe zones between the belts of dunes are slightly concave and slope gently southwestward toward the Shor Khaki. The steppe soils are mainly sandy loams, which are

generally covered with a thick sod. There are also patches of clay and meadow soils. The steppe zones are widely used for pasture and meadow. In the springtime temporary scattered ponds 3 to 8 feet deep and up to a square mile in area are formed in both the transition and steppe zones. The waters are fresh during the early part of the summer but later in the season become saline. There are also some permanent ponds of stagnant, saline water.

Along the northeastern and southern flanks of the Sandy Naryn the alternation of sandy and dune strips disappears, but an intermixture of dunes and steppe continues for some distance. On the north the transition to the desert-steppe plains, with their characteristic clay and clayey-loam soils and scattered areas of salt lakes and mud flats, is more abrupt. On the southwest the transition zone is marked by alternating belts of steppe and low sand dunes that parallel the Shor Khaki and lie at nearly right angles to the general orientation of the Sandy Naryn. The combined width of these belts averages about 3 miles. The final descent to the Shor Khaki is slight but abrupt.

2. Vegetation

Although a complex, mottled pattern of soils and vegetation has developed on the Caspian Lowland in response to details of terrain configuration and the relative effectiveness of the moisture supply, most of the area supports only occasional bunches of coarse grass, desert shrubs, and cactus. The most

typical plant throughout the lowland plain is wormwood. This is a hard, many-branched shrub 1 to 3 feet high, which resembles sagebrush in appearance. White wormwood is the most common type. Black wormwood, which grows on the saltier soils, is almost completely absent from the southern sandy areas, particularly the zone northwest of Lake Baskunchak. Wormwood is used locally for fuel and to obtain oil for absinthe.

The liman depressions usually have several concentric rings of varied soil and vegetation. At the liman center, where water remains, dark-colored meadow soils predominate, and the area is covered with thickets of reeds, rushes, and other swamp vegetation. Scattered clumps of salt grass surround the central swamp. In some of the depressions without swampy cores, such vegetation occurs at the center. The gentle slopes of the depression farther out, which still have plenty of soil moisture, support a thick stand of couch grass, steppe fescue, feather grass, and steppe shrubs. These are the areas most widely used for grazing and cultivation. On the drier, slightly higher parts, light-brown and light-chestnut argillaceous soils of various degrees of salinity or freshness predominate, and the typical vegetation is desert semishrubs -- wormwood, saltwort, and camphor bushes -- surrounded by tufts of low grasses.

A notable characteristic of all sand areas within the study area is the relative abundance of fresh ground water and the

capacity of the depressions to support lush vegetation until late summer. In the Sandy Naryn area, even the dunes are believed to be 10-15 percent covered with vegetation. The basic plants here include sagebrush (which grows to 5 feet in height), reed grasses, bunch grass, licorice, and sandwort. The latter reaches 1-1/2 feet in height and bears seeds that are high in nutritive value. The seeds are collected and used in making bread, kasha, and various other foods. In some of the interdunal valleys, woods are fairly dense, consisting mainly of willow, interspersed with species of poplar, oleaster, pine, and, in the lowest areas, cottonwood. Laurel is also widespread. In the transition belts between the Sandy Naryn and the steppe plains, pine, alder, acacia, and poplar have been planted for purposes of afforestation, and orchards are numerous. The thick grasses of the steppe strips within the Sandy Naryn, which are noticeably richer than in any of the surrounding areas, provide great quantities of hay.

The most highly salinized patches on the surface of the Caspian Lowland are completely devoid of vegetation. They have a hard salt crust, known as solonchak. The wormwood shrubs, which impart a grayish-green hue to the landscape, form a slight contrast to the reddish-brown shades of the bare clay areas and the white, snow-like appearance of the solonchak areas. For a brief period in the spring, the entire area becomes alive with blossoms of varied and brilliant colors, but by early August almost all vegetation has

dried up, and by late summer only scattered wormwood bushes and prickly pears have survived.

3. Fauna

Animal wildlife in the steppe-desert zone of the Caspian Lowland is typically small in size but very abundant. Rodents, especially the suslik (an earless marmot that resembles the American woodchuck and prairie dog in appearance), lemming, hamster, and nocturnal jerboa are the most numerous. Small mounds that indicate suslik burrows dot the surface of the plain and form a very characteristic feature of the landscape, especially in the north. Farther to the south the wildlife also includes sand-eels (sand-launce), lizards, a multitude of green night toads, small sand boa constrictors, common mice, and innumerable hares. Throughout the steppe, beasts of prey are common -- notably the Tartar fox, steppe polecats, ermines, weasels, and various kinds of eagles, owls, and hen-herriers. In the winter, wolves invade the southern parts of the area. Crows, larks, and a large variety of other birds are numerous. Many of the birds nest in the walls of wells or under the flat roofs of the native mud huts.

4. Trafficability

Cross-country movement within the Caspian Lowland is generally unrestricted except during the spring thaw and immediately following the infrequent summer showers. In March and early April the nearly bare surface of the lowland becomes muddy and nearly

impassable for several weeks. This is especially characteristic of the area north of the latitude of Lake Baskunchak. At other seasons, obstacles are of only local significance. The sticky plastic clays, salty clays, and silty soils that predominate around the Sarpinsk and other lakes and in the limany and other depressions may remain difficult to traverse for a month or more -- in some cases, until they freeze over in the winter. Most of the salty depressions on the lowland, however, dry out and have a hard crust by mid-summer. In many places the lakes, marshes, and intermittent rivers are shallow enough to be forded without great difficulty. Gullies, however, are numerous, especially along the Volga-Akhtuba Valley. They are generally steep-sided and deep and are a definite obstacle to cross-country traffic. Loose sands are a hazard only locally, chiefly in the southernmost part of the study area.

Unimproved dirt roads extend in all directions across the almost level surface, avoiding marshes and areas of shifting dunes. The roads are commonly rutty and even vehicular traffic is not necessarily confined to them, except after showers. In the semi-desert Caspian Lowland, roads and trails normally converge at wells and other sources of fresh water.

In general, the availability of drinking water for man and animals is the factor that most seriously restricts cross-country movement. The ground-water table is fairly high in much of the area (12-20 feet), but except in the southern sand regions the water

is saline.* In many of the northern areas, especially to the east of the Saratov-Astrakhan' railroad line, no potable groundwater is found at less than 600 feet. Near Lake El'ton the situation is somewhat more favorable. Here, there are some fresh surface waters, and about 255 of the 430 drilled and dug wells (1932) are fresh. Groundwater is also generally adequate in the immediate vicinity of the Sarpinsk Lakes and in the southern sands, where lenses of fresh water form as precipitation collects.

Fresh groundwater is found throughout the Sandy Naryn area at shallow depths. In the valleys of the sand-dune strips, it may be reached at 2 feet and almost always at depths less than 20 feet. In the steppe belts, groundwater is more likely to be salty, but it is usually found at depths of 3-1/2 to 10 feet.

As a rule, vegetation on the Caspian Lowland is not tall enough to impede movement or to provide concealment. Along reedy lake shores, in dense swamps, and in parts of the Sandy Naryn where the growth of sagebrush is very heavy, passage is difficult locally. Wooded areas dense enough to provide concealment are limited to small, widely scattered patches in moist freshwater depressions and to stretches of shelter-belt plantings. Throughout most of the open plains area, shelter and cover is extremely scarce except for the huge hay stacks left in the liman areas after the first mid-summer mowings. These scattered mounds are normally about

* Locations of major wells are shown on map CIA 11995.

25 feet long and 12 to 15 feet high. Although they are reduced progressively to provide feed for stock, they usually remain through the winter.

In summer when the lowland surface becomes dry and dusty, wind and moving vehicles stir up great clouds of dust. Saline dust storms may last for several days or for weeks. They not only greatly reduce visibility, but at times they render outdoor activity almost impossible.

II. Climate (1-4)

A. General Characteristics

The climate of the study area is strongly continental, with hot, dry summers and cold, severe winters. Both annual and diurnal temperature ranges are great. The range between the warmest month, July, and the coldest month, January, amounts to 33°-36°C (59.4-64.8°F) (see range of temperature chart on CIA 12091 and Appendix B).

Annual precipitation is scant, with the bulk occurring during the warm season. The summer precipitation occurs in the form of infrequent, heavy rains, and much of the moisture is wasted either through runoff or evaporation. In summer, evaporation rates are high because of high temperatures, low humidities, and scorching winds. Skies are characteristically clear in summer, and visibility is only occasionally restricted by fog, dust, or storms.

The transitions between winter and summer are extremely rapid. In the brief fall season, masses of cold air from Siberia and

Central Asia quickly penetrate and soon dominate the weather. The surface of the earth freezes and remains frozen throughout the long winter.

Precipitation is more frequent in winter than in summer, but the total is less. Nevertheless, the snow cover persists throughout the cold season. The snow cover is distributed somewhat unevenly because the winter winds blow the snow from the plains into the ravines and valleys.

All of the study area falls under the Class D of the Köppen climatic classification -- boreal climates with average temperatures of the coldest month less than -3°C (26.6°F), and with the temperature of the warmest month in excess of 22°C (71.6°F).* In terms of vegetation cover, the study area is further subdivided into a steppe (DBSa) and a desert (DBWa) climate. (See Köppen chart on CIA 12091.) Forest climate is encountered only far beyond the limits of the study area, to the north of Saratov. Nowhere on the plains south of Saratov is the available moisture sufficient for the successful growth of forest vegetation. The area of steppe climate extends south to within 200-300 kilometers (125-200 miles) of the Caspian Sea. The area immediately adjoining the Caspian is a true desert.

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* As modified by the Soviet climatologist, A.V. Voznesenskiy.

B. Temperature

The average annual temperature of the study area is 7-8°C (44.6-46.4°F) (see annual isotherm chart on CIA 12091). The minimum monthly temperature occurs in January, when the average is between -9° and -10°C (15.8-14.0°F). From February to May the temperature rises rapidly and reaches a peak of 24-25°C (75.2-77.0°F) in July. The highest and lowest temperatures recorded are 41.0°C (105.8°F) at Stalingrad and -38.7°C (-37.7°F) at Akhtuba.

The duration of the warm season, which is defined in Soviet climatic literature as the period with average daily temperatures above 0°C (32°F), is almost eight months (235-245 days) in length, usually beginning 21-26 March and ending 11-19 November (see warm and cold season charts on CIA 12091). The length of the frost-free period averages about 170 days. If spring is arbitrarily defined as the period during which the mean daily temperatures range from 0°C to 10°C (32° to 50°F), the length of the spring season is about a month (30-34 days). The fall transition period, defined by the same range of daily temperatures, is some ten days longer (40-42 days).

During the summer months, the hot sun beats upon the soil surface and the temperature of the upper layers actually becomes higher than the air temperature. With the onset of evening, temperatures begin to drop sharply, and the night temperatures are markedly cooler than those of the day. In the winter, the thin cover of snow is not sufficient to insulate the soil against the

low temperatures, and the soil freezes to a depth of a meter (3.3 feet) or more by February.

C. Precipitation

The average precipitation ranges from 200 to over 300 millimeters (7.9-11.8 inches) per year (see annual precipitation chart on CIA 12091), the highest occurring in the Hilly Western Fringe of the study area. Records for a 28-year period at Stalingrad indicate that the yearly precipitation average is as high as 382 millimeters (15.0 inches). At Tinguta, located in the Yergeni Hills, precipitation averaged only 253 millimeters (10.0 inches) over a period of 31 years. Such low precipitation does not seem to be representative and may be attributable to the location of Tinguta in the rain shadow of a bluff. On the Caspian Lowland portion of the study area, precipitation is markedly lower. To the southeast, with increasing distance from the Hilly Western Fringe area, the rainfall becomes progressively lower.

The seasonal distribution of precipitation is of great importance to agriculture. Some 60 to 75 percent of the total annual precipitation occurs during the warm season (see Köppen and warm-season precipitation charts on CIA 12091), with May and June the peak months. Early summer rains, combined with the release of accumulated winter soil moisture during the spring thaws, make agriculture possible in spite of the low annual precipitation. Since the precipitation is extremely undependable, deviating widely

from the average from one year to another, drought is a recurrent hazard to agriculture. A secondary precipitation peak, which occurs in October and November, supplies moisture for winter crops. Precipitation is lowest in February and March, at the end of the cold season.

Precipitation is more intense but of shorter duration in summer than in winter. Light summer rains are rare. When they do occur, the moisture evaporates almost immediately. Heavy rains are especially characteristic in the Volga Heights. Intensities reportedly diminish on the lowland east of the Volga, and precipitation of more than 30 millimeters (1.2 inches) a day is very rare. In this area, however, rains of 50-60 millimeters (2.0-2.4 inches) a day have been recorded.

The frequency of precipitation is higher during the winter, but the daily amount is small. By 11-16 December a snow cover is established (see snow-cover charts on CIA 12091). The cover increases gradually to a maximum thickness in late winter (February). The maximum depth ranges from 10 centimeters (3.9 inches) in the southeast to 20 centimeters (7.9 inches) in the northwest near Stalingrad. Average snow depth, however, is difficult to estimate because the winds carry the snow from the open to the sheltered areas. The period of thawing continues for about a month, with some snow cover generally persisting until the middle of March. Local differences in exposure and depth of snow cover affect the

rate of thawing somewhat, and the snow cover persists slightly longer in the Hilly Western Fringe area than on the open Caspian Lowland.

D. Other Climatic Elements

During the winter the relative humidity of the study area is high, averaging about 80-90 percent. In summer the humidity is very low. The chart on air-saturation deficiency* on CIA 12091 indicates that the study area has the lowest humidities in the entire lower Volga region, which is the least humid part of European USSR. The lower Volga region has an average annual air-saturation deficiency of 4.5 millimeters or more. During the warm season, the mean actual water-vapor pressure is 5.0 millimeters, with an average air-saturation deficiency of 6.5-7.5 millimeters. To express it in another way, the relative humidity of the study area during May averages about 40 percent at 1300 hours. The highest monthly figures for air-saturation deficiency (16-18 millimeters) are very close to the figures for the Central Asiatic deserts.

Because of the low relative humidities and the high temperatures, evaporation proceeds at a very high rate during the warm season, reaching a maximum in July.

* This is a Russian concept which uses the difference between the actual and the saturation vapor pressures as an index of the lack of saturation of the air. Since it is expressed in terms of millimeters of vapor pressure, it is not directly convertible to the more common expressions of humidity without additional data.

Strong winds are typical of the study area. Average wind velocities are highest in the winter and early spring, and are lowest during the months of June, July, and August. The mean annual velocity averages about 4-5 meters per second (9.0-11.2 miles per hour). Observations at meteorological stations within the area indicate, however, that calms occur with surprising frequency. In January calms were recorded on an average of 10 to 24 percent of the observations, whereas in July the frequency increases slightly to 19-34 percent.

In winter, the study area appears to be a transition zone between areas of predominantly southerly winds to the north and of predominantly easterly winds to the south. As a result, wind from no one direction can be regarded as dominant. Prevailing wind directions at adjoining stations are inconstant, with very low frequencies for even the dominant winds. In summer, the wind pattern becomes more settled, with northwesterly winds predominating. Winds from any direction may be experienced during all seasons of the year.

The area from Stalingrad east is characterized by many clear days. Cloudless skies are especially typical of spring and summer. In winter, some cloud cover can be expected 70 to 80 percent of the time. The percentage decreases very sharply during the warm season, averaging 30 percent in summer.

Fogs are not as rare as might be expected in such a comparatively arid area. From May to September, fogs are practically unknown, but they are more frequent in spring, especially in March. These fogs are of the radiation type and typically occur on clear nights when the surface of the earth cools very rapidly. Generally they are quickly dissipated by the morning sun, but occasionally they may persist for several days. Advective fogs, which are prevalent over most of the Russian plain, are less frequent here because the cyclonic storms with which advective fogs are commonly associated penetrate into this southeastern corner of European Russia relatively infrequently.

Dust storms are a more significant factor in restricting visibility than are fogs. Strong dry winds frequently carry vast quantities of soil, especially in the spring when the surface is still bare of vegetation. No specific data concerning the frequency, duration, and areal extent of dust storms are available, but they are commonly associated with southeasterly winds.

III. Economy

A. Agriculture (4-18)

1. General Conditions

Agriculture and animal husbandry are the primary economic activities in the study area. In most sections of the area, nearly 100 percent of the population is engaged in these occupations. Although animal husbandry predominates, grain

cultivation also is widespread and truck gardening is highly significant locally. Within the study area the seeding dates for grains and various vegetables range from the beginning of April through 20 June, with the most important crops usually planted in mid-April and early May (14). Winter grain crops are sown in late August and up to 10 September, depending on weather conditions (15).

The intensity of agriculture corresponds closely to the availability of water and the density of population. According to plans, the current trend towards agricultural extension and intensification will be accelerated by the large-scale Soviet projects which include the construction of irrigation canals, the reclamation of swampland within the floodplain, and the planting of trees in shelter belts and orchards. Large areas of potentially productive land within the study area are still agriculturally retarded because of an inadequate water supply, or because of ignorance of or indifference towards modern farming practices.

2. Regional Agricultural Specialization

In the Hilly Western Fringe area, intensive agriculture is practiced along the rivers where a number of gullies are dammed for irrigation. Fruit trees, berries, vines, and vegetables are widely grown on irrigated land. The largest areas of irrigated bottomland are located near Stalingrad and northward. The orchard and vine acreage around Stalingrad represents a very large proportion of the 1940 total for the entire Stalingrad Oblast (Figure 2).

Field crops, including wheat, rye, maize, sunflowers, and fodder crops, are raised on the more level areas and on the parts of the interfluves that are not too dry. Mustard is also grown in important quantities. Forty percent of the mustard growing area of the USSR is in Stalingrad Oblast (1947), and about 10 percent of this is thought to be in the study area. Much of the higher, drier land is given over to pasture and hay fields. By area, almost 45 percent of the Hilly Western Fringe area is in pasture, and about 35 percent is under cultivation. Over 70 percent of the cultivated land is in grains, even though the climate is marginal and yields vary greatly from year to year. Dairy-stock farms are numerous within the hilly region and help meet the demand for dairy products in the Stalingrad urban area. Cattle and sheep are numerically the predominant types of livestock.

The rich alluvial soils of the Volga-Akhtuba Floodplain have a high agricultural potential. Within the study area, the floodplain is particularly noted for its lush meadows. Where embankments protect the land from floods and irrigation is used, valuable truck crops as well as excellent grain yields are obtained. The combination of soils and climatic conditions, accompanied by scientific agro-technical methods, makes possible three crops of vegetables, five mowings of lucerne, and two crops of grains each year, but harvests in such numbers are seldom achieved.

Most of the productive land of the floodplain is in meadow, which is mowed for hay. The area used for grazing is more limited. Dairying and other livestock industries are very important, providing 36 percent of the farm income and employing 26 percent of the labor. Despite the peculiar advantages for specialty crops, the types and proportions of the various crops grown on the floodplain are much the same as for Stalingrad Oblast as a whole. Grains, predominantly spring wheat, winter rye, and millet, occupy 75 percent of the sown area within the floodplain (1945) but provide only about 15 percent of the farm income. Vegetables, melons, and potatoes together occupy only about 11 percent of the seeded area, but yield a much higher monetary return for the hours of labor expended. Outstanding among the garden crops are tomatoes, red peppers, cantaloupe, and watermelons (Figure 3). Orchard crops -- including quince, apples, and table grapes, as well as berries -- are grown in scattered patches throughout the floodplain. Technical and industrial crops occupy only 5 percent of the sown area. Among such crops are fibers, castor bean, and soy bean.

Although parts of almost every island in the floodplain are devoted to agriculture, the greatest development is in the area near Stalingrad. The administrative rayons that are agriculturally most progressive are Krasnoslobodskiy, lying wholly within the floodplain, and Sredne-Akhtubinskiy, most of which is on the Caspian Lowland to the east. The Krasnoslobodskiy Rayon is concerned largely with the

production of fruit, vegetables, and animal products. In prewar days the area delivered almost 400,000 gallons of milk a month to Stalingrad. In 1939, about 26 percent of the total area of the rayon was under cultivation. Of this, some 15 percent was devoted to truck gardening. Of the livestock in the rayon, by far the most numerous are cattle and swine. Horses, oxen, and camels are important as draft animals (Figures 4 and 5). A terrific loss of cattle and draft animals was incurred during the war. In 1946 the collective farms in the Krasnoslobodskiy Rayon had only 200,000 head of cattle or 60 percent of the prewar number. The quality of the stock was also said to be lower (16). In the same year the rayon had only 25 percent of the prewar number of horses and 30 percent of the number of oxen. Agriculture in general, however, was optimistically expected to regain the prewar level by 1947 (16).

The section of the Volga-Akhtuba Floodplain near Stalingrad, where many thousands of acres are enclosed by dikes and embankments, is much better protected against floods than the areas farther to the east and southeast. Floods are an especially severe hazard in the south and southeast because they occur during the second half of May and in June, shortly after the crops have been planted. Most of the area, therefore, is not cultivated, but hay harvests from the seasonally flooded meadows are exceptionally high.

The Caspian Lowland section of the study area is characterized by an extensive type of herding. The proportion of the plains area devoted to grazing varies locally from 55 to 70 percent, generally

increasing with distance northeastward from the Akhtuba River. A much smaller, but very important proportion of the plains is in meadow, which provides hay for winter fodder. Meadow land averages from 8 to 12 percent of the area. Another 10 percent of the land, including parts of limany and a strip along the Volga-Akhtuba Floodplain, is under cultivation. Sheep and cattle are the most numerous types of livestock. The average number of sheep per acre ranges from 3.5 to 5.5 and is greatest in the area just west of Lake El'ton (1936). The average number of cattle per acre is 1.5 to 2. Horses, swine, and camels are found in much smaller numbers but are of great significance locally. Horses are of particular importance on the sandy plain west of Lake Baskunchak. Farms (kolkhozes and sovkhozes) on the Caspian Lowland are typically very large. Many include 25 to 37 thousand acres and support herds or flocks of several or more thousand head.

It is difficult to ascertain the location, conditions, and extent of migratory herding, but it is probably practiced to a considerable degree, even though the Soviet Government has strongly encouraged the settling of the migratory peoples. Strenuous efforts have been made to develop a new system whereby summer hay mowings from the grassy liman areas are stored for winter stall-feeding and whereby fodder supplies from especially productive areas are shipped to the herds instead of moving the livestock to supply areas. How effective such efforts have been and to what degree the traditional

migratory system has been abandoned are not known. In some parts of West Kazakhstan Oblast (possibly east of the study area), where a system of summer-pasture and winter stable-feeding is already in effect, the cattle are pastured for 225-265 days (including some 50 to 70 days of winter pasturing) and are stall-fed for 100 to 140 days (17). In most of the study area the time probably would be somewhat more evenly divided between field and stall-feeding.

The scattered areas of cultivation on the Caspian Lowland coincide closely with the liman patches and are used chiefly for grain production. The principal crops are winter and spring wheat, winter rye, millet, and barley, with millet and barley becoming progressively more important to the east. Vegetables, melons, and industrial crops are also grown but in much smaller amounts. Simple irrigation practices are employed in the liman areas, where weirs and embankments are built to retain the waters from the spring thaw and rains. Some parts of the plain proper, especially in the area near the Akhtuba River, have also been cultivated by using crude methods of dry farming. These areas, however, often have dry saline soils and give very low yields. Many such plowed areas have become wastes of wind-blown sand, even though windbreaks have been established and snow fences of sorghum have been planted in strips to check wind erosion.

Some parts of the Caspian Lowland are less productive than others. For example, farming is considerably less important in the

sandy areas west and south of Lake Baskunchak than in areas farther north. On the other hand, a small area in the vicinity of Mt. Bol'shoye Bogdo is the site of a successful experiment in afforestation and dry farming, which stands out like a large oasis on the dry steppe. Open fields between dense forest strips (which occupy 10 to 15 percent of the area) produce high-grade corn and other crops. Fruit orchards are also well developed in parts of the plain, notably south of Urda in the Sandy Naryn, where fruit trees and many exotic crops thrive. Fruits grown in this area are noted for their large size and high quality.

3. Status of Productivity

The most outstanding factors influencing agricultural productivity are (a) the local climatic hazards and the extent to which they have been counteracted by irrigation, and (b) the attitudes of the farmers towards collectivization, the fulfillment of plans, the use of equipment and materials, and the adoption of new methods and ideas.

On the basis of climatic conditions, the Caspian Lowland is a submarginal agricultural area. Droughts are experienced on an average of one year in four. Many efforts have been made to counteract the effects of drought by irrigation, but probably less than 1 percent of the cultivated land within the study area is currently irrigated. Consequently, the agricultural economy of the whole region is characterized by fluctuations and instability. In drought

years the yields of wheat, one of the hardier crops, are less than 1/5 those of wet years (6).

In the study area, there are at present three intensive irrigation projects -- (a) at Svetlyy Yar, on the south bank of the Volga about 11 miles east of Krasnoarmeysk; (b) in the Nikol'sko-Zaplavnoye area, on the north bank of the Akhtuba River east of Srednyaya Akhtuba; and (c) in the northwestern part of the Volga-Akhtuba bottomland. Current plans call for the irrigation of a total of 62,000 acres in these three areas in the near future (6). (See Figure 6 and section on Projects and Plans for further information on irrigation projects.)

The Soviet authorities apparently are dissatisfied with the agricultural situation of the Stalingrad area. Besides a shortage of workers, there has been much evidence of lack of effort and general indifference on the part of the peasants. Although potentially one of the outstanding truck-gardening sections of the USSR, the area does not meet its own needs. In 1947, about one-half of the potato and vegetable requirements of urban areas along the Volga had to be imported. Government efforts to develop truck gardening have met with very little success. In spite of the tremendous advantages to the farmer of producing garden and orchard crops instead of field crops, the proportion of such crops to the total cultivated area increased by only 3 percent between 1935 and 1945 (6).

Among the areas that produce garden crops, the range in yields is great, in many cases as a result of the attitudes of the farmers. Many of the exceptionally favored floodplain areas of Stalingrad Oblast produced far less per acre (1940) than the average for the oblast as a whole. A study of the 56 leading fruit-vegetable "brigades" in the Stalingrad vicinity reveals that those composed of reliable workers received from 1 to 4 tons more per acre than those with indifferent workers (6). Except on a few outstanding kolkhozes and sovkhozes, farmers have almost completely ignored recommended rotations, optimum planting dates, and measures for combating pests. Repeated planting of potatoes on the same land for year after year has resulted in the development and spread of destructive fungus diseases.

Collectivization of agriculture within the study area was 80-90 percent completed by 1935 (9) and by now is probably nearly 100 percent completed (see Figure 7). Stalingrad Oblast statistics for 1938 indicate that 40 percent of the cattle in the oblast were held by collectives, but that only 23 percent of the sheep were in collectives. Sheep are found in greatest numbers in the eastern, more arid areas among the herds of the Kazakh nomads. For the sedentary farmer in the area, collectivization has offered several advantages. Teamwork has shortened the harvest period, thus helping to prevent the destruction of crops by drying winds. Furthermore, more equipment and special privileges are given to kolkhozes and

sovkhozes. In 1946, for example, a new experimental type of incentive was tried in Krasnoslobodskiy Rayon. Plots up to 5 acres were assigned to the workers on collective farms (kolkhozniki) to be cultivated in addition to their regular common land and individual garden plots (an acre or less). Of the produce from the additional plot, the farmer was allowed to keep for himself everything above an established quota (16). It is not known whether this system is still in effect.

Agricultural machinery in the study area has been inadequate. Even tractors have been in critically short supply, even though the great Dzerzhinskiy tractor factory is located in Stalingrad. In 1935, there were about 1,700 acres of cultivated land for every tractor in the northwestern part of the Volga-Akhtuba Floodplain. For other parts of the study area the cultivated acreage per tractor ranged from 1,100 to 2,000 acres. During World War II, 28 machine-tractor stations in the Stalingrad Oblast were destroyed. By 1946, all had been rehabilitated, but some had many fewer tractors than formerly. The number of tractors at the one station in Krasnoslobodskiy Rayon was reduced from 100 in the prewar period to 20 in 1946 (16). On the other hand, 1951 data indicate that the Krasnoarmeyskiy Rayon (just south of Stalingrad) then had over 200 tractors in contrast to 61 in 1936 (18).

The efficiency of the stations of the study area in developing and putting into operation plans for plowing, seeding, cultivating,

and harvesting has been extremely low. The efforts of the tractor stations have been concentrated on grain lands, and areas of more valuable vegetable crops have been neglected, even though they may be located on irrigated land. This situation is illustrated by two fairly recent reports. In the Krasnoarmeyskiy Rayon, where there are more than 200 tractors, the machine-tractor stations were reported to have plowed less than 280 acres (18).* The 1946 work plan for the Kapustin Yar machine-tractor station called for the plowing of about 32,730 acres of steppe land, most of which was to be used for grain production. Nearly all of this work was accomplished, whereas in the Volga-Akhtuba Floodplain only 42 percent of the 5,325 acres scheduled for plowing actually were plowed (6).

B. Industry

1. Distribution

Most of the industrial activity within the study area is concentrated along the Volga, particularly in the vicinity of Stalingrad. The city occupies a narrow strip along the right bank of the Volga and extends for a distance of approximately 30 miles from Rynok southward to Krasnoarmeysk. The industrial development of Stalingrad owes much to its location at an important junction for river and rail traffic. The heavy industries of Stalingrad are dependent almost entirely upon imports of raw materials.

* It is possible that many of these tractors are assigned to work on shelter belts or the Volga-Don Canal construction site.

With the exception of salt extraction at Lake Baskunchak, industries of the remaining area are of the workshop type or are small enterprises for processing agricultural products. Of these smaller industries, many are located in settlements along the Volga east of Stalingrad. Whereas Stalingrad industries are large enough to produce for the national market, those of the agricultural hinterland are primarily for the local market.

2. The Stalingrad Industrial Core

Among the chief industries of the Stalingrad industrial core are metallurgy, metal fabrication, machine building, lumber processing and woodworking, manufacture of chemicals, and shipbuilding. The major metals and machine industries include the production of high-quality steel, refinery and field equipment for the petroleum industry, excavation and mining equipment, tractors, tanks, and ordnance; the repair of ball bearings; and the processing of scrap metal for steel manufacture. For the metals industries, Stalingrad is an area of surplus production and exports products to other parts of the USSR.

Despite its location in an unforested region, lumber and woodworking industries have developed at Stalingrad as a direct result of its favorable geographic location. Logs from the north are floated down the Volga to Stalingrad and then in lumber form are sent, mainly by rail, to the Ukraine, the Caucasus, and the

Transcaucasus. Sawmilling comprises about 75 percent of the wood industry (19), but simple types of furniture and wood products are also manufactured.

Minor industries of the Stalingrad area include textiles (clothing and hosiery), manufacture of prefabricated houses, brick-making, production of leather and shoes, vegetable and meat canning, and flour milling.

In terms of 1938 value of production, machine building and metals fabrication were the leading industries, with about 50 percent of the total value; metallurgy ranked next with approximately 20 percent (19). These proportions appear to be valid still. Of minor industries in Stalingrad, meat processing and canning are the most important.

The overwhelming majority of the plants of the industrial core area are located within Stalingrad proper. Most of the metals industries are in the northern part of the city. The largest and most important plants are the Krasnyy Oktyabr' steel mill, the Dzerzhinskiy tractor plant, and the Krasnyye Barrikady ordnance and munitions plant, all of which are of national importance. To the south are the two smaller industrial nodes at Beketovka and at Krasnoarmeysk. Administratively both of these settlements are part of the City of Stalingrad, although they are distinct satellite or suburban communities. In southern Stalingrad and Beketovka, lumbering and woodworking industries are located along the Volga.

Krasnoarmeysk is best known for its river shipbuilding activities, and particularly the construction of steel barges. Chemicals are also manufactured in the area, primarily in Beketovka.

The Krasnyy Oktyabr' steel mill is a large producer of high quality alloy steel. The plant has 15 open-hearth furnaces (Siemens-Martin) with an annual capacity of 810,000 metric tons and 5 electric furnaces with an ingot capacity of 25,000 metric tons, thus making a total annual ingot capacity of 835,000 metric tons (20). Pig iron and coal are imported by rail from the Donets Basin, and scrap steel is gathered from the immediate environs of Stalingrad or is brought in by barge from other industrial centers along the Volga. Some quality limestone is available from quarries just north of the city. The mill is the principal supplier of steel for the Krasnyye Barrikady armament plant, the Dzerzhinskiy tractor plant, and the Krasnoarmeysk shipyards. The labor force was estimated at 5,000 in 1949 (21).

The largest single industry of Stalingrad is the manufacture of tractors, and the Dzerzhinskiy plant is one of the four leading tractor producers in the USSR, making caterpillar-type agricultural tractors of 35 to 50 horsepower. The plant also manufactures tank engines, which are shipped to Gor'kiy or other nearby assembly plants (22). In 1949 the number of workers employed was estimated at 20,000 to 40,000 (21).

The Krasnyye Barrikady armament plant is engaged primarily in making field, antiaircraft, and naval guns. Other products include drilling equipment for oilfields, excavators, and possibly castings for bombs and artillery shells (22). The labor force was estimated at 7,000 to 10,000 in 1949 (21).

The Kuybyshev Lumber Kombinat at Beketovka is among the largest in the USSR. It processes about 1.3 million cubic yards of logs annually (23). A fairly large wood-processing plant located in Krasnoarmeysk cuts and impregnates timbers for use as telegraph poles, railroad ties, and ship masts.

The Beketovka chemical plant, although small in comparison with some of the other plants of the USSR (for example, the chemical plant in Dzerzhinsk), produces a fairly large proportion of the total Soviet output for several chemicals. It is one of the largest chlorine-producing plants in the USSR. The 1951 production was estimated at 30,000 tons of chlorine, or approximately 13 percent of the national total. The estimated 34,000 tons of caustic soda produced in 1951 is roughly 10 percent of the national total (20). Unconfirmed reports have given the carbon disulfide production as approximately 25 percent of the total for the USSR. Among the other chemicals produced in fairly large quantities are chloride of lime, soda ash, acetylene, ethylene, sulphuric acid (100,000 tons per year) (21), alcohol, and oxygen. Wood waste from sawmilling operations is repeatedly mentioned as a

raw material for the Beketovka chemical industry. The plant has equipment for filling cartridges with phosphorus, for refuzing ammunition, and possibly for the manufacture of explosives. Chemical warfare gases are also reported to be manufactured at Beketovka (24).

The entire Stalingrad industrial area is served by a power transmission system. In generating capacity, Stalingrad is rated second among the 11 independent centers in the Volga River power system (21). The key power plant for the net is the large regional station known as the Stalingrad Thermal Power Plant (StalGRES I) located west of the Beketovka railroad station. This plant, which operates on anthracite coal brought in by rail from the Donets Basin, roughly 125 miles to the west, has an installed generating capacity of 133,000 kilowatts (25). Additional power plants are located at various industrial sites, the three largest being (a) the plant attached to the Dzerzhinskiy tractor works, for which postwar reports give an estimated capacity of 58,000 kilowatts, (b) that of the Krasnyy Oktyabr' steel works, whose capacity is estimated at 50,000 kilowatts (25), and (c) the 6,000 kilowatts plant of the Krasnyye Barrikady ordnance and munitions plant. Some other industries have small generating stations with capacities generally under 1,000 kilowatts. In spite of the heavy demand placed upon the combined generating facilities of the area, the present power supply is probably adequate for both industrial and urban needs (21).

Two transmission lines, leading northward and southward from StalGRES I, distribute the power within the area. The three large industrial stations are tied into the system, but they are primarily consumers rather than contributors of energy. Thus the regional transmission system is principally for the distribution of power generated at the Beketovka plant. A high-tension line skirts the western limits of Stalingrad and leads to the northern part of the city, where the Krasnyy Oktyabr', Krasnyye Barrikady, and Dzerzhinskiy plants are tied into the system. Another high-tension line parallels the railroad leading southward from Stalingrad and terminates at Krasnoarmeysk.

Upon completion, a gas pipeline now under construction from the Archeda fields, 110 miles to the northwest, will make natural gas for power and heat available to the City of Stalingrad (26). A 10-inch petroleum trunk pipeline, Astrakhan'-Saratov-Kazan', passes through the east-central part of the study area.

3. Industry Outside Stalingrad

Aside from Stalingrad, the study area has little industry and few large centers of population. The greatest concentrations of industry are in the two urban areas of Dubovka, the only other "city"* of the study area, and Krasnaya Sloboda, located on the Volga floodplain opposite Stalingrad. Small industrial

* Classified as a city within the Soviet territorial-administrative system.

establishments are scattered throughout the agricultural hinterland, especially along the banks of the Volga and Akhtuba rivers.

The major enterprises at Dubovka are wood processing (principally sawmilling) and flour milling. The city also has a plant for equipping tanks with guns, an agricultural-machinery repair shop, a small clothing industry, a meat plant, a printing establishment, and a quarry.

Krasnaya Sloboda, with a population of over 10,000, ranks second to Stalingrad in size but is classed as a "workers' settlement" rather than a "city."* It is primarily a river-craft repair center. Maintenance activity consists of overhauling motor launches, tugs, and barges. No new construction is undertaken. The shipyard is old and lacking in modern equipment. From November to March the yard is shut down and is used for winter storage for part of the Volga barge fleet. The arm of the river on which the yard is located is subject to silting and must be dredged continuously.

The agricultural hinterland farther from Stalingrad has even less industrial development. With the exception of salt extracting and processing, the industries are scattered among the agricultural villages on the banks overlooking the Volga-Akhtuba Floodplain,

* A workers' settlement (rabochiy poselok) is defined as having a minimum adult population of 400 and no less than 65 percent of its workers engaged in non-agricultural pursuits.

chiefly the left bank. The plants are characteristically small and process only local raw materials. The extraction and processing of salt from Lake Baskunchak is the only industry that attains national significance, contributing 25 percent of the total USSR salt production (27). The industries representative of the area as a whole are flour milling, brickmaking, repairing of agricultural machinery, vegetable and meat canning, and handicraft or workshop type of sewing and shoe making. Of these industries, flour milling and the manufacture of red bricks are the most important. These two industries have larger plants and employ more workers per plant than any of the other industries except salt. In a few settlements the maintenance of river craft and sawmilling are of some significance. Areas away from the floodplain are almost exclusively agricultural and devoid of industry.

Salt extraction centers around Lake Baskunchak, in the eastern part of the study area, Three communities associated with the salt industry are classified as "workers' settlements" -- Nizhniy Baskunchak, where the salt is extracted; Verkhniy Baskunchak, a transportation and storage center for the salt; and Petropavlovka, the chief processing center and Volga shipping port.

Although extraction of salt initially began at Lake El'ton, Lake Baskunchak became more important at an early date. At Nizhniy Baskunchak, excavators scoop up the salty crust of the lake, and pumps tap the lower lying salt horizons. A railroad extends

out over the salt crust to the site of the operations, and crude salt is dumped or pumped directly into railroad cars for delivery to Petropavlovka for processing. Extraction now appears to be a year-round operation, whereas in the past the season usually extended from April through November. At Petropavlovka, seven mills process the salt and dispatch it to barges that transport it up and down the Volga. Baskunchakskaya Sol', the extracting combine, reported a production of 1,170,000 tons for 1946 (28). The mills are generally reported to have a capacity of about 7,500 tons per day. Apparently the plants operate on a 24-hour production schedule. A large amount of salt is sent to Astrakhan', where it is used by the fish-processing industry.

The chief agricultural villages having small industries are Srednyaya Akhtuba, Leninsk, Vladimirovka, and Chernyy Yar, all of which are located along the Volga-Akhtuba Floodplain.

The principal industrial activity of Srednyaya Akhtuba is wool washing. In addition the village has the usual flour mill, cannery, shoe shop, print shop, and agricultural-machinery repair shop. Leninsk, in addition to the characteristic small industries, has a foundry that produces parts for the local agricultural-machinery repair shop and for the Krasnyye Barrikady works in Stalingrad. Chernyy Yar has no industries other than the small shops characteristic of the hinterland as a whole.

The urban complex of Vladimirovka-Petropavlovka, in addition to salt processing, has a repair shop for river craft. The shipyard, located about a mile and a half south of Vladimirovka, has an old barge repair shop and a tug repair unit that was built during World War II. As at Krasnaya Sloboda, the harbor facilities are used for winter storage of barges. Between 100 and 200 barges can be accomodated. The settlement also has the usual small industries.

Although salt extraction is the principal industry of Nizhniy Baskunchak, it also has a railroad repair shop, a meat plant, and a gypsum plant that processes gypsum from the deposit at nearby Mt. Bol'shoye Bogdo. Rubble for ballast for railroad lines is obtained from a nearby quarry.

A plant producing bromine and bromine compounds is reported to be located in El'ton and probably began operation in 1942. The establishment of such a plant was planned at the beginning of the Second Five-Year Plan (29).

Hunting, especially for birds, and fishing play an important part in the economy of the wide Volga-Akhtuba Floodplain. Fishing kolkhozes are located in Vladimirovskiy, Chernoyarskiy, and Sredne-Akhtubinskiy rayons. The amount of the catch and even the fishing locations are not definitely known. The only known fish-processing plant within the study area is in Nikol'skoye.

Power in the agricultural hinterland is supplied by a number of small generating stations located in settlements along the Volga.

These stations have internal-combustion engines, with capacities generally under 100 kilowatts. The largest is associated with the salt combine of Nizhniy Baskunchak. There are no indications of the existence of any transmission systems. Power stations are located in Vladimirovka, Kapustin Yar, Nizhniy Baskunchak, Dubovka, Leninsk, Tsarev, Srednyaya Akhtuba, and Chernyy Yar. El'ton also has a power plant that supplies a health resort utilizing Lake El'ton radioactive muds, which are of value for medicinal purposes only.

C. Mineral Resources

The only minerals present in the study area in quantities of economic significance are various types of salts, gypsum, tripoli earth, limestone, building stones, glass sands, and natural gas. Of these, salt is the only resource whose exploitation has attained nationwide proportions. Deposits of the other minerals are only slightly developed for local use or are as yet unexploited.

1. Salt

The salt reserves may be divided into two categories, salt lakes and rock salt. At present only the salt lakes are being exploited. The two largest salt lakes in the area are Lakes Baskunchak and El'ton. Several small self-precipitating lakes of little present economic significance are scattered throughout semi-desert portions of the area. In terms of salt production Lake Baskunchak is more important than Lake El'ton, although its area and amount of reserve are smaller.

The Lake Baskunchak area ranks among the four chief salt-producing regions of the USSR (30). Some of the salt is obtained from natural brine by solar evaporation, but most of it is mechanically extracted from bedded salt deposits (Figure 8). Only a shallow depth of brine overlays an enormous reserve of salt deposits, which are interbedded with clay. The actual depth of salt deposits has not been determined, but in 1947 a drill sunk to a depth of 2,350 feet had not completely penetrated the salt beds (31). The exploited upper layer is 30 feet thick and contains three main strata: (a) an upper crust of crumbly, crystal salt known as novosadka, (b) a layer of very hard salt referred to as "pig iron" salt, and (c) a porous, easily worked layer containing 98 percent sodium chloride, which is of greatest value to industry (4). This third stratum is known as granatka salt.

Baskunchak is also a self-precipitating lake, and reserves of the novosadka stratum are renewed through annual formation of a thin salt layer as a result of summer evaporation. Salt is supplied to the lake chiefly by saline springs flowing from the low "salt-dome mountains" of Maloye Bogdo to the northeast and Bol'shoye Bogdo adjacent to the southern shore. These features represent intrusions of salts and gypsum of Lower Permian age into the more recent surface formations. Leaching of the intruded rock salt feeds salt to springs flowing into Lake Baskunchak.

Statistics of reserves are confusing since a number of generally dependable sources disagree, probably because the various estimates

are based on different depths of salt and because the rate of replenishment varies greatly from year to year. The reserves to a depth of 60 feet probably approximate 2.5 billion metric tons (32). One figure places total reserve at not less than 22 billion tons. Conservative reserve calculations for the currently exploited strata are placed at 750 million tons (4).

Analyses of Baskunchak salt show it to be of high quality, with a negligible amount of admixture (4). The sodium chloride content over the total area of the lake varies from 70 to 99 percent (30), but the percentages are in the 90's at most places.

The salt of Lake El'ton has a higher potassium, magnesium, and bromine content than that of Lake Baskunchak. Consequently it is less desirable as a food salt, although it may be of greater value industrially. In 1947 an expedition of the Academy of Sciences of the USSR obtained positive results from a study of the utilization possibilities of El'ton salt for industrial purposes (31). Salt reserves of Lake El'ton are calculated at approximately 4 billion metric tons (29).

In 1931, a bed of high-quality rock salt with a reserve of not less than 100 million metric tons was discovered at Mt. Bol'shoye Bogdo (29). This is the only significant rock salt deposit in the study area. It has not been exploited because of the ease with which salt can be extracted from Lakes Baskunchak and El'ton.

2. Other Minerals

Gypsum is found at Lake Baskunchak, Mt. Maloye Bogdo, and Lake El'ton, and in the vicinity of Chernyy Yar (33). The Baskunchak deposit is the only one now under exploitation (30). Outcrops of gypsum-bearing Permian deposits almost encircle the lake (34), the richest beds being on the western and northwestern shores (4). As of January 1936, operating reserves were estimated at 88.3 million metric tons and total reserves at 406.5 million tons (30).

Although limestone appears to be widespread throughout the area, exploitation is limited. Small quantities are used locally as building stone, and deposits in the Stalingrad area are used for flux in the Krasnyy Oktyabr' steel plant.

Quartzitic sands are also widely distributed, and quality tripoli is found near Kamennyy Yar. Along the length of the left bank of the Volga-Akhtuba Floodplain southward from Vladimirovka, there are a number of deposits of fine-grained sand that has been found to be of value as glass sand. Along the right bank of the Volga northward from Beketovka are sand deposits of optical-glass grade. The status of exploitation of these sands is not known (29).

In the coastal strip along the southwestern shore of Lake Baskunchak, there is a layer 7 feet thick of reddish-brown ocher, which contains 22 percent iron oxide and has the qualities necessary for making good paint (4).

For many years, natural gas has been known to exist in the study area, but exploration and study were not undertaken until about 1928. As of 1935, the following five gas-bearing regions were established: Kargale, Kamennyy Yar, Lake El'ton, Lake Baskunchak, and Mt. Bol'shoye Bogdo. The Kargale field is located 19 miles east-southeast of Urda (4). The Kamennyy Yar deposit, associated with a known anticlinal fold, is located on the right bank of the Volga, 3.7 miles south of Kamennyy Yar (35). Since a number of exploration parties were sent into the area in the 1930's and since the area is close to the Ural-Emba petroleum region, it is highly probable that additional natural gas deposits have been discovered since 1935. Insofar as can be determined, none of the natural gas fields in the study area is currently being exploited.

D. Development Projects and Plans

1. Current Status

Several far-reaching Soviet projects directly concern the development of the study area. Three of these -- a widespread afforestation program, the construction of a dam north of Stalingrad to provide power and water for a projected system of irrigation canals, and the Volga-Don Canal -- are especially important because they are actually under way, or because survey and field research parties investigating various phases of the projects are known to be working in many parts of the study area.*

* Details on the Volga-Don Canal Project are given under Inland Waterways (p. 141).

2. Shelter Belts

Although small-scale local reforestation and shelter-belt planting have been carried on in the area for centuries, the present planting program is thought by the Soviets to be of sufficient magnitude to change the character of the environment (Figures 9 and 10). Large-scale plantings of protective shelter belts are expected to (a) reduce wind velocity, (b) help retain soil moisture, (c) collect snow, and (d) anchor loose sands. According to plans, the city of Stalingrad will be the focal point of three sections of major state forest belts. The Kamyshin-Stalingrad forest belt along the divide on the west bank of the Volga River will approach the city from the north, and the Stalingrad-Cherkessk state forest belt will join it from the southwest. The third, a part of the Saratov-Astrakhan' belt, will parallel both banks of the Volga-Akhtuba Floodplain for its entire length within the study area. Stalingrad is also to be encircled by a "ring of green," which will protect it from strong winds, particularly those from the east. A fourth state forest belt will extend from east of Lake El'ton southwestward, past Lake Batkul', and thence to the Volga just north of Vladimirovka. Except for the Saratov-Astrakhan' belt, each state forest belt is to include three or four parallel forest strips 200 feet wide and about 1,000 feet apart. The Saratov-Astrakhan' forest belt will consist of a solid 330-foot strip on each bank of the Volga-Akhtuba Floodplain.

Smaller local belts are to be established throughout the study area by individual collective and state farms. In addition to these belts, trees are being planted in ravines and hollows.

The main types of trees being planted are oak, poplar, pine, alder, acacia, and willow. Many of the tree plantings are claimed to have acquired a dense growth by the end of the second year, with acacias and maples reaching a height of 7-8 feet. Black poplar planted along the Mechetka River (north Stalingrad) in 1935 are reported to have grown 16-20 feet in four years.

Before World War II, planting was begun in some of the belts and much of the "green ring" around Stalingrad had been planted. The only available specific information as to the present status of the work was published in the 15 January 1949 issue of Pravda, which states: "Komsomol members are undertaking to establish in 3-1/2 years a 170 km. [106 miles] long national protective forest belt from Kamyshin to Stalingrad and to complete all planting work by the spring of 1952." In other areas of planned afforestation, particularly in the Caspian Lowland Region, it is probable that very little actual planting has been accomplished as yet. Mapping and extensive soils and other scientific surveys and appraisals are still in progress and detachments of specialists from Moscow University and other organizations are continuously entering and leaving the region.

3. The Stalingrad Power and Irrigation Project

The second major project concerns a hydroelectric-power dam at the north end of Stalingrad City and a gigantic irrigation system to be fed from the resulting reservoir. Construction of the dam was to have been started in 1951, with 1956 scheduled as the date of completion. The planned generating capacity of the power project is 1,700,000 kilowatts, and its yearly production around 10 billion kilowatt-hours, which is to be distributed far beyond the Stalingrad area (36). The completion of the dam should greatly stimulate the industrial development of Stalingrad, as will the completion of the Volga-Don navigation canal.

A natural-flow system of irrigation canals will carry water from the dam to semiarid and desert land in the Caspian Lowland between the Volga and the Ural rivers. The site of the dam construction is near a settlement identified in one intelligence report as Lotoshinok.* There are indications that work is already in progress. A gravity-flow outlet canal about 370 miles long will leave the reservoir from the east side and cross the territory between the Volga and the Ural rivers. According to Izvestiya for 19 June 1951, the approximate route will be as follows: east from Stalingrad to Saykhin on the Saratov-Astrakhan' Railway, where it turns northeastward, detouring around the short Gor'kaya River,

* Lotoshinok has not been located on any map, but a settlement named Latashanka is located just north of Stalingrad.

then southeastward into the area south of Urda, and finally northeastward again towards the Aral-Sor, which is beyond the study area. A network of gravity-flow branch canals will extend southward from the Stalingrad Canal, and supply water to local canals and irrigation networks.

In July of 1951, three survey parties were working in the area along the proposed canal route, two in Stalingrad Oblast and the other in the area within a 60-mile radius of Saykhin (18). A statement made by the president of the Academy of Sciences of the USSR that was published in Izvestiya on 5 October 1950 gave the following information:

(a) Work on the canal is to begin "next year."

(b) Before beginning construction on the canal "it is necessary to carry out thoroughgoing and scientific research work...."

(c) "Next year 43 exploratory parties and 7 static /fixed/ scientific-research points are being organized." The 7 points mentioned are all east of the study area.

(d) "A special committee comprising the most prominent scientists has been appointed to cooperate in the building of the Stalingrad Hydro-Power Station and the Stalingrad Canal."

Plans for the Stalingrad power and irrigation project call for the damming of the Akhtuba River near the point at which it leaves the Volga and the diversion of water from the reservoir to the Akhtuba by a canal, which will be equipped with locks to permit continuous navigation. Another canal is being constructed to

connect the Akhtuba with the Volga on the south side of the dam below the locks.

The chances that the project will be completed and operating at full capacity by 1956 are very slight, since important technical aspects still seem to be in the exploratory stage, much machinery essential to maintaining a rapid construction pace is still being designed, and there is a shortage of skilled labor necessary to operate the machinery when or if it becomes available. Nevertheless, the project has the important propaganda value of demonstrating to the outside world that the Soviet Government is building for peace. It also provides another rallying point for the morale of the Soviet people themselves.

IV. Population

A. Distribution and Density

The study area as a whole is sparsely populated, even though Stalingrad is the southeastern point of the densely populated triangle that includes three-fourths of the population of the USSR.*

* The First All-Union Census, 17 December 1926, is one of the most complete accounts ever presented of the population of any country. This census gives a substantial basis for the study of later trends. The summary data from the Census of 17 January 1939 comprise a second reliable source, but the publication of the complete returns from this census was interrupted by war. Fairly complete vital statistics are also available for the years immediately preceding and following the 1926 census. The publication of vital statistics, however, was discontinued shortly thereafter, except for summaries or selected data for individual years, for example, 1936 data published in Rayony i Naselennyye Punkty Stalingradskogo Kraya. (See Source 37.)

From the Stalingrad area eastward the population density becomes progressively less, decreasing from a density of over 100 persons per square mile to less than 3.

The Soviet trend, particularly in the western part of the area, seems to be toward the concentration of population in cities, towns, workers' settlements, and collectives of various types. In the eastern plains areas the Soviet regime has long worked toward the conversion of the traditionally migratory peoples into settled farmers in agricultural villages and kolkhozes.

Before World War II the emigration-immigration ratio in Stalingrad Oblast was 8 to 6, which indicates a relative loss of population to other areas of greater economic activity, primarily industrial. A comparison of prewar and postwar data, however, indicates that there was a large population increase in the Krasnoslobodskiy Rayon, located immediately east of Stalingrad on the Volga-Akhtuba Floodplain (9). The prewar emigration-immigration ratio for the Kazakh SSR was about 3:15 (37), which probably approximates the situation for the eastern part of the study area. Currently, there is a deficiency of both industrial and agricultural labor throughout the study area, especially in the western part. A postwar Soviet source states that at least 23 percent more agricultural working strength is needed than is available in the kolkhozes of Stalingrad Oblast (6). The same source states that in order to fulfill the plans for agricultural

projects, many of which are in the study area, workers must be obtained by relocation and importation. The amount of resettlement in the near future, however, was described as "in all probability highly limited."

The distribution of settlements within the study area follows a definite pattern. Large settlements are characteristically situated along the banks overlooking the Volga and the Volga-Akhtuba Floodplain. Stalingrad (Figures 11-16), the largest and only outstanding urban concentration in the area, extends for 30 miles along the west bank of the Volga at the head of the Volga-Akhtuba Valley. "Stalingrad City" includes all the area from Rynok south to and including Krasnoarmeysk. Population figures for this city range from about 445,000 in 1939 to the current US Air Force estimate of 650,000. Despite this upward trend, its relative rank among cities of the USSR has reportedly declined from thirteenth to fifteenth place (37). The relative decline may be attributed to the very great depopulation during World War II and to a disproportionately larger postwar increase in the population of other cities in the USSR.

Of the settlements in the study area that have over 1,000 inhabitants, the great majority -- 41 out of 62 towns -- are located along the banks of the Volga and Akhtuba rivers. The remainder are located either in the western third of the study area or near Lakes Baskunchak and El'ton. The most conspicuous

concentration of the settlements with over 1,000 inhabitants is along the northern shore of the Akhtuba River. These large villages are basically agricultural centers (usually with a machine-tractor station), administrative centers, and focal points for cultural activities. The villages are spaced at an average distance of about 7 miles and usually are the termini of the principal roads leading from the Caspian Lowland plains.

Five-sixths of the villages with populations of over 1,000 have fewer than 4,000 inhabitants. Seven of the eight settlements with populations known to be over 5,000 have some type of manufacturing activity and five are administrative centers (see map CIA 11995).

The vast majority of the settlements in the study area have fewer than 200 inhabitants and are exclusively agricultural (Figure 7). Those in the Hilly Western Fringe area are typically situated along the valley systems, and in some valleys the string of settlements is almost continuous. Throughout most of the Caspian Lowland area, the smaller villages are much more evenly distributed, availability of potable water being an important factor in determining their exact location. In the relatively richer zone along the left bank of the Volga and Akhtuba valleys, the average distance between villages is 2 to 4 miles. To the east, villages are progressively farther apart, most notably in the area east of the Saratov-Astrakhan' railroad line. In the

extreme east a small section of the Sandy Naryn near Urda has a noticeably denser population than surrounding areas. Some areas, such as the extreme northern extension of the Kalmyk Steppe and the Shor Khaki, are almost completely devoid of settlements.

Throughout the plains there are a large number of settlement sites that are used seasonally by migrant herders. Many of these sites apparently have permanent buildings, even though they are used only during one to three months of the year.* In addition, there are probably a large number of traditional camp sites used by the Kazakh herders for briefer periods.

Calculations of population densities are of necessity based on 1936 data. In the Hilly Western Fringe area near Stalingrad the average density of population was 26 per square mile or, excluding villages of over 1,000 population, a rural population of 6.5 per square mile. Figured on the same basis, the average and rural population densities on the Volga-Akhtuba Floodplain near Stalingrad were 108 and 65, on the Caspian Lowland near Stalingrad were 20-38 and 13-18, on the Caspian Lowland farther from Stalingrad but near the Volga-Akhtuba Floodplain were 15-23 and 4-7, and on the Caspian Lowland in the east were 8 and 5. If the population of villages over 500 were also excluded, the rural population density would be lower by about half throughout most of the area (9).

* Soviet maps of the study area at 1:200,000, published in 1941-43, indicate a large number of settlements in the Plains as "let." (summer), "letn. kh-ra" (summer 'khutor' or farm), and "l.kh." followed by a proper name. For most of these places, there are symbols indicating several buildings.

Postwar information on population shifts or conditions is available for only four localities within the study area: (a) The area northeast of the Volga-Akhtuba Floodplain reportedly has lost some 3,000 persons through evacuation. (b) In the northern outskirts of Stalingrad, along the Mechetka River and in nearby areas, new settlements have been constructed (38). (c) The Krasnyy Oktyabr' Kolkhoz of the Krasnoslobodskiy Rayon was reported to have 110 households both before the war and in 1946; at the latter date the total population was 340 persons and the working force was 119 persons, of whom 87 percent were women (16). (d) Just north of Verkhnyaya Akhtuba on the Akhtuba River a new town is reported to be under construction in connection with work on the new Stalingrad dam project (39).

B. Ethnic Composition, Language, and Religion

The population of the study area consists of two main groups -- the Slavs including the Great Russians and Ukrainians, and the Turko-Tatars including the Kazakhs, the Tatars, and some Kalmyks. A small number of Germans were also included in the prewar population. The Great Russians, numerically the largest population group, are concentrated in the Hilly Western Fringe area and adjacent parts of the Volga-Akhtuba Floodplain. With few exceptions, Great Russians dominate all of the larger settlements. In 1936, most of the Ukrainians in the study area were located

(and probably still are) in small settlements northeast of Stalingrad on the east bank of the Volga.*

In terms of area occupied, the Kazakhs are the principal peoples in the study region. They are largely migratory herders and occupy practically all of the Caspian Lowland. Tatars and Kalmyks also occupied sections of the Caspian Lowland before the war, but in much smaller numbers. In 1936, significant Tatar concentrations were located in the vicinity of Leninsk (nearly 1,500 persons in 3 settlements) and in the area between Lake Sarpa and Krasnoarmeysk (1,850 persons in 2 settlements).

The postwar fate of the two smallest minority groups mentioned, the Kalmyks and the Germans, is unknown. Their status has undoubtedly been affected by the fate of others of their ethnic groups who lived in the Kalmyk ASSR and the German-Volga ASSR. Both of these autonomous republics were abolished, the former in 1943 and the latter in 1941, for alleged collaboration with the German invaders.

Since the study area is in the European-Central Asiatic transition zone, physical characteristics of the different ethnic groups comprising the population are not sharply defined (Figures 2-5, 16, and 17). The predominant characteristics of the Great

* About 3,000 Ukrainians were located just beyond the limits of the study area in a zone 6 to 19 miles west and southwest of Stalingrad. In this area numerous non-Russian elements were distributed among several large villages and many smaller settlements strung out along the Chervlenaya and Rassoshka valleys.

Russians are fair hair, blue or grey eyes, and usually stocky frames of medium height. The Ukrainians (also referred to as Little Russians) tend to have darker hair, brown eyes, and swarthy complexions. Both groups traditionally belong to the Orthodox Christian (Pravoslavny), Uniat (Greek Catholic or Eastern Rite), or Roman Catholic faiths. The Russian and Ukrainian orthographies are based on the Cyrillic alphabet. The languages differ but to some extent are mutually understandable.

The Kazakhs are definitely mongoloid in physical appearance, with evidence of considerable Caucasoid admixture in this particular region. They are Moslems and speak a Turkic language. The orthography, which was adopted in 1929, is based on the Latin alphabet, with the addition of a few symbols for sounds not readily expressed by Latin characters. In most aspects the culture of the Kalmyks is closely related to that of the Kazakhs.

C. Historical and Social Background of the Kazakhs (40)

The Kazakhs, frequently referred to in the older ethnographic literature as Kirgiz,* dominate at least 80 percent of the study area. Before the era of Russian domination, local groups, made up of related family groups migrating together, were to a great extent independent or at least autonomous politically,

* The administrative area assigned to this people was established as the Kirgiz ASSR in August 1920 (this area is not to be confused with the Kirgiz ASSR that later became Kirgiz SSR). In June 1925 the Kirgiz ASSR was renamed Kazak ASSR. This unit was advanced to the rank of Union Republic (SSR) in December 1936, and the spelling of its name modified to Kazakh.

although they were nominally subject to the khans or sultans, who at different times succeeded in gaining a measure of supremacy in different parts of the steppe. The solidification of Russian power brought important changes to social structure and the administration of the Kazakhs. Russian occupation of the steppes became truly effective about the middle of the nineteenth century, when the capture of Tashkent in 1865 was followed by the conquest of all Turkestan. In 1868 the entire steppe was divided into a number of administrative units, among which the tribal groups were apportioned arbitrarily. Local officials were elected, subject to government supervision, and Kazakh common law was systematized. There is some evidence that the native Kazakh political organization was rather easily abandoned by the people. The names of the official Russian civil divisions very quickly acquired more significance than the old tribal names, and the clannish feeling for the members of the same family group and tribe was transferred to the members of the same volost and uyezd (Tsarist administrative divisions). The regulations of 1868 remained in force until the revolution of 1917, with only minor changes. As recently as 1936, however, natives usually referred to former tribal organization in terms of Tsarist administrative units.

Kazakh social structure is based on an elaborate family organization, much of which still persists in spite of Soviet efforts at eradication. The average man has only one wife. According to

Mohammedan law, however, a man is allowed four wives, but a rich Kazakh may have a larger number of wives or several different houses with a wife and children in each. First marriages are usually arranged by the parents of the parties concerned. When the financial status of the family permits, marriage takes place at a very early age.

Class distinction among the Kazakhs is determined, first, on the basis of hereditary castes and, second, by economic position within the community. Wealth is based on ownership of cattle, grazing lands, winter habitations, and other land.

According to ancient Kazakh tradition a passing traveler is entitled to stop at any man's hut (kibitka) and remain indefinitely. The host is responsible for the welfare of his guest and may be tried for the murder of any stranger who succumbs to starvation or exhaustion within the vicinity of the camp. In order to avoid the burden of this obligation, the Kazakhs camp sites are generally at a distance from much frequented routes or are concealed behind hills. Although theoretically even enemies have the right to hospitality, travelers seldom stop where they do not expect to be welcome.

During the Tsarist era the herding economy experienced many changes, but changes have been far more radical in the last few decades. The impact of collectivization of agriculture, urbanization, and the introduction of new industries has had a pronounced

effect on the social structure of the population. Despite the drive for changes, cultural traits of the Kazakhs that are not readily adaptable to current changes have persisted and manifest themselves in various forms of resistance to the Soviet system.

D. Political Attitudes

The political attitudes of population groups are expressed in various ways. The cohesiveness of Mohammedan family life remains a serious obstacle to Soviet encroachment and domination. Persistent efforts have therefore been made by the Party to stir up discord between youth and the older generation and to alienate youths from the influences of home and family. Moslems, in general, have been opposed or indifferent to the Communist agricultural system, and many of them have been arrested and sent to Siberia. Moslem religious practices are still observed in private, and in the smaller and more remote communities, public worship persists. The Mohammedan religion is not limited to a family or local community. The ties between the Moslems in the Soviet Union and the rest of the Moslem world are stronger than the Soviets would like to admit.

There is little basis for estimating the political attitudes of the indigenous Great Russians since relocation (generally a source of grievance) is not involved, and numerous reports indicate that the average citizen is rather poorly informed as to conditions outside the USSR. Nevertheless, agricultural reports written as recently as 1951 decry the indifference and lack of cooperation

among the peasants in Stalingrad Oblast and particularly in the vicinity of Stalingrad City. Although there are several outstanding pro-Bolshevik sovkhozes and experimental farms in the study area, the majority characteristically fall short of planned production and are slow to accept new programs.

The Ukrainian minority consists of people who were transported to the study area for economic or political reasons. Under the Soviet system, it is not uncommon to transplant a group of people to form a working nucleus for the development of some type of economic activity in which they are experienced. Some of the Ukrainian migrants were brought in as skilled laborers from the industrial centers of the Ukraine and others as agriculturalists with experience in a specific type of farming. These people are generally pro-Ukrainian by tradition and sentiment, which has been known to breed an anti-Soviet attitude. This attitude was reflected in the conduct of some Ukrainians during the German invasion and by periodic Soviet purges.

Political migrants are usually people in political disfavor or Party cadre assigned to an area to perform special functions. Those in political disfavor may be sent out to do heavy physical labor or, in the case of artists or intelligentsia, to spread culture in more primitive surroundings. People of this type are usually anti-Soviet in attitude. On the other hand, the Party cadre are likely to be Party trouble-shooters or functionaries who are staunch Soviet supporters.

E. Health and Sanitation

Information on the status of health and medical facilities for the study area is based on reliable 1936 data, supplemented by more current information wherever possible (9). Throughout the populated area, medical facilities are fairly evenly distributed in relation to the density of population. The quality of these facilities cannot be ascertained. The comparatively low infant mortality and relatively young population, coupled with a low morbidity from endemic diseases (with the exception of malaria), indicates a generally favorable health situation.

Five years before World War II, a record of medical facilities for Stalingrad Oblast as a whole listed the average hospital cot accomodations as 4.6 per 1,000 persons and 1.2 per 1,000 for the rural villages. Yearly visits to medical dispensaries average 6 per person in urban centers and 1.4 in the villages. At this time the goal for the USSR as a whole was to increase cot facilities to 72 per 1,000 persons in urban centers and 20 per 1,000 in rural villages. By 1950, however, cot facilities available in rural areas throughout the USSR were still only 2.75 cots per 1,000 persons.

On the basis of 1936 statistics for nine administrative rayons whose areas are still included in the area of study, medical facilities were as follows: (a) from 1 to 5 hospitals per rayon, with more than five rayons having 2 hospitals; (b) from 17 to 50

cots per hospital, with the majority of hospitals having 20 cots; (c) from 2 to 6 medical dispensaries per rayon, with an average of 4 per rayon; and (d) from 4 to 9 first-aid stations, with an average of 7 per rayon. In addition, there are a few sanatoria and workers' rest homes within the study area.

Sanitary control is maintained by the government to aid in the preservation of health and to control the spread of epidemics. A four-point sanitary program is based on the home and community, school, industry, and governmental food control. Within a rayon, sanitation work is directed by the rayon sanitation inspector who sometimes has an assistant. Occasionally one inspector will serve several rayons under an inter-rayon setup. Each rayon sanitary epidemic station has a laboratory, a disinfecting point, a disinfecting chamber, a mobile disinfecting unit, a vaccination center, a milk-control center, and a sanitary-education point with a mobile educational display unit. The sanitary control station may also include units for malaria control, pasteurization, and measles control (41).

A 1929 survey indicates that malaria morbidity for the study area is relatively high, reaching a yearly average of from 400 to 600 patients per 10,000 persons. At that time, there was a malaria control station located in Stalingrad. The highest malaria morbidity record for the USSR is 1,000 or more cases per year per 10,000 population (in the southern Caucasus area). The floodplain

of the Volga and Akhtuba rivers is infested with malaria-carrying mosquitoes during the summer. The worst months are August and September (42).

A survey of the morbidity of typhus in the study area discloses the lowest number of cases in the USSR -- 0.9 per 10,000 persons per year. A maximum number of patients are affected in February (43).

The number of cases of typhoid in the area, 5.0 per 10,000, is also the lowest in the USSR. The disease is more prevalent in urban than in rural areas. The number of patients with typhoid reaches a maximum in the fall (September) and minimum in the spring (April to June) (44).

The area ranks second to the lowest in the USSR in the number of occurrences of smallpox, averaging 1.0 patient per 10,000 inhabitants. The maximum number of cases is reported in March. A law in the RSFSR requires that all persons be vaccinated against smallpox by the age of one and then revaccinated at the ages of 11 and 21 (45).

Throughout the entire USSR, lice and bedbugs are two of the most pernicious insect pests, not only from the standpoint of bodily discomfort but also as mediums for the spread of disease. Most cities and urban settlements have delousing stations connected with industrial establishments or sanitation centers, but usually the measures taken are not thorough and provide only limited control rather than complete eradication. In some factories, workers are regularly deloused every two weeks.

Ticks are also a common pest. A recent release by the Kazakhstan Academy of Sciences reports the "discovery" that ticks (ixiodiae) are also carriers of microbes that cause many serious human and animal diseases.

The water supply of the study area presents numerous health hazards. No part of the area is equipped with entirely adequate water purification and sewage disposal facilities. Much of the area uses unprocessed ground waters and is completely without disposal systems. Along the Volga and at Stalingrad the situation is least primitive. Water for the Stalingrad industrial district is taken primarily from the Volga and, to a much lesser degree, from wells. It is purified by sedimentation, filtration, coagulation, and chlorination. Facilities for purification, however, are believed to be very old and to be inadequate for current demands. Sewage water is discharged into the Volga and its tributaries. Of the daily discharge, about 65 percent is industrial waste. A large proportion of the waste is unprocessed or inadequately processed, and the Volga becomes heavily polluted by mid-summer, when the water level is lowest. The Tsaritsa and other small streams in the area are always badly polluted. Even away from densely populated areas the water supply is not good and becomes considerably worse in the dry season. According to an official 1934 source the water in the area north of Stalingrad "in 70 percent of the inhabited places is polluted by discharges, in 33 percent by livestock watering, and in 33 percent by clothes-washing" (4).

F. Educational Facilities

Educational facilities are widespread throughout the area and include pre-school nurseries and kindergartens, elementary or primary schools, incomplete secondary schools, secondary schools, and institutes.

In 1936 the educational facilities of the 9 administrative rayons of Stalingrad Oblast that are located in the study area included approximately 115 elementary or primary schools, 33 incomplete secondary schools, 5 secondary schools, and 1 teacher-training school. Most of the larger villages have at least one elementary school. Some villages ranging in size from 2,000 to over 8,000 inhabitants have more than one elementary school. In 1936, three villages had 2 elementary schools each, one had 3, and one had 4. The 33 incomplete secondary schools are distributed throughout the rayons in proportion to the population. Because of its central location with reference to surrounding villages, Kamennyy Yar has 2 secondary schools although its population numbers only 2,000. The entire nine rayons are served by five secondary schools (9).

The utilization of increasingly large numbers of women in industry and agriculture has increased the need for nurseries and kindergartens. Some operate the year round, others only during the seasons of peak agricultural work.

The only known school of higher education in the study area is a teachers' institute in Stalingrad. Kazakh higher education is primarily oriented toward the more densely populated areas of eastern Kazakh SSR beyond the study area, particularly toward Alma Ata.

G. Forced-Labor Camps

1. Soviet Forced-Labor Organization

Plans for increased industrial development of the study area and the completion of programs for afforestation, dam construction, and canal, road, and railroad building are to a large extent dependent upon the use of cheap forced labor. The forced-labor system in the study area is part of a nation-wide program. The Soviet Union is divided into a number of camp systems, whose borders are often coterminous with those of the administrative oblasts. The central organization is Gulag (Glavnoye Upravleniye Lagyeriy) in Moscow. The camp systems, which are supervised by Gulag and administered by the secret police of the Soviet Union (MVD), are divided into districts (otdeleniye), which are further subdivided into labor gangs (lagpunkty). A labor camp may include from several hundred to several thousand inmates and a labor gang from 600 to 1,800 prisoners. The three main types of civilian forced labor -- detention at the worker's normal place of employment, exile, and confinement to a place of detention -- are all represented in the study area (46).

In addition to Soviet civilians, forced laborers have been impressed from the ranks of wartime non-Soviet displaced persons and prisoners of war. In many cases the latter were convicted on trumped-up charges to enable the MVD to retain skilled labor.

A substantial portion of the study area is a part of the Osobostroy slave-labor district, which includes the Stalingrad and Krasnoarmeysk, Kamyshin, Krasnyy Yar, and Engels areas, all with headquarters at Kamyshin (124). Long-range economic activity of Gulag in this district emphasizes (a) construction and maintenance of canals, roads, and railroads, (b) building of fortifications, (c) construction of factories and installations for war industries, and (d) factory work. All activities involve both men and women.

Information about forced labor in the area is based largely on reports from German prisoners of war who spent some time in the area and worked at the various installations. Some were in the area as recently as May 1949. The reports are of little value in establishing specific locations or precise statistical data, but the strikingly similar descriptions in the various reports lends some credence to their general reliability and renders them of use in providing background information on the area.

2. The Stalingrad-Beketovka Area

The Stalingrad-Beketovka area employs both skilled and unskilled forced labor. Most of the unskilled laborers are engaged in construction work. Skilled and semi-skilled workers are

employed in a number of the factories of the area. In many cases it is difficult to distinguish between forced and regular laborers, because security measures are in evidence throughout the plants and there are numerous off-limits areas and enclosures. Plant areas are generally surrounded by concrete walls and wooden or barbed-wire fences.

The largest utilizers of forced industrial labor are the Krasnyy Oktyabr' iron and steel plant and the Krasnyye Barrikady armament plant, but large numbers are also employed at other installations. A total of 10,000 prisoners, together with about the same number of civilians, are employed daily in two 8-hour shifts in the five sawmills of the area. The Beketovka electrical power plant employs 300 prisoners of war and 600 civilian laborers, working in three 8-hour shifts daily (50).

In the Stalingrad area, many forced laborers and political prisoners have been interned in camps originally constructed for German prisoners of war who have gradually been repatriated. The transition from P-W to civilian-prisoner camps could be identified by the replacement of barbed-wire fences by high wooden fences to prevent visual contact between prisoners and the outside.

Former Prisoner-of-War Enclosure 7362/1 is located in the western outskirts of the city of Stalingrad about one-half mile west of the Dzerzhinskiy tractor plant (18). It consists of from 7 to 10 wooden barracks, each 65 to 100 feet long and 20 to 25 feet

wide. The barracks have flat roofs covered with dark roofing paper. Prisoners of war have stated that the last of their group was removed in December 1949, at which time Soviet political prisoners moved into the enclosure. During the summer of 1949 the barbed-wire fence was replaced by a wooden fence 10 feet high. Up to December 1949 an unknown number of MVD guards patrolled the camp. The camp had a capacity of over 2,000 prisoners, a small percentage of whom were employed at the Dzerzhinskiy tractor plant in Stalingrad.

Former Prisoner-of-War Enclosure 7362/2 is also located in the western outskirts of Stalingrad, a little to the west of Enclosure 7362/1. It was used as a hospital enclosure and has about seven wooden barracks, each approximately 50 feet long and 15 feet wide, with flat roofs covered with roofing paper. Together the buildings can accommodate 400 to 500 inmates. The enclosure was still in operation as a prisoner-of-war camp in April 1950, but the barbed-wire fence was being replaced by a high wooden one, an indication of a probable shift. Except for some modern X-ray equipment, the hospital equipment was primitive and in poor condition.

Former Prisoner-of-War Enclosure 7362/3 is located in the same general vicinity as the other two and is about 5,000 feet west of the Dzerzhinskiy plant (49). It consists of 8 or 10 earth bunkers with only the windows and the flat, paper-covered roofs above the ground level. Each bunker is about 50 feet long, 25 feet wide, and 15 feet high and can accommodate 150 men. The interiors are of

wooden construction. The enclosure also includes three two-story brick structures about 65 feet long and 25 feet wide. In 1949, one building served as a hospital, and the other two were occupied by prisoners. There were also 10 wooden guard towers, each about 15 feet high. Eight of the towers were equipped with stationary electric lights and the remaining two with revolving searchlights. Two of the brick buildings also had searchlights. Some 150 guards patrolled the installation and lived in a building just outside the enclosure. When on patrol outside the fence the guards were accompanied by dogs. About 200 of the prisoners of war were employed at the Dzerzhinskiy plant. During the summer of 1949 the barbed-wire fence was replaced by a wooden fence 10 feet high, and the last of the German prisoners left on 23 April 1950. The erection of the wooden fence indicates the camp will probably continue as an enclosure for civilian prisoners (47, 48).

Former Prisoner-of-War Enclosure 7362/11 is located approximately 1 mile south of the Dzerzhinskiy plant on the west side of the main double-track railroad to Stalingrad. The layout consists of four bunkers about 50 feet long and 15 feet wide, with only the flat, paper-covered roofs and small windows above ground. Alongside these is another bunker of the same dimensions and type of construction, except that about half of the building is above ground. Each bunker can accommodate some 90 men. Three additional flat-topped wooden barracks, measuring about 50 feet long and 20

feet wide, were built to house operational facilities, such as bath house, tailor shop, and shoe-repair shop. The enclosure has five or six wooden guard towers 15 feet high. In 1950 the place was guarded by some 40 guards with dogs. In January 1950 a wooden fence 10 feet high was constructed, and in March the German prisoners were replaced by 250 Rumanian and Hungarian Volksdeutsche.

A Soviet prison camp that has always been for civilians is located about 1,600 feet west of the Stalingrad city prison and 650 feet east of the double-track railroad leading north and south through the city. The area is surrounded by a high wooden fence and is patrolled by MVD guards with dogs. In December 1949, Soviet citizens and German prisoners of war stated that 20,000 civilian prisoners were to occupy this enclosure (48).

Former Prisoner-of-War Enclosure 7362/14 is located at Beketovka at the southwestern edge of the Stalingrad industrial area and contains four wooden barracks about 60 feet long and 25 feet wide, with shed-like roofs covered with paper. There are also three earth bunkers 50 feet long and 25 feet wide, with only sod roofs and windows above the ground level. A wooden fence 15 feet high surrounds the area. On either side of the fence and 15 feet away from it are barbed-wire fences 5 feet high. In 1949 the enclosure contained about 1,000 prisoners, 300 of whom were employed on canal construction, together with civilian laborers of both sexes. German prisoners were replaced by Soviet civilian prisoners in late September or early October 1949 (48).

Another German prison camp is located at the southwestern edge of Beketovka in the section known as Staraya Otrada. It is about 1,600 feet west of the main highway leading south from Stalingrad to Krasnoarmeysk. The enclosure contains about five buildings and is surrounded by a high wooden fence. It is not known whether this camp has been converted into a civilian prison camp.

3. The Krasnoarmeysk Area

Krasnoarmeysk is a center for forced labor on construction work, primarily on the Volga-Don Canal Project and the Volga-Don Highway. Plans for this work are reported to include the construction of five forced-labor camps which will be spaced at 6- to 9-mile intervals along the course of the canal between Krasnoarmeysk and Tundutovo (51).

A settlement of Russian forced laborers, Gorodok Vokhra, is located on the southeastern outskirts of Krasnoarmeysk. In May 1949 the settlement, which is surrounded by a double wooden fence 6 feet high (49), consisted of three wooden barracks (170 feet long, 40 feet wide, and 15 feet high), a kitchen, a mess hall, and a kennel for dogs. Three additional barracks of the same size were in early stages of construction. In March 1949, an unknown number of Uzbeks, Cherkessians, and Turkmens were transferred to the Gorodok Vokhra barracks to help in the construction of the Volga-Don Canal. The majority of these workers were between the ages of 17 and 20. According to Russian workers the settlement is

to be extended to the east and south to accommodate a total of 10,000 or 12,000 forced laborers. About 1,000 Uzbeks are being trained to guard these laborers.

Two known prisoner-of-war camps in the Krasnoarmeysk area have been converted into civilian forced-labor camps for construction work. Former Prisoner-of-War Enclosure 7108/1, consisting of 10 barracks and 4 auxiliary buildings, housed 3,000 prisoners. By December 1949, all German prisoners had been removed, four additional barracks had been built, others were under construction, and civilian laborers had begun to arrive. Former Prisoner-of-War Enclosure 7108/T was also converted into a forced-labor camp, which houses about 3,000 Soviet civilians.

Two other forced-labor camps in this area, one containing 5,000 prisoners and the other an unknown number, are also in operation, but their exact locations are not known. One camp consists of two sections, one for men and the other for women. Laborers at the camps range in age from 16 to 60 and come from all parts of the USSR. Most of them are employed on the construction of the Volga-Don Canal.

Other installations in the Krasnoarmeysk vicinity that were known (1949) to use prison labor either in construction or operations are as follows: (a) a shipping station that employed 300 prisoners of war and 200 civilians in 3 shifts, 6 days a week; (b) a sawmill that employed 500 prisoners of war and 100 civilians

in 2 shifts, 6 days per week; (c) a cement plant; (d) a shipyard; (e) an alcohol plant; (f) a kolkhoz belonging to a power plant west of Krasnoarmeysk; (g) a butter and fat factory; and (h) the Volga-Don Canal Project Motor Pool No. 1. Construction of the motor pool was almost completed by December 1949. It was then equipped with 60 to 70 dump trucks. Facilities included a garage and repair shop of brick construction, 2 storage sheds, and 6 wooden barrack-type workers' billets, with 10 more under construction (50, 52).

V. Transportation

A. Transportation Pattern

The transportation network within the study area is most nearly adequate around Stalingrad and adjacent to the Volga-Akhtuba Floodplain. In this area it consists of major railroads and roads that are well maintained and trafficable throughout the year, supplemented by the navigable Volga River and air transportation.

Apart from the Stalingrad center there are only two railroads in the study area -- one paralleling the south and east bank of the Volga from Post Paromnaya to Vladimirovka and continuing eastward to Lake Baskunchak and the other crossing the eastern half of the study area from north to south, passing through El'ton and Baskunchak and continuing on to Astrakhan'. The road net also becomes progressively less dense with distance from Stalingrad and from the Volga-Akhtuba Floodplain. Except for a new improved dirt

road that is under construction from Urda westward towards El'ton or Zhitkur (117) and short sections of improved dirt roads near Lakes El'ton and Baskunchak, the road net in the eastern part of the study area consists of seasonal unimproved dirt roads, trails, paths, and caravan routes. To the north and south of Shor Khaki, the net consists almost exclusively of caravan routes. Currently the only actively maintained airports are in the vicinity of Stalingrad.

The 10-inch Astrakhan'-Saratov-Kazan' oil pipeline reportedly passes through the eastern part of the study area in a generally north-south direction (72, 73). The Astrakhan'-Saratov section was constructed during World War II, when water-borne traffic on the lower Volga was interrupted by the German advance and an alternate channel of supply had to be established. Crude oil from the Caucasus oilfields is currently transported by this pipeline to the refineries at Saratov. Information as to the alignment of the pipeline is vague, being based solely on reports that pumping stations are located at El'ton, Verkhniy Baskunchak, Vladimirovka, and Udachnoye (125). For this reason it is not shown on the accompanying map, CIA 11995.

B. Railroads

1. Regional Distribution

Railroad facilities in the study area can be divided into the following four units: (a) the Stalingrad center; (b) the

three major railroads that converge at Stalingrad; (c) the railroad line from Post Paromnaya, via Vladimirovka, to Nizhniy Baskunchak; and (d) the railroad from Saratov to Astrakhan', which connects the salt-producing areas of Lakes El'ton and Baskunchak with Astrakhan'. Administratively, the first two units are part of the larger Stalingrad Railroad System and the other two units belong to the Ryazan'-Ural Railroad System.

2. The Stalingrad Railroad Center

Stalingrad is an important rail center for all of southeastern European USSR. It is linked by rail with Astrakhan' (200 miles southeast), with the main Transcaucasus line at Tikhoretsk (240 miles southwest); with the Donets Basin via Likhaya (175 miles west); with Saratov (210 miles northeast); and with Moscow (500 miles northwest). These lines, converging upon the city, are linked to each other by a system of belt lines that encircles Stalingrad proper and enables through traffic to bypass the city (21).

Of the 13 railroad stations and yards within the Stalingrad railroad center, eight handle almost all the passenger and freight traffic as well as most of the railroad repair work. Four of the eight, including the main passenger station for the entire area, are in Stalingrad proper. Two others are located in the towns of Beketovka and Krasnoarmeysk, south of Stalingrad proper. The remaining two are in Gumrak and Kruten'kiy, both of which are

located to the west of the urban area of Stalingrad. The important rail yards in the Stalingrad area appear to have the dual functions of car storage and classification (21).

The main terminal, referred to by the Air Force as Stalingrad Railroad Station, Yards and Shops North (I),* is in the center of Stalingrad proper. Besides the large passenger station, Stalingrad North has extensive freight sidings with an average width of 20 tracks, a small transshipment depot, and important facilities for locomotive repair and servicing, including a turntable and a water tower (21). Although the station was severely damaged during World War II, apparently little repair work has been undertaken (56). All the significant traffic through the city on the line from the Caucasus to north-central USSR and the Ukraine is handled at this depot.

Stalingrad Railroad Station, Yards and Shops South (II) is located two miles southwest of the main railroad station. It has important freight-handling equipment, multiple sidings with 10 to 15 tracks, and several warehouses, as well as minor locomotives and passenger-car repair shops. The majority of the buildings in the area were destroyed in April 1943. Stalingrad South straddles the railroad lines connecting Stalingrad with the Caucasus and Ukraine (21).

* The terminology used for station titles follows that of source 21 listed in Appendix F-1.

The third significant installation in Stalingrad proper is the Bannaya station and yard which parallels the southern section of the port area. In addition to the small passenger station, there is an 11-track storage yard, with a warehouse and six auxiliary buildings, that services the port area and possibly the Krasnyy Oktyabr' steel plant (21).

On the southern fringe of Stalingrad proper is the Stalingrad Railroad Classification Yard "Yel'shanka," which has a 10-track storage yard, a medium-sized classification yard for traffic to the Caucasus, a single-story warehouse, and an L-shaped building assumed to be a passenger station (21).

Farther to the south is the Stalingrad Railroad Classification Yards "Beketovka." It includes a passenger station and a small storage yard described by one source as having a width of 7 tracks (21). According to another source, however, the installation has a medium-sized classification yard 10 to 15 tracks wide, with sidings approximately 4,000 feet long. The installation handles local and Caucasus-bound traffic.

The station at the northwestern end of Krasnoarmeysk is listed as the Stalingrad Railroad Station, Classification Yards, and Shops "Sarepta." It is the main station in Krasnoarmeysk and had been described as the "southern gateway to Stalingrad." An important function here is the transloading of freight from railroad to Volga steamers and barges, but a considerable amount of

freight for Stalingrad also passes through Sarepta. Among the facilities at the station are storage yards, important locomotives and car repair shops, a roundhouse of nine-locomotive capacity, a turntable and a turning "Y," and a water tower (21). Damage in 1942 appears to have been slight.

Six miles west of the city, at the junction of the northern part of the belt line and the main line leading northwestward toward Moscow, is the Stalingrad Railroad Station and Yards "Gumrak," which includes a passenger station and an 11-track storage yard. The small classification yard handles traffic to north-central USSR. Eight auxiliary buildings are reported to have been destroyed in April 1943 (21).

Seven miles south of Gumrak and six miles west of Yel'shanka is the relatively small Stalingrad Railroad Station and Yards "Voroponovo" (known also as "Kruten'kiy"). Like Gumrak, it is located at a junction of the belt line (central section) and a main line leading out from Stalingrad. Voroponovo, which serves the railroad line to the Donets Basin, has 11 tracks, 5 auxiliary buildings, and possibly a passenger station (21).

The most important railroad bridge within Stalingrad is the bridge over the Tsaritsa River. It is a double-track, steel-trestle bridge about 530 feet long, with an estimated web height of 5 feet. The ends of the bridge are on concrete abutments, and the support piers are of steel lattice-work construction (21, 53).

Although there are several bridges along the belt line, exact information as to location or construction is available for only two, both of which are on the northern section. The Orlovka River is spanned by a single-track, arch-type bridge 200 feet long, possibly of masonry construction. Near the eastern end of the northern belt line section, a single-track bridge 350 feet long, possibly of masonry-arch construction, crosses the Sukhaya Mechetka River (21). The Korennaya River also is crossed by a bridge located on a branch line (from the vicinity of Dzerzhinsk) that connects with this northern section. It is a single-track, nine-span bridge 275 feet long, of arch-type masonry construction (21).

Within the dock area the Banniy Ravine is crossed by a three-span, steel-girder bridge 335 feet long that carries a single track (21). It is located on a short branch line, most of which is double tracked, that runs along the bank of the Volga River for a distance of 6 miles and serves the port of Stalingrad.

The postwar reconstruction program for railroad facilities in the Stalingrad area includes many changes and general modernization in the transportation system, which has always been unsatisfactory. A railroad ran the entire length of the city, occupying a large strip of land, intersecting many streets, and dividing the city into two parts. Heavy freight passed through the city and repair facilities were located in the center of

Stalingrad. According to the reconstruction plan, a new peripheral railroad about 13 miles long will surround the city. The freight yards and repair and maintenance shops are to be moved from the center of the city to the outskirts and will be connected with the new belt line. Freight entering Stalingrad will be distributed by means of the new line to the appropriate freight terminals. At both ends the peripheral railroad will be connected with the dock area to permit the transferral of freight to barges and steamers for shipment to points north and south along the Volga River. Only passenger traffic and freight destined for Stalingrad proper will be handled in the heart of the city. The new arrangement will facilitate the handling of local passenger traffic within the 30-mile-long city (21, 54, 55).

In the central part of Stalingrad proper the main north-south railroad will run through a shallow subway, which will reduce the number of grade crossings and leave uninterrupted areas for parks (21). According to one report a large underground railroad station is to be built within the city. This report is substantiated to some extent by the fact that little repairing has been done on the severely damaged main railroad station (56).

Passenger transportation within Stalingrad is handled mainly by streetcars and buses. The streetcars have bow-type collectors and run on Russian standard-gauge tracks. Except for the line from the center of town to the northeastern suburban industrial area,

all streetcar lines are single tracked. An interurban line runs from Beketovka on the south to the tractor plant in the northern part of the city. Before the war a line also ran from Stalingrad to Gumrak, but it was damaged during the war and has not yet been repaired. Most of the streetcars are in poor condition and appear to have no springs. Travel is slow, averaging 10 miles per hour, and requires frequent transferring (56).

Streetcars and buses are supplemented by commuter service on the railroads. A local train makes 10 round trips daily between the northern and southern sections of the city, and it is reported that three daily workers' trains run between the industrial areas of Beketovka and Krasnoarmeysk (57, 21).

3. Lines Converging at Stalingrad

a. Stalingrad-Tikhoretsk-Krasnodar

This line from Stalingrad to the western Caucasus is double tracked from the main station, Stalingrad North, through Sarepta to Krasnoarmeysk, then single tracked southwest through Sal'sk to the junction with the important Rostov-Baku line at Tikhoretsk and on to Krasnodar (21). The roadbed is in very good condition. Ballast consists of granite chips, and the ties are of oak (58). Agricultural and petroleum products from the Caucasus, timber from the northern areas, fish from the Black Sea, and machinery and oil-field equipment from Stalingrad are the important products carried over the line (21, 59, 60).

Branching off from the main line at the Tundutovo railroad station (southwest of Krasnoarmeysk), a new railroad built on an old roadbed runs in a generally northwest direction and connects with the main Rostov-Stalingrad railroad line. The branch is single tracked, with a sand roadbed and wooden ties (48, 61). A 1951 Soviet source indicates that this line was completed and put into operation in autumn of 1949 (62). Plans have been made to construct a railroad bridge where the railroad intersects the Volga-Don Highway to replace the present level crossing. Surveying for the bridge was under way in December 1949 (82). There is a possibility that the bridge is either completed or that a temporary structure is now being used by through traffic.

Most freight entering Krasnoarmeysk on this line either continues north to Stalingrad proper, or is transloaded to river carriers. The Sarepta station is a principal transshipment point for grains (63). Grain from the Stalingrad region, some of which is locally processed, is shipped north along the Volga. Wheat and barley is received from the Ukraine and the Caucasus area (Kuban') from June to October and is transloaded to Volga barges by means of conveyor belts (64). Because of the activity connected with the construction of the Volga-Don Canal, the station has also become a busy terminal for all kinds of building and construction materials (65). The Beketovka freight consists largely of coal, wood, and scrap iron, which are sent to the Stalingrad Chemical and Chemical

Warfare Plant "Beketovka" 91, to the Stalingrad Thermal Power Plant, Gres I, and to other local establishments (21).

b. Stalingrad-Likhaya

This line provides direct communication between Likhaya in the Donets Basin and the Stalingrad industrial complex. The line is double tracked from the main or north station of Stalingrad west to the Stalingrad Railroad Station and Yards "Voroponovo" (also referred to as "Kruten'kiy"), then single tracked to Likhaya, where it joins the Voronezh-Rostov line. The heavy incoming freight traffic on the line includes manufactured products, coal, and ores from the Donets Basin, and iron from Krivoy Rog (21). From May to October, coal shipped by rail from the Donets Basin to Stalingrad is loaded on wooden barges and transported via the Volga to Saratov (64). Timber from the northern areas makes up a large portion of the return freight to the Donets Basin.

c. Stalingrad-Moscow

This line to Saratov is double tracked for the 12-mile stretch from the main Stalingrad station to the Stalingrad Railroad Station and Yards "Gumrak," and then proceeds on a single track to Ilovinskaya. At Ilovinskaya it turns northwest to Gryazi, where it joins the double-track line to Moscow. This is the most direct route between Stalingrad and Moscow. A branch line turns northeastward from Ilovinskaya to Saratov, thus providing a through

rail route between that important river port and Stalingrad. The Stalingrad-Moscow line is an important traffic artery for manufactured goods from the Central Industrial Region (Moscow), as well as for northbound industrial products and oil shipments from Stalingrad. The oil shipments make up a large share of the northbound traffic. According to a report, three oil trains of 40 to 50 cars each travel northward daily (67). The shipment of prefabricated concrete houses to Moscow and Voronezh is also important (68).

4. The Post Paromnaya-Vladimirovka-Nizhniy Baskunchak Line

This railroad line, which extends in a generally east-west direction across the study area, is important primarily because it connects Stalingrad with the salt-producing center located at Lake Baskunchak and provides rail connection with the Caspian Sea port of Astrakhan'. Large quantities of salt are transported yearly over this rail line to Petropavlovka, the salt port of Vladimirovka, where the salt is transferred to Volga barges. In the following paragraphs, details of the line are given roughly from west to east.

The sector from Post Paromnaya, the railroad terminus on the eastern bank of the Volga River, to Vladimirovka was built during World War II as a vital supply route for the defense of Stalingrad (69). Connection with Stalingrad is maintained by ferry service between Post Paromnaya and Latashanka, about 12 miles northeast of the main Stalingrad railroad station (21). At this point, where the river is approximately 2.5 miles wide, the ferry provides

crossing facilities for both road and rail transport (64). In the Latashanka area, there are two ferry stations -- the northern is used for low-water crossing and the southern for high-water crossing (118). No information is available as to high- or low-water ferry stations on the east bank of the Volga. Soviet sources and recent reports indicate that a rail and road bridge has been constructed over the Volga River to replace the time-consuming ferry service, but the U.S. Embassy personnel who passed this point in daylight as recently as September 1951 saw no such structure. The bridge reportedly is located immediately north of the ferries and is said to be 2.8 miles long. Apparently it is to serve both railroad and highway traffic (21, 70).

The Post Paromnaya-Verkhniy Baskunchak line is single tracked and of Russian standard gauge.* Leaving Post Paromnaya, the railroad passes the stations of Paromnaya, Bezrodnoye, and Zaplavnoye. West of Leninsk and 1-1/2 miles northeast of the center of Bakhtiyarovka the line crosses a bridge over a deep, narrow ravine tributary of the Akhtuba, which at this point is 120 feet wide. Structural details of the bridge are not known. The Leninsk station is located about 1-1/2 miles north-northeast of the center of town. On the north side of the main track are three loop spurs, each approximately 940 yards in length. At the east

* Unless otherwise indicated, information related to the Post Paromnaya-Kapustin Yar sector is based on Source 71.

end of the station, two dead-end sidings 400 yards long parallel the main track on the south, and a single-track branch line runs about 3 miles southeast to Malyayevka. The Leninsk station has no permanent buildings, platforms, or repair facilities.

Available information indicated that in 1942 the branch line to Malyayevka terminated at a quarry one-fourth mile northwest of the center of the village. By February 1943 this spur reached the north bank of the Akhtuba River about a mile from the center of Malyayevka, where a landing pier probably is to be constructed. Along this spur, approximately 270 yards north of the landing, a siding branches off to the southeast, terminating in a building 280 feet long and 25 feet wide. Another short track, reported under construction in April 1943, leaves the main spur line at a point just southeast of the old quarry.

In the Malyayevka area there are two railroad bridges. At a point 2.5 miles north of the center of Malyayevka a small gully tributary to the Akhtuba River is crossed by a two-span bridge with two central columns, which may be of the suspension type. The over-all length of the bridge is 180 feet, and the shore-to-shore distance is 130 feet. A little beyond this, where the line crosses another gully, two parallel bridges can be seen on air photos. Currently, the railroad passes over the southern bridge, and the rails appear to have been removed from the old bridge to the north. The two bridges are of similar construction, both having long

approach ramps. Over-all lengths are 900 feet and clear spans 120 feet long.

At Solodovka the station is located 2 miles northwest of the center of town. A loop spur 1,100 yards long runs alongside and to the north of the main track. No buildings or platforms are visible on 1943 air photographs, but the photos indicate that a shallow cut extending in an east-northeast direction was then being dug at the eastern end of the station. This cut may be either the beginning of a new line or a siding to a nearby airfield. At points 350 and 900 yards east of the station, the line crosses small gullies by means of culverts.

Approximately 1.5 miles northeast of Kolobovka, the line crosses a deep, broad, marshy valley. The crossing consists of a viaduct that appears to span the top of a concrete dam. The viaduct crosses the north or upstream side of the dam. Over the eastern half of the dam the viaduct is of multispan lattice construction, whereas over the western half the construction is more solid. The eastern half of the dam is higher than the western half, which contains 6 or 7 sluices. The over-all length of the dam is 630 feet; the eastern half is 150 feet wide and the western 100 feet wide.

The station of Kolobovka is located 3 miles east of the center of town. No buildings or platforms are visible on air photos. A loop spur 900 yards long runs alongside the main line. In February

1943, 22 holes (each 20 feet square) had been excavated around the station. Although probably designed for storage, all were empty at the time. Another bridge crosses over a water course at a point about 3.5 miles north-northwest of the center of Stasov.

At Stasov, the station is located 3 miles northeast of town, and a loop spur 800 yards long runs alongside the main line. From the east end of the loop, a spur extends 240 yards to the northwest. No platforms or buildings are visible on 1943 photos, but there were large stockpiles of some type around the station.

Approximately 4 miles southeast from the Stasov railroad station is the village of Kapustin Yar. The railroad station is located 3 miles southeast of the center of town. A spur approximately 1,200 yards long runs to the south of the main line. From the eastern end of the spur, a dead-end siding extends westward for 800 yards. At the station is a group of 11 closely spaced huts, with average dimensions of 30 by 20 feet. Three miles southeast of Kapustin Yar, a gully is crossed by a bridge of single-span construction, with long approach ramps. The span clearance is 75 feet, and the over-all length, including ramps, is 280 feet.

About one-half mile due north of Solyanka the line crosses a ravine tributary to the Postepka River. The bridge is of single-span, bowstring type, constructed of either steel or reinforced concrete, probably the latter. The over-all length, including ramps, is 890 feet. From the bridge the line proceeds in an

easterly direction for 4.3 miles and then turns to the southeast toward Vladimirovka, passing the stations of Pologoye Zaymishche and Pokrovka. At the northern outskirts of Vladimirovka, a spur branches off to the southeast from the main line and rejoins it just east of Akhtuba, thus by-passing both towns. Vladimirovka, with its port facilities at Petropavlovka approximately 2 miles to the south, is the main transshipping center for salt received from Lake Baskunchak. From the Petropavlovka railroad station, located on a branch of the Volga River, spur lines run north and south, connecting docks and shipyards. Petropavlovka is connected by a single-track railroad line with the main line at the western edge of Akhtuba, where there is a railroad engine depot (9). Leaving Akhtuba, the main line proceeds in an easterly direction to the important railroad center of Verkhniy Baskunchak. In the stretch between Akhtuba and Verkhniy Baskunchak, there are several railroad stops and stations -- siding "Kilometer 15," Kochevaya station, siding "Kilometer 33," and Solonchak station. About a half mile north of Verkhniy Baskunchak the line from Akhtuba joins the north-south Saratov-Astrakhan' line at Post Peredacha station. This station, in turn, is connected with the main station of Verkhniy Baskunchak by a spur that branches off to the south of the main line (117). Railroad facilities at Verkhniy Baskunchak consist of general maintenance shops, enginehouses that can accommodate 50 locomotives, a railroad-engine depot, and a railroad-car repair shop and depot (9, 74).

The section of the line from Verkhniy Baskunchak to its terminus at Nizhniy Baskunchak is 7.4 miles long. Here junction is made with what may be an electrified spur running north and south along the shore of Lake Baskunchak. A 1930 Soviet map indicates that the northern spur was being extended along the northern shore line of the lake. Another spur 4.3 miles long is laid out over the salty crust of the lake almost to its center, where salt is pumped directly into waiting railroad cars. A caterpillar truck moves both the salt pump and sections of track to sites of active operations (75). Salt extracted along the northern shores of the lake is transported by railroad to Nizhniy Baskunchak.

5. The Saratov-Astrakhan' Line

This single-track, Russian standard-gauge trunk line, which cuts across the study area from north to south, connects the Caspian Sea port of Astrakhan' with Saratov, which is connected by rail with both Moscow and the industrial Ural regions. Raw materials from the Ural region, as well as manufactured goods and machinery from the Moscow area, are transported to Astrakhan' for transshipment to Baku and Krasnovodsk. The route is also important for the transport of salt from Lakes El'ton and Baskunchak to Astrakhan'. Verkhniy Baskunchak is the junction point with the Post Paromnaya-Nizhniy Baskunchak line. The 63.3-mile sector of the line from "Kilometer 299," the northernmost stop within the study area, to Verkhniy Baskunchak is being converted to diesel-engine traction,

which will materially reduce the consumption of water. The first consignment of new diesel locomotives are now being sent to Verkhniy Baskunchak from the Khar'kov locomotive works (76).

Entering the study area from the north, the line follows a straight southerly course, passing sidings "Kilometer 299" and "Kilometer 307."* At El'ton an industrial spur 3.7 miles long branches off to the salt-producing areas at Lake El'ton. On reaching the shore the spur line continues across the salty crust of the lake for a distance of about one-half mile.

Between El'ton and Saykhin (northeast of Lake Batkul') stations, there are four small bridges, located 1.1 miles, 1.9 miles, 4.8 miles, and 19.4 miles south of El'ton. The main bridge crosses the Samaroda River. From Saykhin, the line follows a southeasterly direction for a distance of 5.5 miles. A railroad bridge is located about 2.5 miles southeast of Saykhin (78). Three miles farther south the line turns southward toward Verkhniy Baskunchak, passing siding "Kilometer 365," Shungay station, and sidings "Kilometer 401" and "Kilometer 408" (77). Near Verkhniy Baskunchak the line is joined by the Verkhniy Baskunchak-Nizhniy Baskunchak section of the Post Paromnaya-Nizhniy Baskunchak line. Approximately 2.5 miles south of Verkhniy Baskunchak, a spur line branches

* Sidings along the main line are named according to kilometer distances from Pokrovsk, the terminus of a 7-mile branch line from Anisovka (15 miles southeast of Saratov) (77).

off to the east of the main track to stone and ballast quarries located southwest of Nizhniy Baskunchak. Individual quarries are serviced by feeder lines of the main spur.

From siding "Kilometer 427," 6.8 miles south of Verkhniy Baskunchak, to Bogdo there are many cuts and fills along the line. South of Bogdo, the line passes siding "Kilometer 459," and at Verblyuzh'ya station approaches within 2 miles of the Volga-Akhtuba Floodplain. Southeast of Verblyuzh'ya the railroad generally parallels the Volga-Akhtuba Floodplain. The last stop of the line within the study area is at siding "Kilometer 486" (77).

C. Roads

1. General Characteristics

The road system in the study area is relatively poor. Although maps show a dense net, it is composed mostly of unimproved dirt roads of seasonal trafficability, trails suitable only for foot or animal traffic, and caravan routes. The roads, therefore, cannot be classified in the usual manner as first, second, and third class. All of the seven major roads in the area focus on Stalingrad and are trafficable throughout the year. Of these, the three entering the region from the west, northwest, and northeast are classified as highways. All of the roads have some improved dirt stretches, and at least a part of each is paved or has a metalled roadbed. Within Stalingrad, the quality of the major roads improves and they become part of the street pattern of the city.

2. Major Roads

a. Stalingrad-Kursk-Moscow Highway

A small portion of the Stalingrad-Moscow Highway lies within the study area. From south-central Stalingrad, the highway arches northwestward and meets the Stalingrad-Ilovlinskaya Railroad two miles east of the "Gumrak" station. Beyond this point the highway parallels the east side of this main line for the remaining distance to Frolovo, near the edge of the study area. Air coverage of the road is at too small a scale and of too poor quality to provide the basis for a detailed description. The road is about 25 feet wide, apparently with a packed earth or gravel surface (66). Prisoner-of-war information as of 1948 states that at least part of the road is paved with asphalt and is wide enough to carry two lanes of traffic (79).

b. Kazan'-Saratov-Stalingrad-Astrakhan' Highway

This highway is a major trunk line from Kazan' to the Volga at Saratov, and along the river to Astrakhan' on the Caspian Sea. It serves all the major river cities and at several points branch roads connect with a main east-west highway that leads to Moscow. From Saratov the road parallels the high right bank of the Volga, lying at a distance of 1 to 4 miles inland from the river and cutting across the alternating interfluves and deep valleys at right angles. It is in fairly good condition, having an improved dirt surface (or possibly gravel) and an average width

of 30 feet. On entering Stalingrad the road widens considerably and merges into the general street pattern. The road, which becomes one of the main north-south routes through Stalingrad City, is approximately 40 feet wide, asphalt-surfaced, and in very good condition (56, 66).

Beyond Stalingrad, the road follows the right bank of the Volga River east and southeastward from Krasnoarmeysk, connecting most of the larger villages situated on the river bank. The roadbed is approximately 30 feet wide and is either metalled or gravel-surfaced. Wide dirt trails run alongside the road, making a total width of some 160 feet. Approximately 10 miles east-southeast of Krasnoarmeysk, the road is crossed by an improved dirt road that connects the Volga port of Svetlyy Yar with Bol'shiye Chapurniki on Lake Sarpa. Between Lake Sarpa and Liman Tarmanskiy this road is still under construction.

Continuing in a generally southeastward direction, the Astrakhan' road passes the southern outskirts of the Volga port of Raygorod and of the town of Solodniki. Two miles south-southwest of Solodniki, a number of dirt tracks converge on the main road to cross a bridge 220 feet long and 25 feet wide. Some of the tracks lead to the water course, an indication that vehicles may cross the river bed during the dry seasons. A second bridge, located 2.5 miles southeast of Solodniki, seems to have an over-all length of 145 feet, an over-all width of 25 feet, and a shore-to-shore width

of 90 feet. From the bridge eastward, the road appears to be of more recent construction and better surfaced.

Four and a half miles southeast of Solodniki, the road forks, the main road continuing due southeast to Vyazovka and the left branch running northeast to Kamennyy Yar. The main road runs in an east-southeast direction. About 8 miles beyond Solodniki a causeway 35 feet wide carries the main road above ground that appears to be low and marshy. An improved dirt road that runs south from Kamennyy Yar forks north of the main road -- one branch joining it 2 miles and the other about 1-1/4 miles west-northwest of Vyazovka. Available information indicates that, as of September 1942, work at the western section of the causeway had been completed only as far as the west bank of a small tributary of the River Vyazovka located at the western end of the village of Vyazovka. Apparently a bridge was to be built at this point. In 1942 the road crossed the river at a ford approximately 40 yards farther downstream. In the center of the town, the Vyazovka River is crossed by a single-span bridge, probably of reinforced concrete. The bridge has an over-all length of 210 feet and a width of 25 feet. Seven and a half miles southeast of Vyazovka, a branch road runs north-northeast to Stupino and rejoins the main road, via Pady 2-1/2 miles northwest of Staritsa.

In the Vyazovka-Staritsa section the road does not run on a causeway and consists of perfectly straight sections connected by

gentle curves. Little information is available on the section of the road from Staritsa to Tsagan-Aman, just beyond the study area. The highway continues as an improved dirt road with an average width of 30 feet. Within the study area, the road passes through the river ports of Chernyy Yar and Nikol'skoye and improved dirt roads connect it with the villages of Solenoye Zaymishche, Grachi, Prishib, and Vetlyanka. Between Solenoye Zaymishche and Prishib, several bridges cross small watercourses and ravines, but no information is available as to their lengths or widths.

c. Stalingrad-Kalach-Rostov Highway

The highway from Krasnoarmeysk to Kalach is the Volga-Don Highway and was recently reported as completed. Construction proceeded from both Krasnoarmeysk and Kalach, with the two sections meeting at a point between Tundutovo and Gavrilovka (61). Construction of the road is the responsibility of the Volga-Don Highway and Volga-Don Canal companies, under the direction of Road Construction Unit I, which is headed by MVD officers (82). The road distance from Krasnoarmeysk to Gavrilovka is approximately 25 miles.

The eastern half of the highway runs generally parallel to the route of the Volga-Don Canal. From Kalach the road continues to the important transportation center of Rostov. Available reports agree that the highway from Krasnoarmeysk to a point north of Tundutovo runs 1,000 to 1,300 feet north of the canal. Beyond that point,

however, there is disagreement as to the exact position of the road. Most of the sources indicate that it crosses the canal north of Tundutovo and then proceeds in a northwesterly direction along the south side of the canal (82, 83). This route is said to lie some 300 to 1,000 feet south of the railroad line, which is now under construction. Other reports, however, suggest that the highway may continue along the north side of the canal toward Gavrilovka (84).

The highway is 20 feet wide and on either side has low shoulders 6.5 feet wide. The elevation of the road above the surrounding land varies from 5 to 10 feet (82). The roadbed consists of a well-constructed foundation of rolled sand, crushed rock, stone, and tar, surfaced with an asphalt layer 0.4 to 1.6 inches thick. Road signs and drainage ditches are lacking.

Along the section of the highway between Krasnoarmeysk and Andreyevka, there are a number of bridges and culverts. The bridges are generally of reinforced concrete construction, without piers, and are about 20 feet wide. The bridge 1.5 miles east-southeast of Chapurniki railroad station has a 100-foot span and 3-foot sidewalks on both sides. The bridge a mile north-northwest of Solyanka has a 130-foot span, with iron protecting rails on the sides. Two other bridges are located in the western outskirts of Solyanka and approximately 12.5 miles

west-southwest of Krasnoarmeysk. The lengths of the spans are not known but the first has iron protecting rails and the second has both sidewalks and rails.

A wooden emergency bridge is reported to be in use where the highway crosses the Volga-Don Canal route. Plans call for the replacement of this temporary structure by a reinforced concrete bridge and the construction of three new bridges which will span ravines ranging from 20 to 33 feet in depth in the area west of the canal site.

Culverts, which are placed in the smaller earth-bridged ravines, consist of concrete pipes 6.5 feet in diameter. Two culverts, located about 1.2 miles south of Krasnoarmeysk and a mile west of Solyanka, have single reinforced concrete pipes. Two other culverts, about 1.7 miles northeast of Tundutovo, consist of three reinforced concrete pipes, the two on the bottom laid parallel and the third resting on top.

d. Stalingrad-Kalach Alternate Road

The road to Karpovskaya generally follows the alignment of the Stalingrad-Likhaya railroad line, crossing fairly flat terrain (66). It connects Stalingrad with Kruten'kiy and leaves the study area near Karpovskaya. At Kalach it joins the Stalingrad-Kalach-Rostov Highway. Soviet sources indicate that the road has an improved (packed) dirt-on-gravel surface and is 39.4 feet wide (117). Because photo coverage of the road is at small scale and of poor quality, a detailed description is not possible.

e. Stalingrad-Mikhaylovka-Astrakhan' Road (71, 117)

This road, paralleling the northern and eastern edge of the Volga-Akhtuba Floodplain, is a second main route from Stalingrad to Astrakhan'. It has an improved dirt (possibly gravel) surface, is approximately 30 feet wide, and is well maintained and usable at all seasons. In a number of places the road ascends and descends steep banks and ravines along the edge of the floodplain.

The road, actually, has no direct connection with Stalingrad but begins at the village of Krasnaya Sloboda on the floodplain opposite the city. Traffic from Stalingrad is carried by ferry to Krasnaya Sloboda. From there the road proceeds in an easterly direction over the Volga-Akhtuba Floodplain, crossing two small bridges over water courses at Burkovskiy and Rybachiy. At the town of Srednyaya Akhtuba the road reaches the Akhtuba River, which is crossed on what appears to be a dam or an embankment (117).

In Srednyaya Akhtuba the road connects with two improved dirt roads -- one leading west-northwest to Verkhnaya Akhtuba and Sredne-Pogromnoye and the other leading 10 miles northeast to a point about 2.8 miles north of the Urochishche Bol'shoy Liman. Eastward from Srednyaya Akhtuba the main road follows the north bank of the Akhtuba River, passing through the western outskirts of the town of Zaplavnoye to the center of Leninsk, where it divides into several main thoroughfares. The southernmost is

generally used for through traffic. The roads converge at the eastern end of town. Approximately 1.5 miles east of Leninsk an improved dirt road about 25 feet wide branches off the main road and leads northeast to Budennyy. By now, this road may have been extended to Bol'shevik to join an improved road that runs toward Zhitkur and El'ton.

Six miles east of the center of Leninsk the main road crosses a tributary of the Akhtuba on a bridge 120 feet long and 20 feet wide. At this point, the shore-to-shore width is 60 feet. On the northern outskirts of Solodovka, an improved dirt road forks to the northeast for a stretch of 5.5 miles and terminates near an inactive airfield. Two miles northwest of Kolobovka the main road descends the valley of an intermittent tributary, which it crosses on a single-span bridge at considerable height above the water level. An embankment connects the southeastern end of the bridge with the plateau. The following information is available on the crossing: span of bridge, 160 feet; width of bridge, 25 feet; northwest ramp, 320 feet; southeast embankment, 120 feet; and shore-to-shore distance, 75 feet.

Immediately to the west of the present bridge is an old and apparently unused bridge. At a distance of 2.5 miles west of Kapustin Yar, the main road crosses a watercourse and divides into two branches, both of which pass through Kapustin Yar. A number of dirt roads lead to the north and northeast from Kapustin Yar.

One terminates at the village of Konstitutsiya, in the immediate vicinity of Kapustin Yar airfield.

The two branches of the main road converge about 2 miles east-southeast of the center of town. Air photographs as of 1942 show numerous tracks alongside the main surfaced road, as well as several parallel earth tracks about a mile due east to the Kapustin Yar railroad station. About 4.5 miles southeast of Kapustin Yar the road crosses a dry watercourse by means of an embankment, which was probably constructed for protection against flood water. The embankment has an over-all length of 180 feet and is 50 feet wide.

North of the center of Solyanka the road descends into the valley of the Postepka River, which it crosses on a single-span bridge of steel-arch construction. The bridge is 250 feet long and 25 feet wide, with a shore-to-shore distance of about 140 feet. The road, which is 30 feet wide, ascends the steep eastern side of the valley by means of a deep cut 950 feet long, with a width of 140 feet at the top. Three-quarters of a mile east of Solyanka, the road crosses a small stream on a single-span, steel, bowstring-type bridge, which has an over-all length of 125 feet and a width of 25 feet.

Thereafter, the road follows a generally southeastward course to Vladimirovka. It crosses several unimproved dirt roads that lead to Akhtuba River villages of Pologoye Zaymishche, Dimitriyevka, Pokrovka, and Pechnevka. In Vladimirovka a road

26.2 feet wide, with an improved dirt or gravel surface, branches off in an east-northeasterly direction. The branch road is only 11 miles in length. From Vladimirovka the main road continues its general course paralleling the Akhtuba River. It crosses the Vladimirovka-Nizhniy Baskunchak railroad east of Akhtuba at a level crossing. Between Akhtuba and Novonikolayevka the road crosses several steep but short ravines. No information is available on bridges or culverts. One mile northeast of Novonikolayevka another improved road with dirt or gravel surface crosses the main road and runs northeast to the center of Verkhniy Baskunchak. At Verkhniy Baskunchak this road turns northward, then westward, for 8 miles toward Vladimirovka, paralleling the south side of the Saratov-Astrakhan' railroad. It is anticipated that the westward extension will ultimately be extended to Petropavlovka, thus forming a second and shorter traffic route for salt shipments from Lake Baskunchak to the Volga River.

Southeast of Novonikolayevka the main improved section of the Astrakhan' road suddenly terminates to the north of the desert area around Bolkhuny. An unimproved stretch of dirt road leads to Bolkhuny and Pirogovka. Beyond Pirogovka the main road turns southeastward to the Saratov-Astrakhan' railroad line at Verblyuzh'ya station. After running parallel to the line for a distance of 2 miles, it turns southwest to Mikhaylovka. Two unimproved dirt roads connect Mikhaylovka, the last village within the study area, with Sasykoli.

f. Stalingrad-Stepnoy-Caucasus Road (66, 117)

This road leading southward has an improved dirt or gravel surface and is approximately 25 feet wide. It passes through flat country that is subject to flooding in the wet season, and alternately runs along the west and east sides of Lakes Sarpa, Tsatsa, Barmantsak, and Prishib. Lake Prishib and the town of Malyye Derbety lie beyond the limits of the study area. The road is characterized by long straight stretches. Just south of Krasnoarmeysk and about 1.8 miles northwest of Lake Sarpa, it crosses a tributary of the lake by means of a deck-type bridge, probably of concrete construction. The bridge is 100 feet long and 40 feet wide. The road then follows the western shore line of Lake Sarpa and at Malyye Chapurniki crosses a second tributary of Lake Sarpa on a concrete bridge 440 feet long and 70 feet wide. In the center of Bol'shiye Chapurniki an improved dirt- or gravel-surfaced road branches off towards the west to Tundutovo, where it connects with the Volga-Don Highway. At Dubovyy Ovrag, 26 miles south of Stalingrad, a bridge of concrete construction carries the road over a third tributary of Lake Sarpa. This bridge is reported to be 230 feet long and 120 feet wide. The shore-to-shore distance is 180 feet. South of Dubovyy Ovrag the road passes east of the Bol'shaya Tinguta, an intermittent stream tributary to Lake Tsatsa, and follows a southward course east of Lakes Tsatsa and Barmantsak. Immediately south of the study area the road divides into two

sections. One branch crosses the narrow water passage between Lakes Barmantsak and Prishib on a small bridge and then skirts the western side of Lake Prishib, via Malyye Derbety. The other branch, reported under construction, runs straight south along the east side of the lake. Approximately 1.8 miles southeast of the lake, the two branches converge. From the study area the road leads into the North Caucasus by way of Stepnoy and eventually connects with the Tbilisi highway system near Dzaudzhikau.

g. Stalingrad-Solyanka-Abganerovo Road

Although this road is of local significance only, it has an improved dirt surface and is trafficable throughout the year. It leads in a general southwesterly direction. From Krasnoarmeysk, it runs south to Bol'shiye Chapurniki, where it turns westward for a distance of 10 miles to Tundutovo. From Tundutovo, the road follows the west side of the Stalingrad-Tikhoretsk-Krasnodar railroad line southwestward. At the Abganerovo station the road turns southeast to Abganerovo village. The road, which crosses fairly level terrain, is generally straight, with only a few sharp curves. It is approximately 30 feet wide (117, 66).

3. Streets and Roads in the City of Stalingrad

All of the main streets in Stalingrad are paved. They have been cleared of wartime rubble but in some respects still show surface damage that resulted from fighting during World War II (79). The average street width ranges from 20 to 40 feet. Smaller streets

are unpaved, usually of packed earth, and are poorly drained and maintained (56). Within the city, there are a number of bottlenecks and sharp corners that restrict movement of heavy traffic. Streets in the industrial and harbor areas are particularly narrow (79).

The main north-south highway route leading through Stalingrad proper, Beketovka, and Krasnoarmeysk has been greatly improved since the war. At present it is heavily used for transporting materials to the construction site of the Volga-Don Canal (80). Reconstruction of the Stalingrad-Beketovka section began in the summer of 1948 and was completed by 1949 (81). The old road, which was formerly constructed of cobblestones, is now surfaced with asphalt. Four to five miles north of Beketovka the new highway forks off the old road but meets it again in the southern outskirts of the suburb. The highway that passes through the center of Beketovka is elevated 3.3 feet above the surrounding land. In this area, the road is approximately 26 feet wide. Although part of the road is paved with asphalt, the remainder is still cobblestoned. Soft shoulders and drainage ditches parallel the road on both sides (80). North of Beketovka the foundation is being laid for a bridge that will span a ravine.

The section of highway from the southern outskirts of Beketovka to Krasnoarmeysk has also been built on top of the old cobblestone road (55). Reconstruction of this section began in spring of 1948. The new highway has a base about 4 feet deep of coarse sand, topped

with a gravel and asphalt layer 1 to 1.5 inches thick. Soft shoulders 5 feet in width line the road on both sides. This section of the highway has no bridges, but it has five or six culverts consisting of one or two parallel concrete pipes. No drainage ditches, kilometer markers, or road signs have been reported. A row of wooden telephone poles parallels the road on the east (80).

A considerable amount of reconstruction is in progress along other main thoroughfares in the central part of Stalingrad. Several plans for reconstruction have been approved by the Architectural Affairs Committee attached to the Council of Ministers of the USSR (85). The plans call for a system of squares interconnected by broad avenues. In the city blocks bounded by Moskovskaya, Komsomol'skaya, Sovetskaya, and Oktyabr'skaya streets, the clearing of ruins and the carting away of debris has been completed. Public buildings to house oblast and city executive committees and other agencies are to be built in the region around Ploshchad' Pavshykh Bortsov (Square of Fallen Fighters). The square will be connected by Alleya Geroyev (Avenue of Heroes) with Ploshchad' Pobedy (Victory Square) on the Volga River. Broad terraces along Alleya Geroyev will be adorned with monuments to the defenders of Stalingrad and a statue of Stalin in commemoration of the Stalingrad Victory (86).

One of the main north-south thoroughfares, Prospekt im. Stalina (Avenue Stalin), which will be lined with apartment houses and public

buildings (85), leads into the city from the south and terminates at the main railroad station. Beyond the railroad station it will be extended to the northern outskirts of the city (the Tractor Plant Stalingrad III) as Ulitsa Krasnyy Armeysk (Red Army Street). Recent reports describe both of these sections as cobblestoned and 20-33 feet wide (56).

Other main streets are the Ulitsa Pionerskaya and Ulitsa Mira (53). The first begins at the main railroad station and extends northward. It is 40 feet in width, with asphalt surface and concrete curbs and gutters. The second has recently been completed and was opened for traffic in December 1950. It has the same width and type of surface as Ulitsa Pionerskaya. A recent Soviet source claims that an asphalt-surfaced motor road is being constructed from Stalingrad to the village of Rynok, approximately 2 miles to the northeast (70). It is probable that the main north-south highway route follows parts of several of these thoroughfares.

Several highway bridges have been built across tributaries of the Volga. Detailed descriptions of these bridges are given in Appendix C-1.

4. Roads Near Urda (117)

A significant road construction development is noted in the Urda area. A Soviet map series at 1:200,000, published in 1942 by the General Staff of the Red Army (117), shows three roads with improved dirt or gravel surfaces extending to the northeast,

north, and northwest. The first two roads have improved surfaces for approximately 2 miles each, and then continue as unimproved dirt roads. The road leading northwest in the direction of Saykhin is completed for 3 miles and under construction for 12.4 additional miles. If completed to Saykhin, this road would connect Urda with the Saratov-Astrakhan' railroad line. The reason for the existence of these improved road facilities to Urda, a rather isolated urban area, is not known.

5. Minor Roads, Trails, and Caravan Routes (117)

Aside from the eight main roads leading out from Stalingrad, the network in the study area consists of a number of unimproved dirt roads (Figures 4 and 10), caravan routes, and trails, whose seasonal character creates serious transportation problems for large sections of the study area. During rainy seasons unimproved roads are usually impassable ruts, with mud axle-deep. In the dry season, they are dusty but trafficable for motor vehicles.

Unimproved roads are adequate in number to serve the area north of the Volga-Akhtuba Floodplain and west of the Saratov-Astrakhan' railroad. Many of these roads lead from towns located along the Akhtuba River northeastward to the larger centers in the Caspian Lowland, such as Zhitkur, Shungay, and Verkhniy Baskunchak. Others focus on small villages and hamlets and serve only local traffic.

West of the Volga River, a number of northwest-southeast unimproved dirt roads focus on the Stalingrad area and on other settlements along the right bank of the river. Most of the traffic, however, moves along the improved roads that radiate from Stalingrad.

Within the swamp areas of the Volga-Akhtuba Floodplain, except at the western end near Stalingrad, there are no true roads, merely trails and footpaths, which are impassable even on foot during flood periods. Pack-animals and camels are often used to transport bulky freight and merchandise.

South of the Volga-Akhtuba Floodplain, the number of roads decreases. Most of them head outward from larger settlements on the right bank of the river, usually in a southwesterly direction.

East of the Saratov-Astrakhan' railroad line, even unimproved dirt roads decrease in number and become practically nonexistent in the desert areas northeast of the Shor Khaki (salt flats) and south and southwest of Azgir. Transportation in these areas follows caravan routes and trails. The active trade formerly carried over the caravan routes from USSR, via Kazakhstan, Uzbekistan, and Turkmenistan, to Iran and Afghanistan has to a large extent been absorbed by recently built railroads and the expanding of shipping facilities on the Caspian Sea. Today, the caravan routes are used chiefly for the seasonal movement of cattle and camel herds and for some local trade.

D. Inland Waterway Transport

1. General Characteristics

Inland waterway transportation within the study area is concentrated along the broad, navigable Volga River. Little traffic uses the Akhtuba River because of its many obstructions and shallow water. The Volga-Don Canal, which is now being constructed, will greatly increase both the volume and value of water traffic within the area by affording direct access to the Donets Basin and the Black Sea and by providing a direct connection with the White Sea.

Port installations are concentrated in the Stalingrad area (Stalingrad-Beketovka-Krasnoarmeysk) and at Petropavlovka, the port for Vladimirovka. The major ports are especially equipped to handle the types of products shipped in or out of the area. Many of the smaller landing places along both banks of the Volga have no port installations (docks, piers, etc.) and are used primarily for local trade.

2. Volga River Traffic

The Volga River is the most important inland water-transport route in the USSR. Reliable sources place the tonnage carried by the river and its major tributaries, the Kama and the Oka, at about one-half the total inland waterway shipping of the USSR. About one-tenth of the Volga shipping is concentrated in the 400-mile section between Stalingrad and the Caspian Sea (88).

Through its major tributaries and connecting canals, the Volga links a number of the economically most important regions of the USSR. The Volga system provides a route for traffic in crude oil and fish from the Caspian area, cotton from Turkestan, ores from the Urals, cereals from the middle and lower reaches of the Volga Region, timber from the upper reaches of the Volga, and salt from Lakes Baskunchak and El'ton, as well as various industrial products from the Stalingrad area (87).

As a means of transport the Volga River is even more important than the rail lines of the study area. In 1933, for example, the total volume of freight turnover at Stalingrad was 4.1 million tons, of which 2.9 million tons were classified as river freight (21).

Navigability on the Volga and the operation of several of the ports can be maintained only by systematic dredging of sand bars and silt accumulations. Any slackening of this operation would cause a serious traffic tie-up and would considerably reduce the tonnage that could be shipped, especially in late summer when water is lowest. To maintain the depths required for loaded vessels, it is necessary to dredge and clear the bottom of the approaches to wharves (Stalingrad-Beketovka-Krasnoarmeysk) as well as the main channel. Dredging of the channel to maintain a depth of 7 feet begins as high waters start to recede in the early summer (4). Management and maintenance of the river navigation is handled by

Volga Administration for River Transport (VURT). The Stalingrad Section of VURT is responsible for the stretch from Kamyshin to Vladimirovka and the Astrakhan' Section for the stretch from Vladimirovka to the mouth of the river. Volga shipping is also interrupted each year by freezing, which lasts for long periods ranging from 90 days at the mouth to 160 days in the upper reaches. The average freezing period at Stalingrad is 110 days. The average date for the beginning of navigation at Stalingrad is 7 April (88).

Craft commonly used for Volga traffic consist of freight-passenger steamers, tugs, and barges. The freight-passenger steamers are generally side-wheeler or diesel screw driven, but they vary in size and in freight and passenger capacity, according to the stretch of the river in which they operate. The largest vessel noted by an American observer was 230 feet long (21). Most of the tugs used are about 130 feet long. The most powerful, 300 to 900 horsepower, are used to pull petroleum barges. Harbor tugs commonly are 40 to 130 horsepower. Barges are of several types, depending on the commodity transported. Oil barges are generally of steel construction. Wooden dry-freight barges are used for carrying bread, salt, and metals. In freight capacity they range from 1,500 to 3,000 tons and in length from 164 to 328 feet. The low-decked iron or wooden barges (barksy) used to transport timber and grain are generally 164 to 278 feet long (4).

Although Stalingrad is a large market for industrial and civilian goods, the bulk of the freight, both rail and water, passes through the city en route to other areas. The principal bulk commodities handled are timber and petroleum. An estimated 40 percent of the total freight in 1933 consisted of south-bound timber (Figures 18 and 19), much of which was unloaded at Stalingrad, processed in its large woodworking plants, and shipped by rail to the Donets Basin. Of the total river freight, 30 percent consisted of north-bound petroleum from the Transcaucasus. Because of the quantity transshipped to the Donets area, Stalingrad has become a major petroleum storage center.

Other items arriving at Stalingrad by way of the Volga are fish from the south and manufactured products from the north. Large quantities of coal and iron and other ores now enter Stalingrad by rail from the west and are transferred to the Volga for shipment northward to the Central Industrial Region (Moscow) (21).

The port of Stalingrad proper extends for a distance of 3-1/4 miles along the river near the heart of the city. Port facilities (Figures 20-25) include piers, quays, conveyors, cranes, and mechanical cargo-handling and transshipment equipment for grain and other products. The port also includes two coal transshipment areas that are served by spurs of the Stalingrad-Tikhoretsk-Krasnodar railroad.

A large timber transshipment area, "Lesobaza," is situated near the Krasnoarmeysk section of the city (117). On the north side of Krasnoarmeysk is the Sarepta harbor, which is situated in a backwater of the Volga. At the entrance of the Sarepta harbor there are 11 wharves, of which one serves the shipyard and four appear to be coal-handling wharves. The shipyard occupies a walled area of 900 by 600 yards in extent. A broad-side launching slip, 360 feet wide and 1,600 feet long, is situated on the eastern side of the yard (66). Ships built here are towed away by small tugs (89).

Another shipyard of the Stalingrad area is located on the east bank of the Volga River at the northern edge of the village of Krasnaya Sloboda. This yard handles repairs of river craft exclusively, including tugs, motor launches, and barges (90, 91). Krasnaya Sloboda is connected with Stalingrad by a ferry, which runs on a regular schedule. It is believed that there is an oil barge unloading platform northeast of Krasnaya Sloboda, with an underwater pipeline to the oil-tank farm on the west bank.

Stalingrad has two docks for river passengers. One handles the local traffic up and down the west bank, as well as ferries to Krasnaya Sloboda and excursion boats to the "park of culture" across the river. The other passenger dock is about 50 yards farther south and handles long-distance inter-city traffic. Both docks are located in the heart of the city.

There are five ferries in the Stalingrad area in addition to the Krasnaya Sloboda ferry. Of these, the Latashanka-Post Paromnaya

ferry is most significant. It carries the Stalingrad-Astrakhan' road and rail traffic across the Volga. Recent reports, however, indicate that a dual-purpose bridge spanning the Volga just north of the ferry line has been planned to replace the ferry (21, 70). The other ferries carry traffic between the island "Sarpinskiy" and Beketovka and Yel'shanka (119).

The second-ranking port in the study area is Petropavlovka (1.6 miles south of Vladimirovka). It serves both rivers, since it is situated on the Akhtuba River at a point where it connects with a navigable side channel of the Volga River. Cereals, lumber, potatoes, and vegetables are brought to the port by wooden barges of about 5,000 tons capacity, towed by oil-fired tugs (92). Petropavlovka ships out almost all of the Lake Baskunchak salt after it has been processed at the local salt mills. Salt is transloaded onto wooden barges for shipment to Stalingrad or Astrakhan'. Petropavlovka also has ship repair shops for both tugs and barges of the lower Volga River Fleet (93). The barge repair shop is old and its equipment is in poor condition. The tug repair shop, however, is relatively new, having been built during the latter part of World War II. In winter the harbor is used for storing over 100 barges (94).

Salt shipping procedures in Petropavlovka have been reported to be unsatisfactory. The People's Commissariat for the River Fleet (NKRF) reported that, during the 1943 navigation period, the barges

received from the Upper and Middle Volga Shipping Administration were so filthy that salt shipments had to be delayed (95). On 20 April 1946, Izvestiya stated that salt producers failed to have their cargoes ready in time for scheduled shipment. During the first days of navigation in 1946 a critical situation arose on the Lower Volga River. Although the salt-shipment quota of Petropavlovka had been set at 5,500 to 7,000 tons of salt a day, the Ministry of Food Industry delivered only 12,500 tons of salt to the port between 24 March and 12 April.

Other landings in the study area are of two types: those with docking installations and those without installations. The former includes Dubovka, Pichuga, Yerzovka, Latashanka, Svetlyy Yar, Gromki, Raygorod, Chernyy Yar, and Nikol'skoye. The latter group includes Legkodimov, minor landing points in the Stalingrad and Beketovka areas, and a small ferry service south of Krivusha (117).

3. Akhtuba River Traffic

Traffic on the Akhtuba River is limited to very small flat-bottom barges and motor boats because the river bed is shallow, narrow, and unregulated. Available information indicates that in the near future the Akhtuba will be dammed at the point where it now leaves the Volga and a canal connecting the two rivers will be built a little to the south. Large dredges have arrived to start on the construction of the canal, which will connect the Akhtuba and Volga rivers near the site of the planned dam (96).

4. The Volga-Don Canal

The "Greater Volga Plan" and the building of the Volga-Don Canal will greatly improve the river-transport system of the European USSR. Strategically it will provide a secure internal connection from the Baltic and White Seas to the Black Sea. Cheap water transport between the industrial north, south, and east will lighten bulk shipment on railroads. The Volga River terminus of the canal is located south of Krasnoarmeysk. From this point the canal will proceed due south for a short distance and then gradually turn toward the southwest along the valleys of the Chervlenaya and Karpovka rivers and finally northwest toward the Don River. The canal is scheduled for completion by the spring of 1952. Judging from current intelligence reports and past Soviet performance in construction work, it is very doubtful whether this canal will be in full operation by 1952. With the completion of the canal it is expected that the volume, composition, and direction of traffic along the more important waterways and railroads throughout the Soviet Union will be radically changed.

According to reports, canal traffic will release for other uses 400,000 two-axle freight cars within the next 3 or 4 years. The necessity for the double railroad transshipment of cargo, at Kalach and at Stalingrad, will be greatly reduced or eliminated, and the center for freight transshipments may be shifted from Stalingrad to some point possible as far west as Rostov (97).

It has been estimated that the total freight turnover within the Don Basin will be increased five- or sixfold (98).

The main freight to be transported along the Volga-Don Canal will be coal from the Donets Basin, which will be delivered to the large manufacturing towns on the Volga and to the steel-producing centers in the Urals (99). The canal will also make it possible to ship Ukrainian wheat and fish from the Don and Kuban' rivers to most of the major towns in the Volga Basin. Timber from the Kama, Vetluga, Unzha, and Kostroma river areas will form an important part of the return traffic to the Lower Don region and the Ukraine. Chemical fertilizers, largely apatites from the Kola Peninsula, will be sent to the south along the White Sea-Baltic Canal, the Volga-Baltic Waterway System, and the Volga System. Machines, equipment, metal, and industrial goods will be sent to the Ukraine and North Caucasus from the Leningrad, the Moscow, and the Ural areas (100). Much of the local freight needs of the 118-mile stretch along its route will also be met by the new canal.

The Committee on Construction for the Volga-Don Canal has reported the following statistics concerning the number, dimension, and capacity of vessels to operate on the canal: maximum dimension, 56 by 394 feet; maximum draught, 9.4 feet; and maximum number of vessels during the navigation period, 9,400 (101).

E. Airfields (21, 58, 71, 102-106, and 108-112)

Within the study area there is a total of 77 airfields (see Appendix C-2). All of these airfields were active during the

severe fighting in the Stalingrad area in 1941 and 1942. According to the latest available information, only five of the airfields are now classified as active.

The active fields are located west of the Volga River within a 12-mile radius of Stalingrad (see Appendix C-2, pp. 7-8). The Stalingrad-Beketovka Field, near Beketovka, the largest airfield in this area, is used by the Soviet Air Force for paratrooper training. The Stalingrad-Gorodishche Field, located northeast of Stalingrad near Gorodishche, is a medium-sized field, but no information is available as to its current use or facilities. The Stalingrad-Gumrak Field, located west of the rail junction at Gumrak, is the second largest field in the Stalingrad area. Recent reports indicate that jet fighters and four-engined bombers may be based at this field. The Stalingrad-Konnaya Field, northeast of the Konnaya railroad station, is also reported to be a training base for paratroopers. The Stalingrad-Southwest (Voroponovo) Field, southwest of Stalingrad, is operated jointly by the Soviet Civil Air Line "AEROFLOT" and the Soviet Air Force. Since the abandonment of the Stalingrad-Tsaritsyn Airfield as an active field (58), the Stalingrad-Southwest Field is believed to have assumed the handling of all civil air service of the Stalingrad area.

The inactive fields are largely concentrated in an area extending northward and eastward from the Volga-Akhtuba Floodplain

to the Saratov-Astrakhan' Railroad. Information on these fields is based primarily on 1942-44 sources, with postwar intelligence data for a few of the fields. During World War II, many airfields were developed hastily and had few facilities. Virtually no information is available as to which of these fields have been totally abandoned. Probably many are being maintained on an inactive basis so that they could be put into operation with a minimum of effort should the need arise (102).

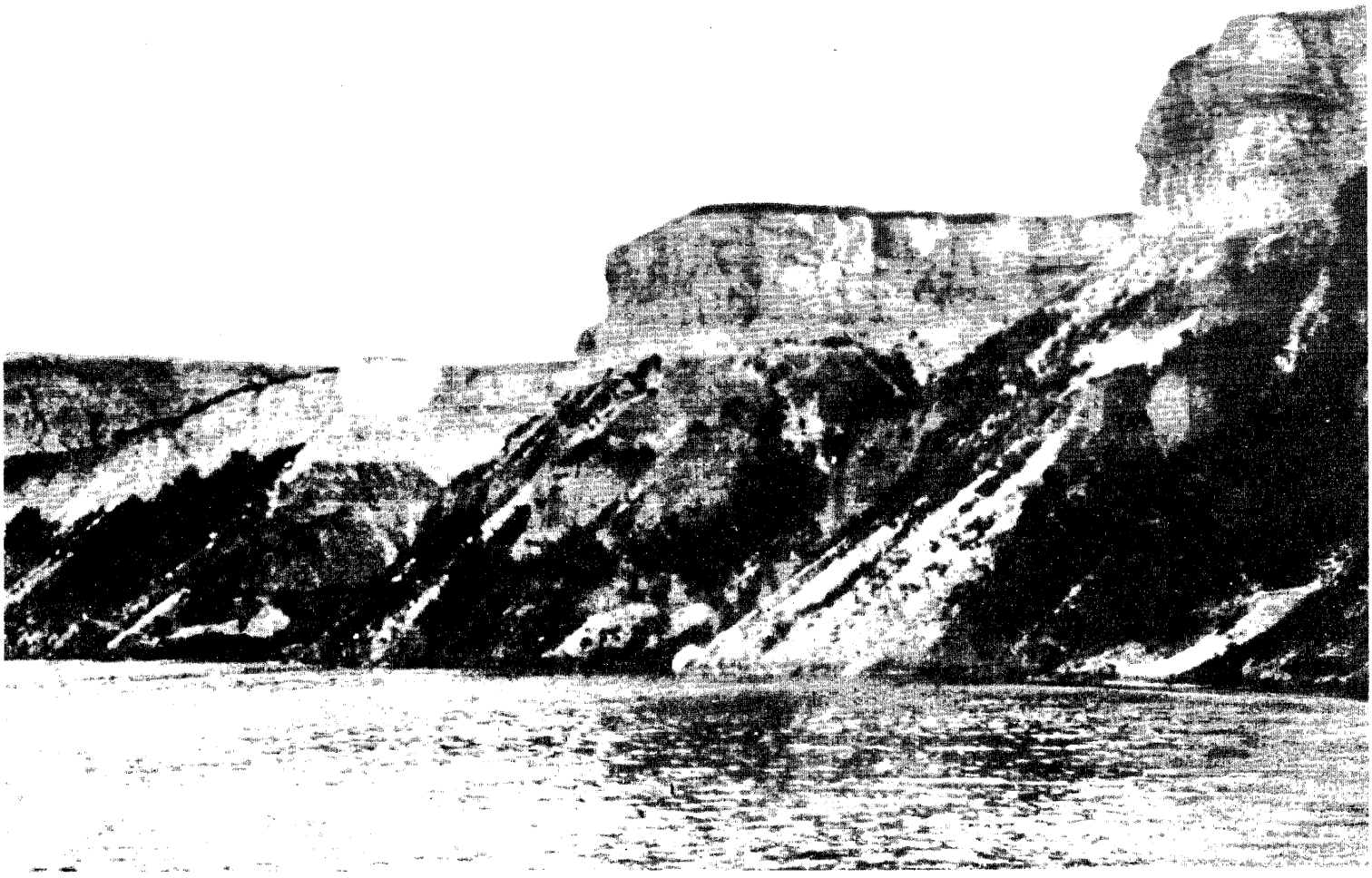

Figure 1. Dissected west bank of Volga River north of Stalingrad.

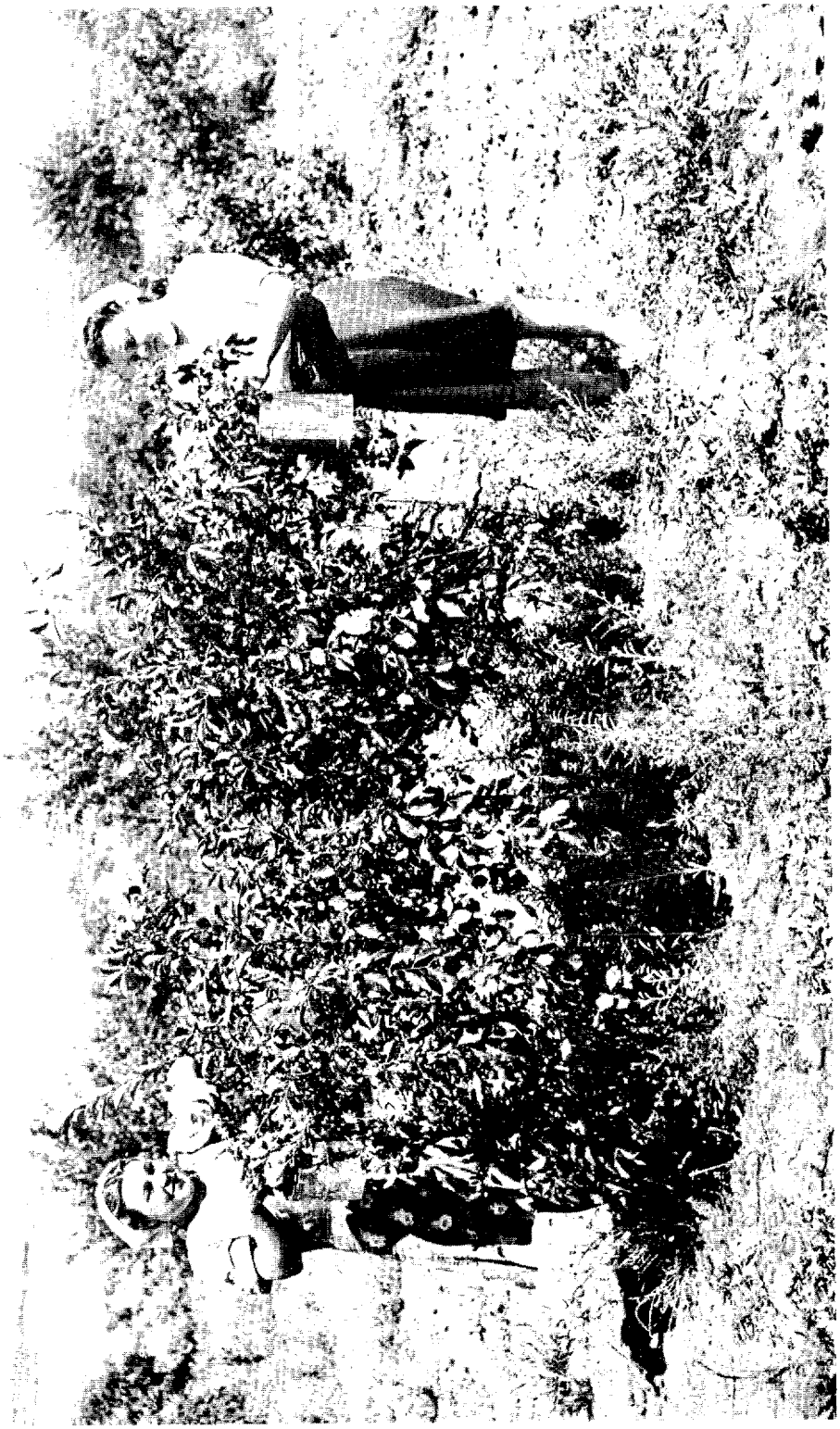

Figure 2. Cherry picking on fruit farm near Stalingrad. July 1946.

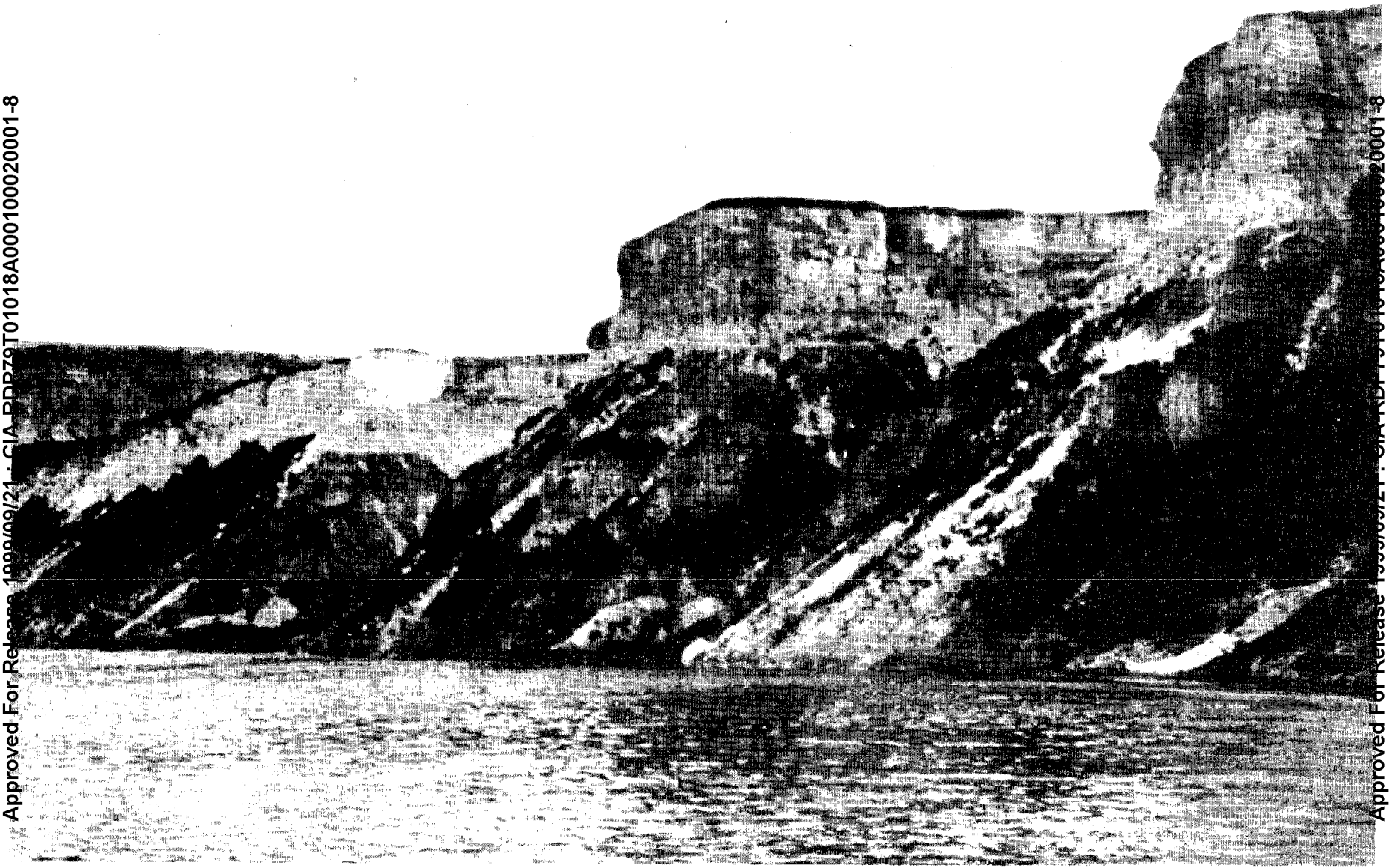

Figure 1. Dissected west bank of Volga River north of Stalingrad.

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Figure 3. Irrigation of tomato plants on a collective farm near Stalingrad. July 1946.

Figure 4. Collective farmers and wagon on road near Stalingrad. July 1946. [redacted]

Figure 5. Rural scene near Stalingrad. July 1946.

Figure 6. Preliminary work for construction of dam. Enough water will be stored to irrigate several hundred acres of land near Stalingrad. July 1946. SECRET

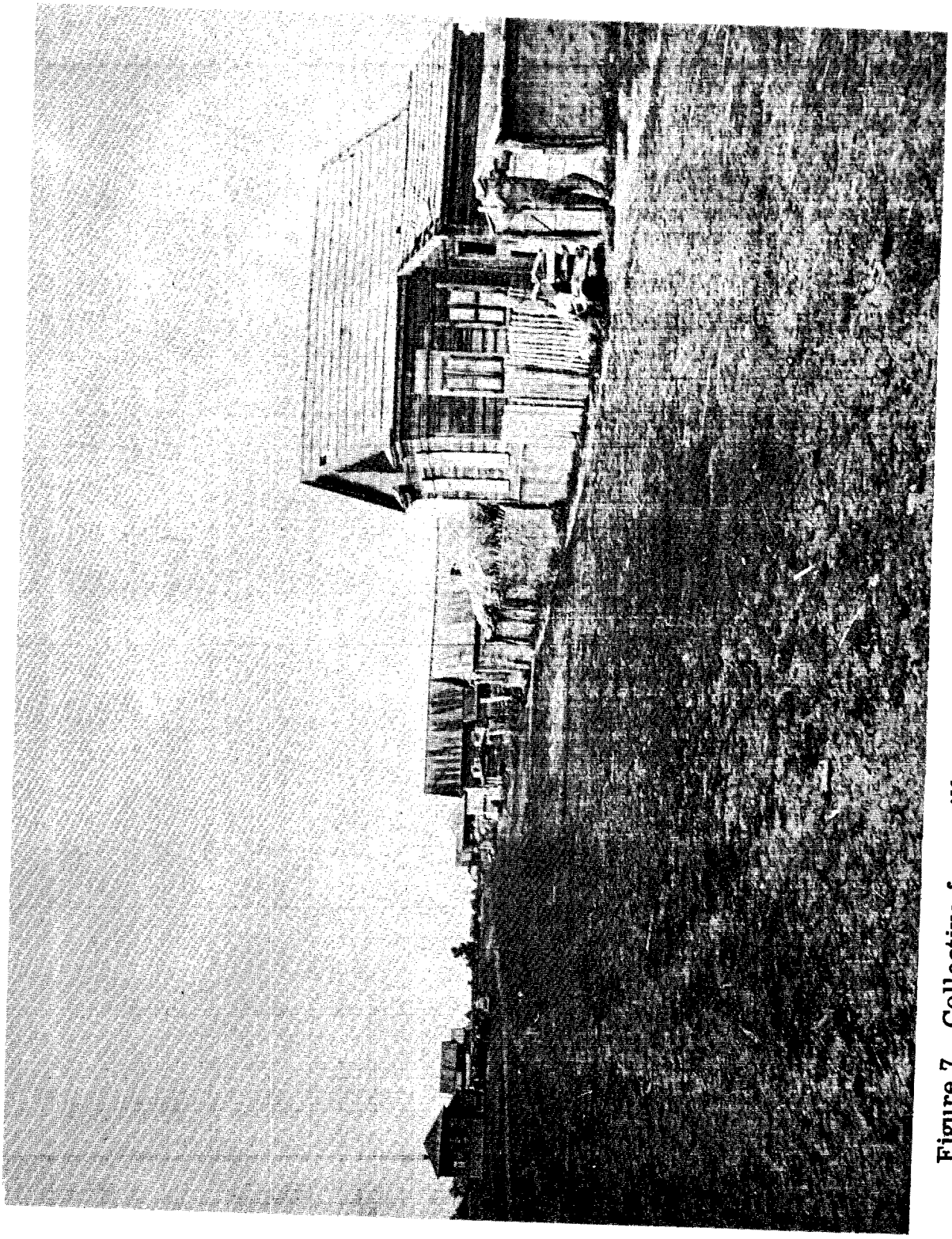

Figure 7. Collective farm village in Stalingrad Oblast. July 1946.

Figure 8. Mechanical salt extraction at Lake Baskunchak. Probably 1948.

Figure 9. Women workers on experiment station near Stalingrad. Shelter belt in background. July 1946.

Figure 10. A forest shelter belt on the " Iskra " state farm, Stalingrad Oblast. November 1948.

Figure 11. Prewar view of Central Square of Stalingrad from air. After severe war damage the city is now in the process of reconstruction.

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Figure 12. New housing construction in Stalingrad. 1946.

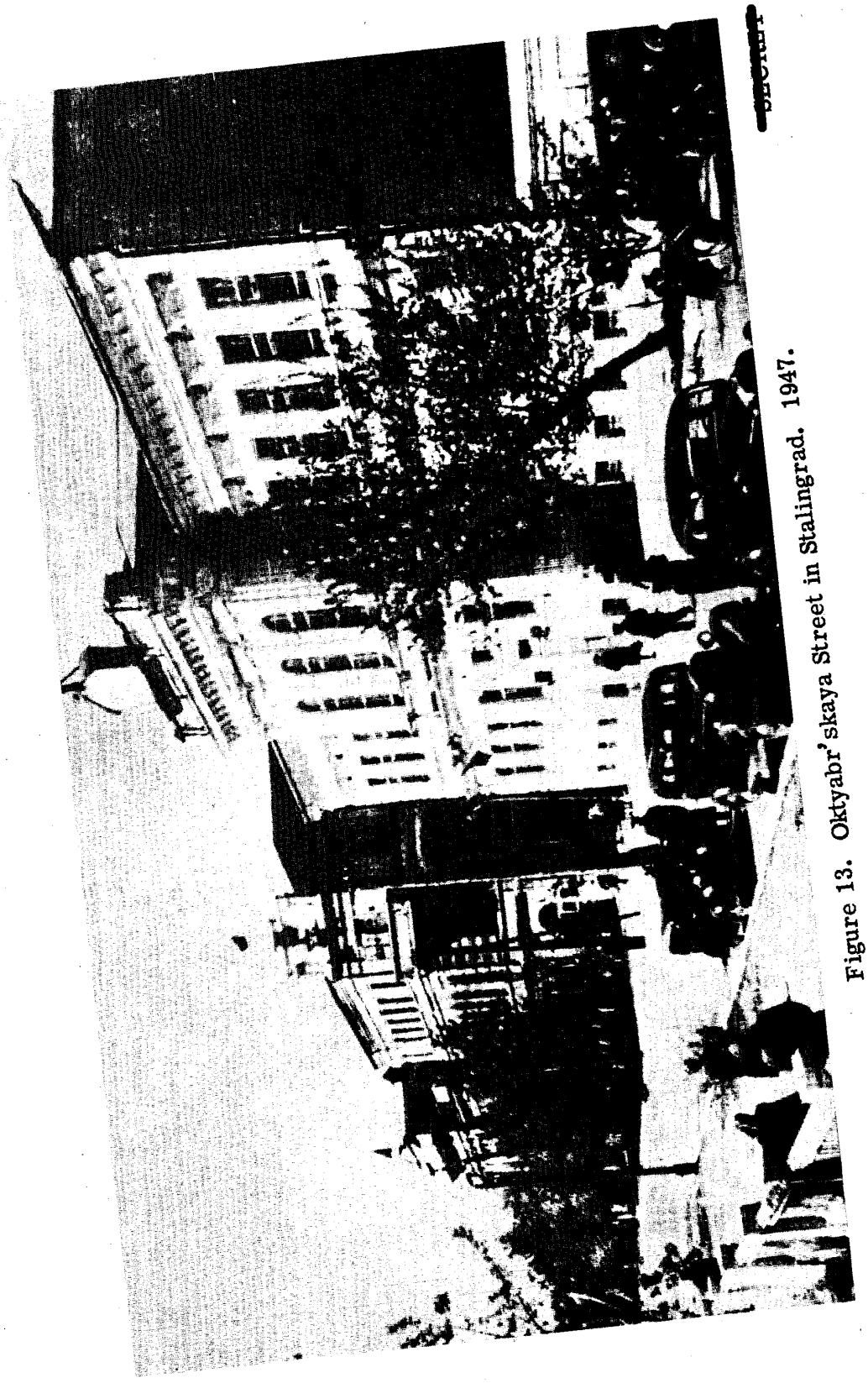

Figure 13. Oktyabr'skaya Street in Stalingrad. 1947.

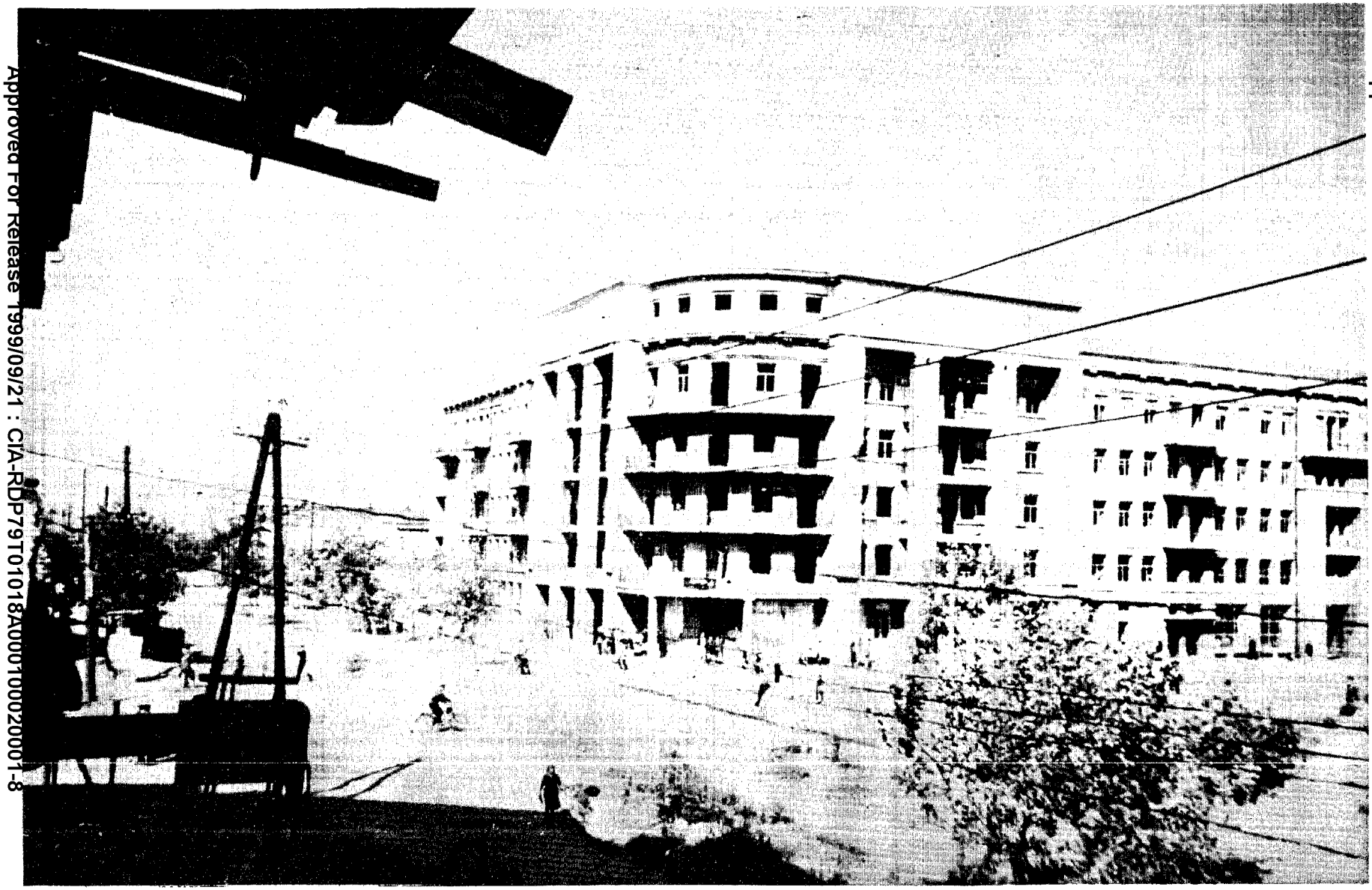

Figure 14. New apartment house on Tsiolkovskiy Street in Stalingrad. Prior to 1949.

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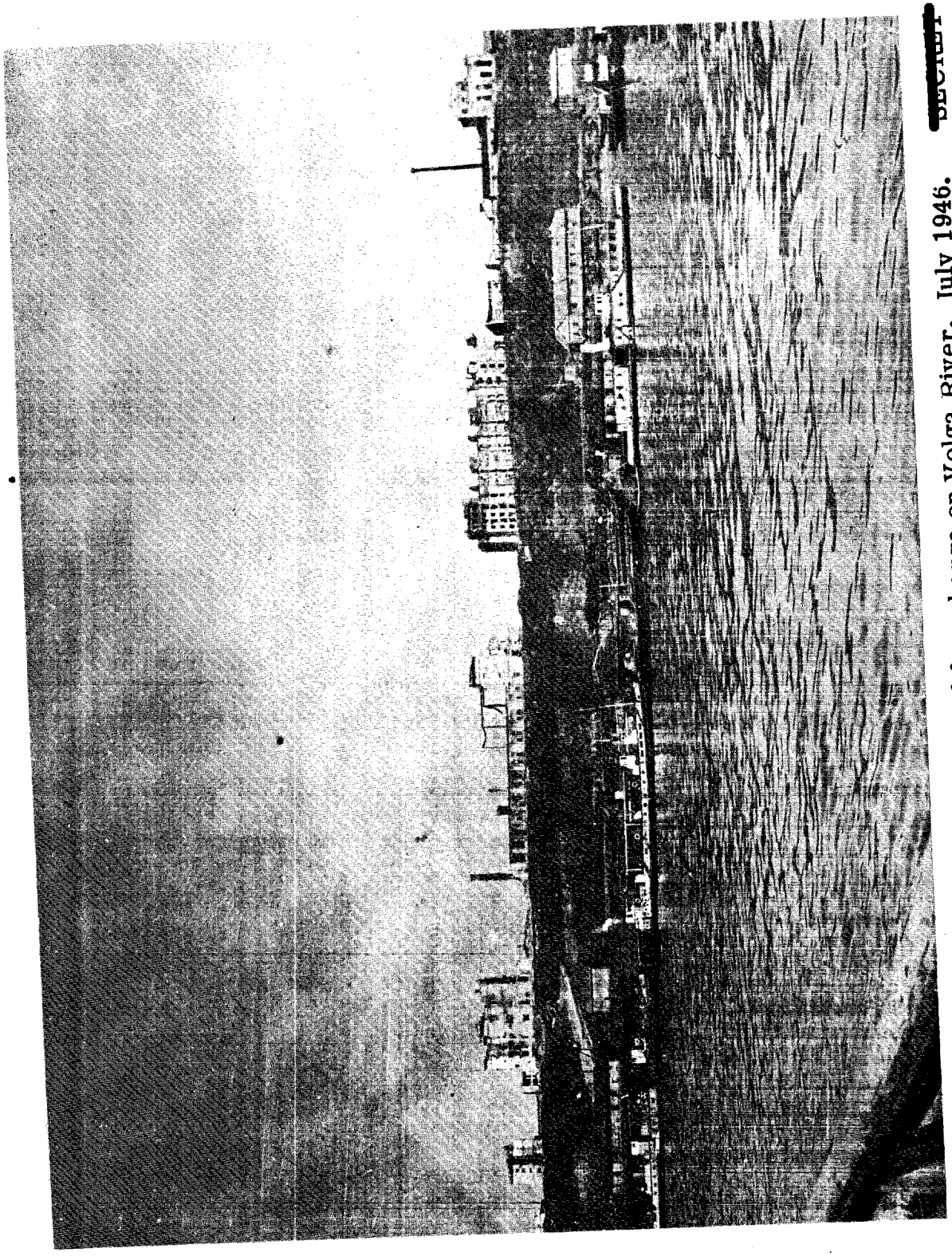

Figure 15. View of Stalingrad from barge on Volga River. July 1946. SECRET

Figure 16. Russian passengers on barge in Volga River. View of Stalingrad in background. July 1946.

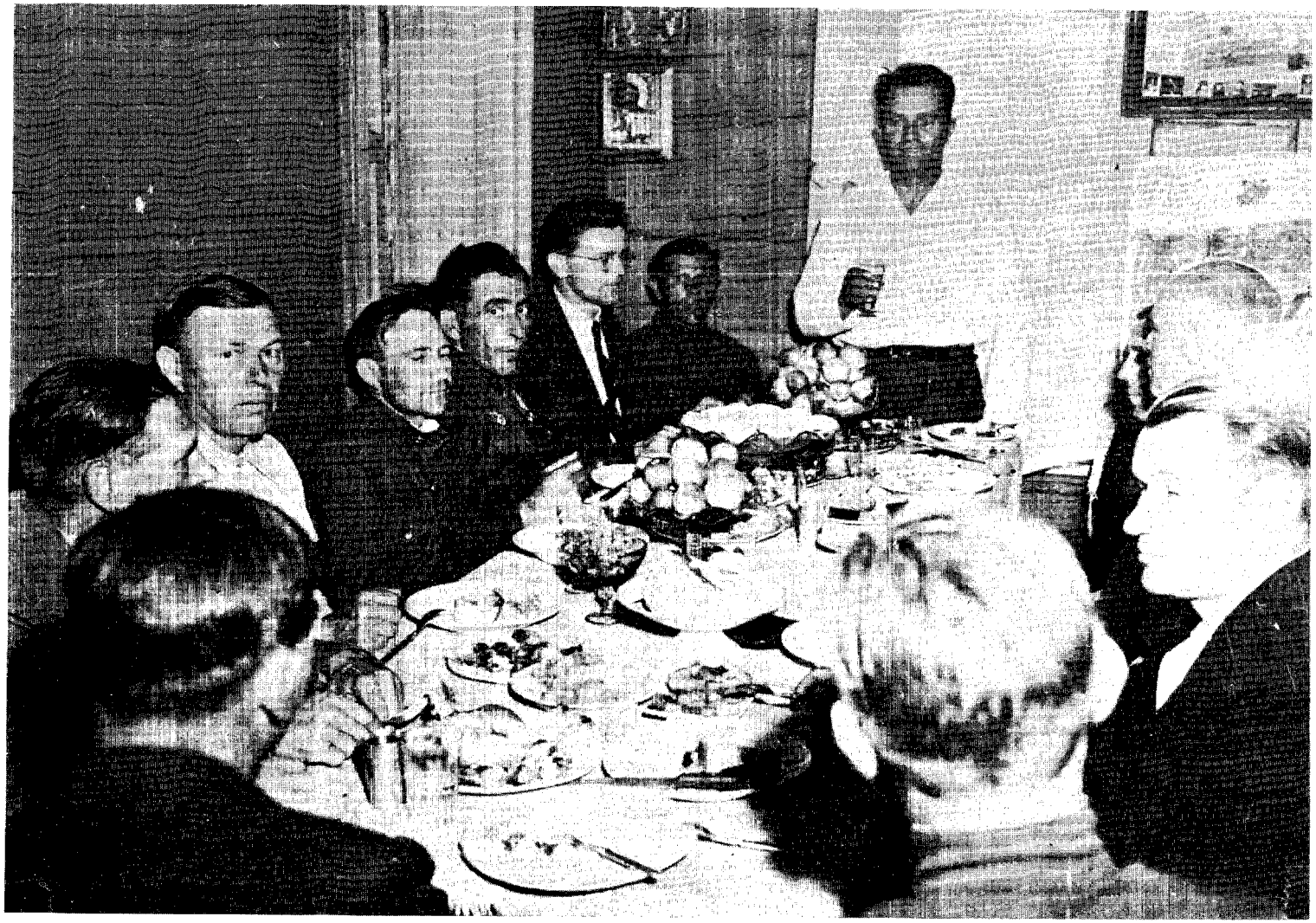

Figure 17. Chairman of collective farm addressing visiting American guests and minor officials. Note the clothing of the Russian officials. July 1946.

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Figure 18. Transporting rafts of timber down the Volga. Prewar.

Figure 19. Transporting timber on the Volga by low-decked wooden barksy.
Prewar.

Figure 20. Volga River from Stalingrad side. Low eastern bank in background. [redacted]

Figure 21. Part of wharf area along the Volga River in Stalingrad. 1944.

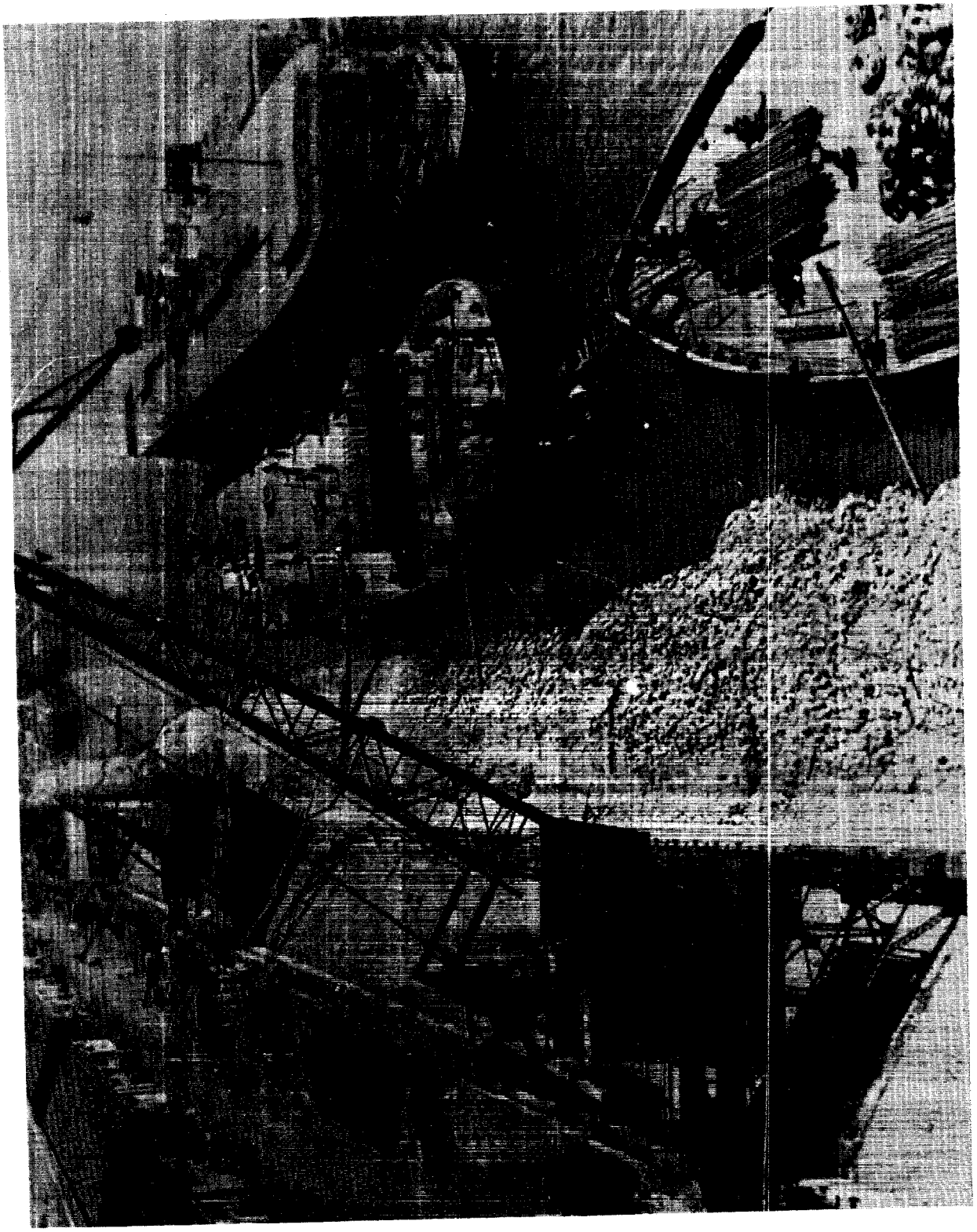


Figure 22. Unloading of Volga River vessels at the port of Stalingrad.

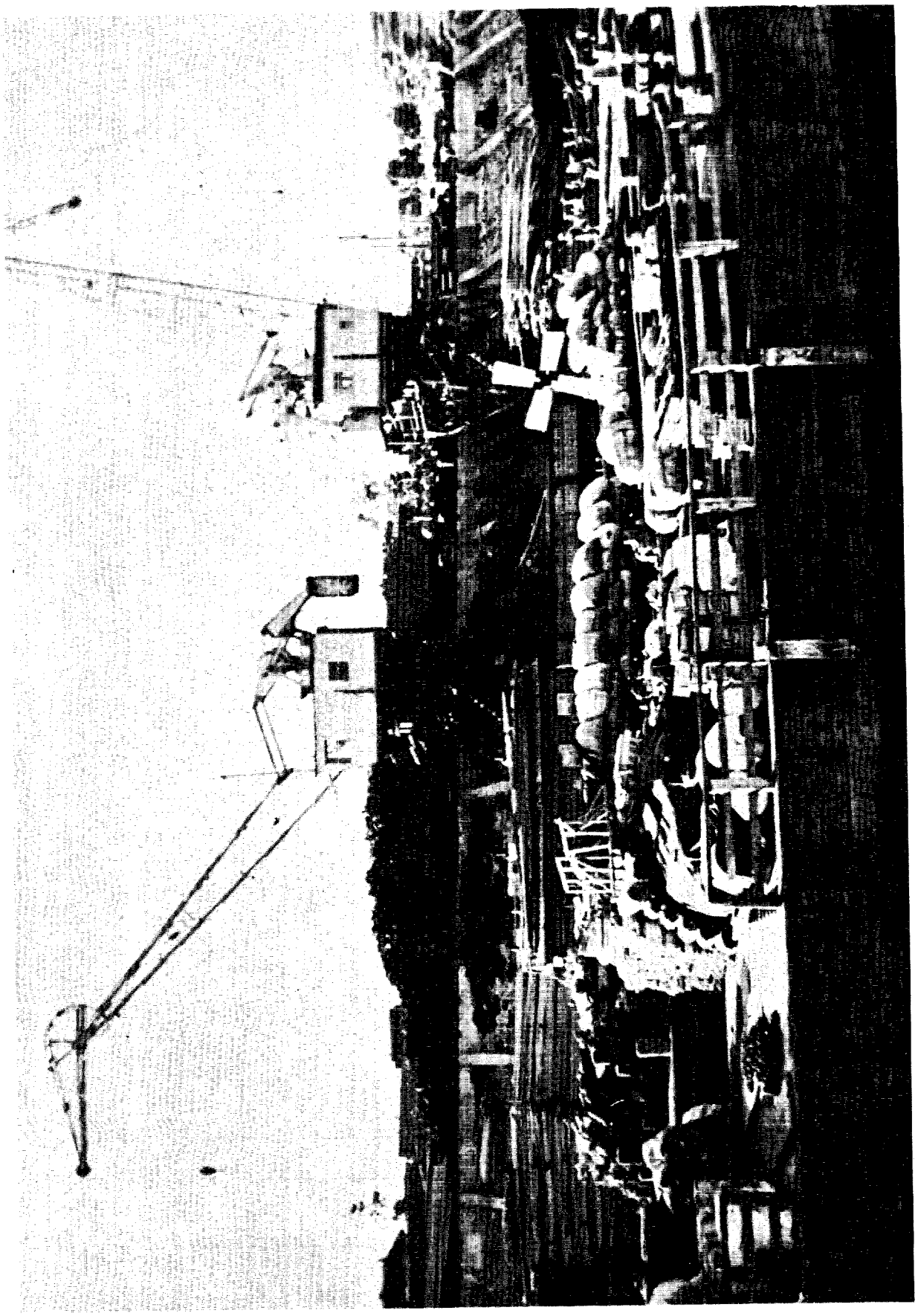


Figure 23. Volga River docks at Stalingrad. August 1947.

Figure 24. Loading facilities at Stalingrad. August 1947.

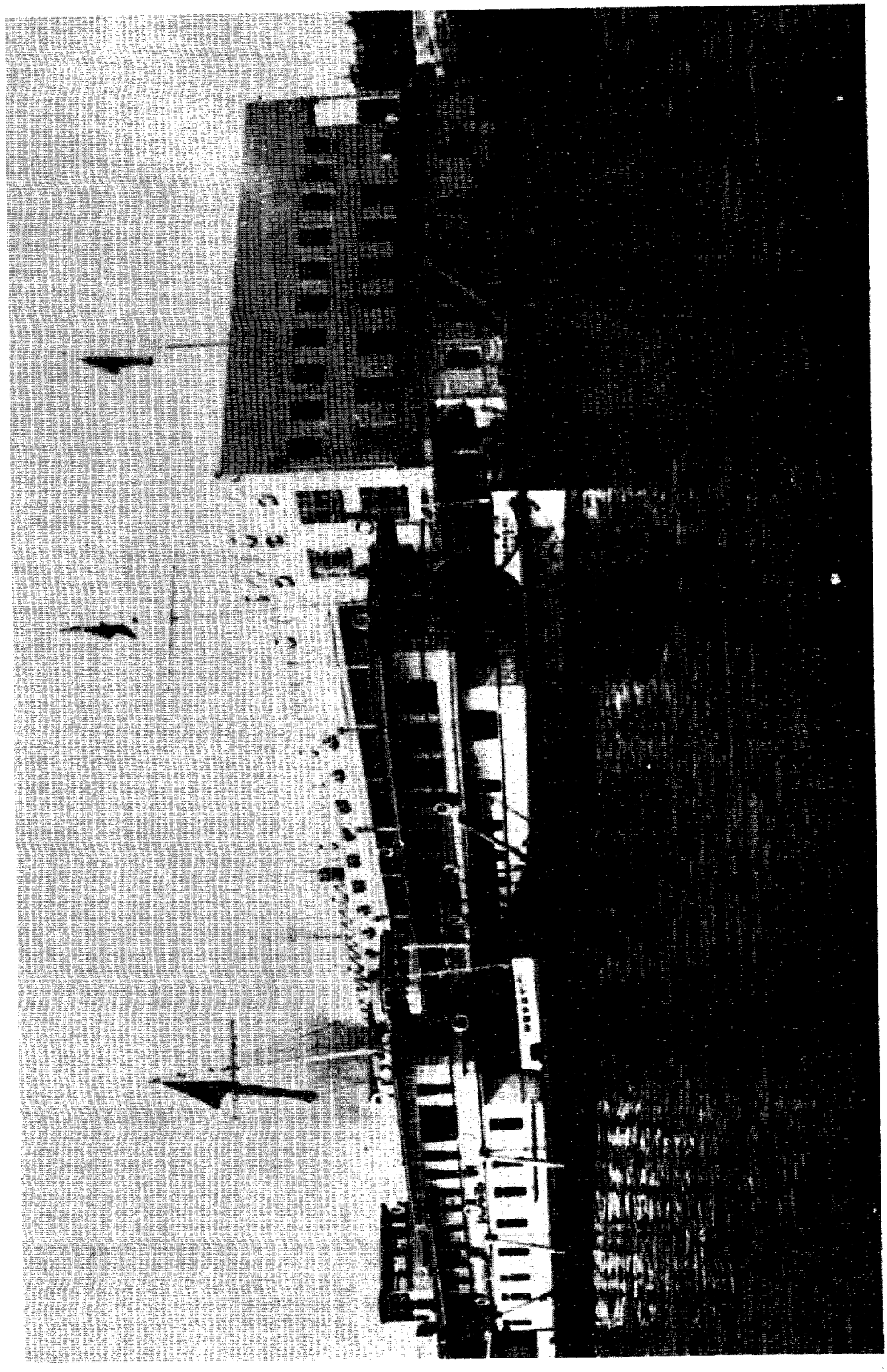


Figure 25. River-boat dock at Stalingrad; believed to be a floating dock.

APPENDIX A

ADMINISTRATIVE DIVISIONS

The following administrative units were wholly or partly included in the study area as of 1 October 1950 (116).

Administrative Unit	Administrative Center
A. Stalingradskaya Oblast (RSFSR)	Stalingrad City
Entire area of:	
Krasnoarmeyskiy Rayon	Svetlyy Yar (village)
Krasnoslobodskiy Rayon	Krasnaya Sloboda (workers' settlement)
Leninskiy Rayon	Leninsk (village)
Sredne-Akhtubinskiy Rayon	Srednyaya Akhtuba (village)
Parts of:	
Gorodishchenskiy Rayon	Gorodishche (village)
Dubovskiy Rayon	Dubovka (village)
Proleyskiy Rayon	Lugovaya Proleyka (village)
El'tonskiy Rayon	Zhitkur (village)
B. Astrakhanskaya Oblast (RSFSR)	Astrakhan' City
Entire area of:	
Vladimirovskiy Rayon	Vladimirovka (village)
Kapustinoyarskiy Rayon	Kapustin Yar (village)
Parts of:	
Nikol'skiy Rayon	Nikol'skoye (village)
Sasykol'skiy Rayon	Sasykoli (village)
Chernoyarskiy Rayon	Chernyy Yar (village)

Administrative Unit	Administrative Center
C. Zapadno-Kazakhstanskaya Oblast (Kazakhskaya SSR)	Ural'sk City
Part of:	
Urdinskiy Rayon	Urda (village)

APPENDIX B

CLIMATIC DATA

1. Temperature

Station	No. Years of Observation	Average Temperature in Degrees C			Lowest Absolute Temperature in Degrees C	Highest Absolute Temperature in Degrees C
		Yr.	Jan	July		
Kamyshin	33	6.2	-10.6	23.1	-37.2	40.8
Stalingrad	32	7.6	- 9.2	24.2	-34.6	41.0
Tinguta	26	7.5	- 8.9	23.7	--	--
Saratov	37	5.7	-11.1	22.5	-41.4	40.7
El'ton	2	7.0	-10.6	24.4	--	--
Urda	9	7.2	-10.3	24.5	--	--
Akhtuba	24	7.6	- 9.4	24.3	-38.7	40.1
Baskunchak	8	7.7	- 9.8	25.3	--	--
Novouzensk	6	5.3	-12.5	23.1	-44.5	41.0
Astrakhan'	35	9.3	- 6.8	25.1	-32.7	38.9

2. Precipitation

Mean, Maximum, and Minimum Precipitation in Millimeters

Station	No. of Years Observed	Monthly I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual
Kamyshin	38	18	19	16	18	27	33	34	80	26	29	32	27	312
		53	71	47	44	119	87	110	118	70	84	85	91	452
		1	0	0	0	1	0	2	1	1	0	6	2	180
Dubovka I	24	25	21	15	19	28	36	32	23	30	30	36	29	324
		61	46	42	45	113	104	71	68	75	70	84	75	620
		4	2	2	3	0	4	2	2	0	0	8	7	202
Dubovka III	6	44	25	28	15	56	52	36	60	55	17	32	50	470
Sredne-Pogromnoye	7	16	20	14	13	22	29	31	19	27	30	29	34	284
Stalingrad	28	32	30	21	19	32	43	34	23	31	30	38	44	377
		88	63	76	59	129	137	95	79	112	97	113	108	715
		1	3	4	0	0	0	0	0	0	0	1	3	196
Tsatsa	8	24	16	19	18	29	36	26	27	29	14	20	29	287
Tinguta	31	14	10	13	16	32	32	30	22	23	18	22	21	253
		38	31	60	49	182	235	89	82	56	68	66	65	524
		1	0	1	3	0	0	4	0	0	0	2	2	76
Saratov	26	29	23	20	22	38	40	34	37	31	35	37	36	382
		88	49	47	47	99	87	110	131	82	83	98	86	589
		3	0	2	4	1	2	3	4	1	0	7	9	233
Urda (Khanskaya Stavka)	17	16	11	8	15	23	24	21	24	21	17	29	21	230
Akhtuba	27	18	18	12	15	20	28	25	18	21	19	23	24	241
		52	70	30	40	77	111	80	63	51	70	63	75	399
		3	0	0	2	0	2	1	0	0	0	2	2	137
Baskunchak	29	20	17	10	15	25	22	21	18	17	20	24	22	231
		50	57	31	43	102	68	73	74	46	78	61	62	380
		2	0	0	0	0	1	0	0	0	0	2	6	120
Chernyy Yar	7	19	14	8	22	24	26	27	21	20	20	26	24	251
Astrakhan'	34	12	11	9	12	21	19	14	13	17	11	13	17	169
		38	60	32	56	95	107	48	42	49	34	47	55	282
		0	1	0	0	0	0	0	0	0	0	0	1	86

3. Snow Cover

Station	No. of Winters Observed	Mean Beginning of Persistent Snow Cover	Mean End of Persistent Snow Cover	Mean Date of Maximum Snow Cover	Duration of Persistent Snow Cover in Days	Period of Thaw in Days	Annual Snow Cover in Centimeters		
							Maximum	Mean	Minimum
Kamyshin	8	5/XII	15/III	5/II	100	38	46	18	9
Dubovka	24	15/XII	15/III	15/II	90	28	42	23	2
Sredne-Pogromnoye	7	15/XII	25/II	25/I	72	31	26	16	5
Stalingrad	27	15/XII	15/III	15/II	90	28	74	31	7
Tinguta	8	15/XII	10/III	5/II	85	--	47	18	9
Saratov	27	5/XII	5/IV	25/II	121	39	78	42	17
Urda	15	15/XII	5/III	15/II	80	18	21	14	1
Akhtuba	24	15/XII	15/III	5/II	90	38	42	18	3
Chernyy Yar	9	15/XII	25/II	25/I	72	31	32	13	6

4. Meteorological Stations

Akhtuba	48°18'N-46°09'E
Astrakhan'	46°21'N-48°02'E
Baskunchak	48°10'N-46°49'E
Chernyy Yar	48°04'N-46°07'E
Dubovka	49°03'N-44°50'E
El'ton	49°06'N-46°50'E
Kamyshin	50°05'N-45°24'E
Novouzensk	50°28'N-48°11'E
Saratov	51°32'N-46°03'E
Sredne-Pogromnoye	48°56'N-44°47'E
Stalingrad	48°42'N-44°31'E
Tinguta	47°56'N-44°34'E
Tsatsa	48°12'N-44°42'E
Urda (Khanskaya Stavka)	48°45'N-47°33'E

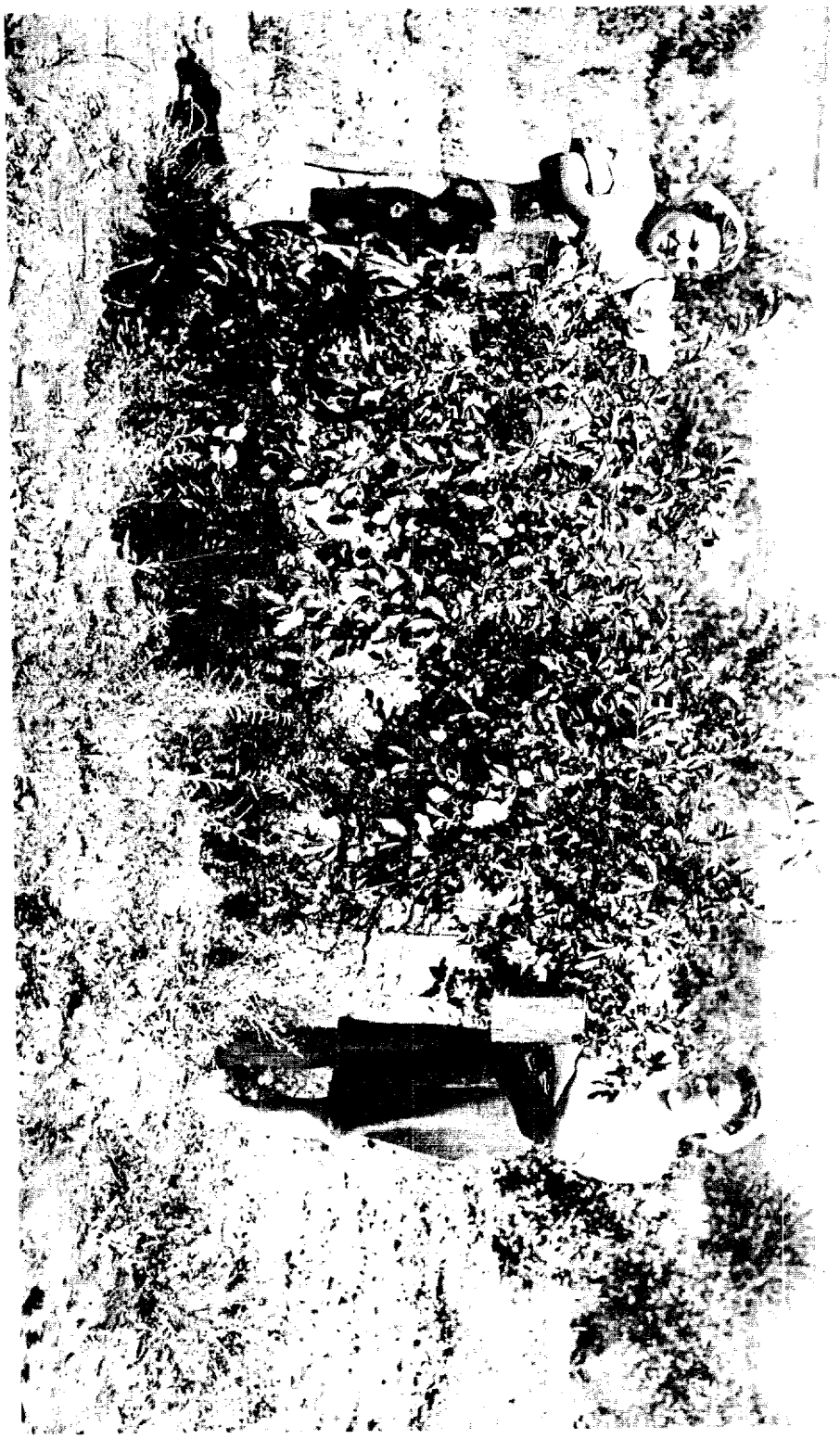
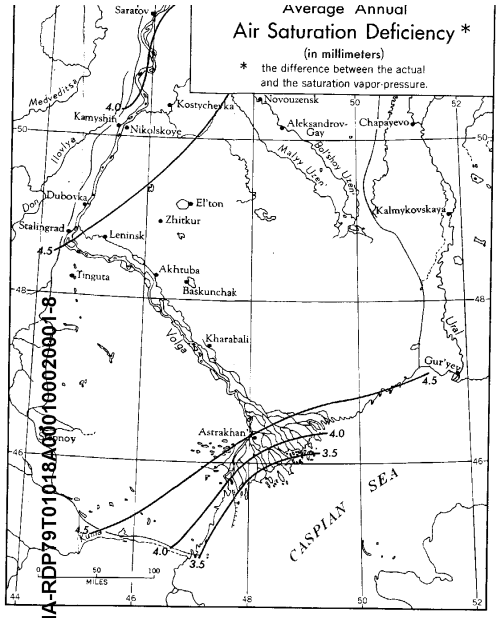
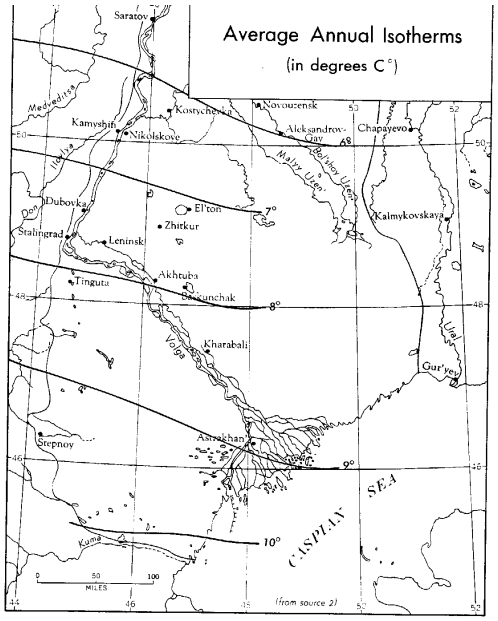
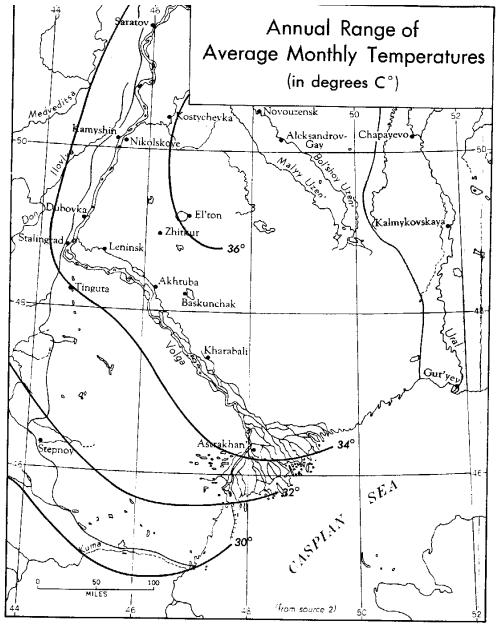


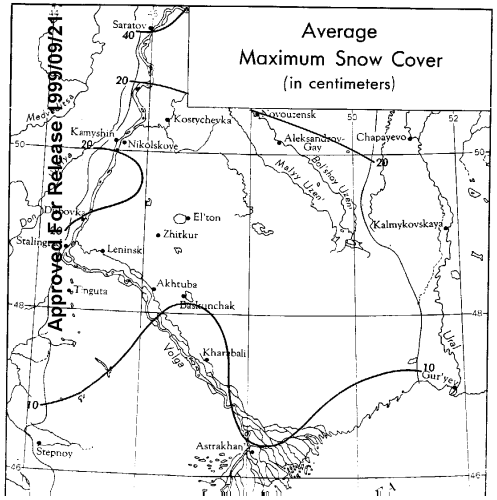
Figure 2. Cherry picking on fruit farm near Stalingrad. July 1946.

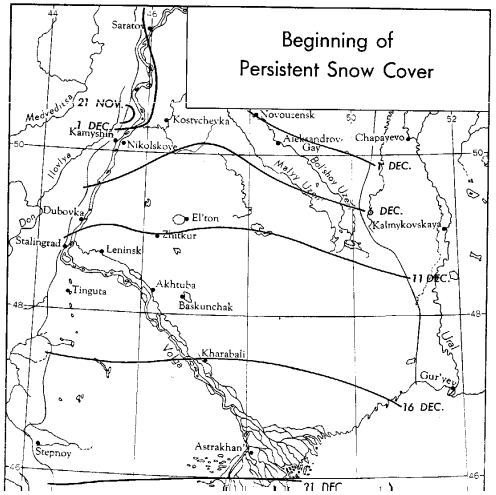
[redacted]

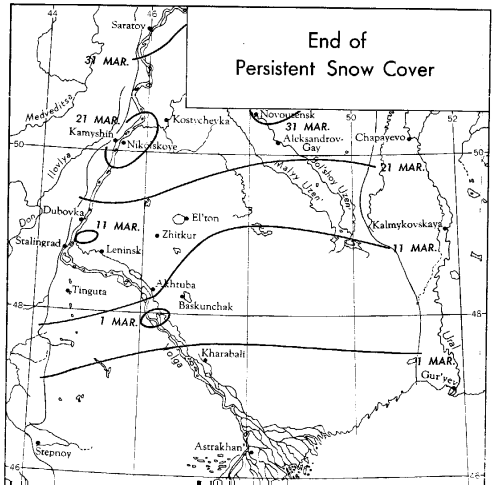






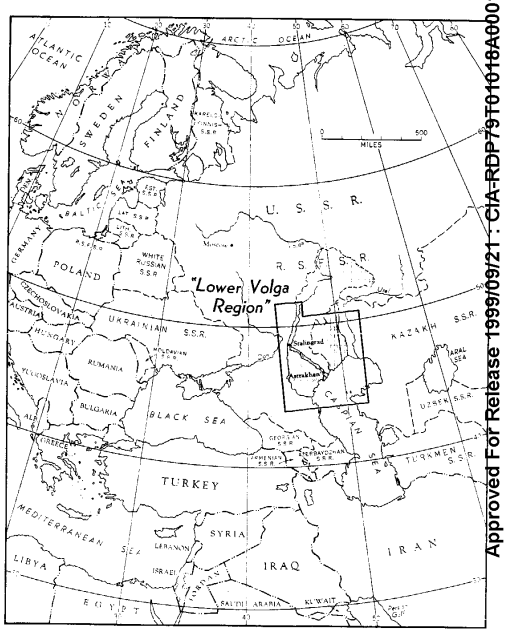






RESTRICTED
SECURITY INFORMATION

CLIMATIC ELEMENTS
of the
Volga-Caspian Lowland



The Government of the United States has not recognized the incorporation of Estonia, Latvia, and Lithuania into the Soviet Union, nor does it recognize as final the de facto western limit of Russian Administration in Germany, the Oder-Neisse line, or some other effective boundaries do not necessarily correspond to the boundaries recognized by the United States Government.

APPENDIX C

TRANSPORTATION

1. Road Bridges in the Stalingrad Area (66)

a. A concrete road bridge crosses the Orlovka River 8-1/2 miles NE of the Stalingrad main railroad station. The bridge has embanked approaches 280 feet long on either side.

Length:	715 feet
Width:	55 feet
Shore to shore:	180 feet

b. A narrow bridge, probably capable of carrying single-lane traffic, crosses the Orlovka River 8 miles NE of the Stalingrad main railroad station and 450 yards west of bridge No. 1.

Length:	860 feet
Width:	14 feet
Shore to shore:	800 feet

c. A narrow road bridge crosses the Orlovka River 800 yards west of bridge No. 2 and approximately 7-1/2 miles NE of the Stalingrad main railroad station. This bridge is believed to handle single-lane traffic only.

Length:	360 feet
Width:	10 feet
Shore to shore:	340 feet

d. A concrete bridge carries a good metalled road (probably the Stalingrad-Saratov Highway) over the Orlovka River some 650 yards west of bridge No. 3.

Length: 215 feet

Width: 25 feet

Shore to shore: 140 feet

e. Three miles NE of the main railroad station, a concrete bridge carries a secondary road over a loop line of the Stalingrad railroad system.

Length: 100 feet

Width: 20 feet

f. A concrete road bridge over a small tributary of the Volga River is located 1 mile NE of the main railroad station.

Length: 250 feet

Width: 65 feet

g. A bridge of concrete construction carries a good surfaced road over a tributary of the Volga approximately 1 mile SE of the main railroad station.

Length: 500 feet

Width: 65 feet

h. Two and a half miles SW of the main railroad station, a concrete road bridge crosses a loop line of the Stalingrad railroad system. A 35-foot section of the bridge was destroyed in 1942. The bridge has embanked approaches on either end.

Length: 380 feet

Width: 86 feet

i. Five and a half miles SW of the main railroad station, a single-span beam-type bridge carries the main road to Beketovka over a tributary of the Volga River.

Length:	175 feet
Width:	30 feet

2. Active and Inactive Airfields in the Study Area

a. Complete List of Airfields

Name	Coordinates ° ' "
Akatovka	48 53 00 N 44 40 00 E
Akhtuba	48 17 00 N 46 13 00 E
Batayevka	48 09 00 N 46 19 00 E
Bogdo	47 59 00 N 46 47 00 E
Bolkhuny	48 00 00 N 46 27 00 E
Bol'shiye Chapurniki	48 24 00 N 44 34 00 E
Breyusova	48 37 15 N 45 53 15 E
Chernyy Yar	48 03 00 N 46 06 00 E
Davydovka	49 18 00 N 44 39 00 E
Dryukov	48 29 00 N 46 29 00 E
Dubovka North	49 06 00 N 44 46 00 E
Dubovy	49 12 00 N 44 31 00 E
Dubovyy Ovrag	48 20 00 N 44 37 00 E
Dzhitkurinskiy	48 46 00 N 46 28 00 E

Name	Coordinates ° ' "
El'ton I	49 03 00 N 46 55 00 E
El'ton II (Mololkin)	49 03 00 N 46 56 00 E
Gorno Vodyanoye	49 14 40 N 44 57 10 E
Imeni Shestnadsatogo Parts"yezda	49 00 00 N 45 55 00 E
Ivanovka	48 28 15 N 44 23 45 E
Kapustin Yar	48 40 00 N 45 44 00 E
Kardayev	48 35 00 N 46 17 00 E
Kochergin	49 01 00 N 46 16 00 E
Kochevaya	48 16 00 N 46 26 00 E
Kolobovka	48 42 00 N 45 30 00 E
Kolod Krestovich	49 11 00 N 46 16 00 E
Kovzalov	48 43 00 N 46 01 00 E
Krasnyy Oktyabr'	49 08 00 N 45 38 00 E
Leninsk	48 44 00 N 45 13 00 E
Leninsk-Kirov (Kirov)	48 48 00 N 45 31 00 E

Name	Coordinates ° ' "
Lis'ya Balka	49 18 00 N 46 42 00 E
Loznoye	49 16 30 N 44 25 40 E
Lugo-Shirokoye	49 17 00 N 44 59 00 E
Lugo-Vodyanoye	49 15 00 N 45 00 00 E
Morozov	49 15 00 N 46 49 00 E
Nikitin	48 55 00 N 45 08 00 E
Nikol'skoye	47 45 00 N 46 22 00 E
Novonikol'skoye	49 05 00 N 45 01 00 E
Novyy Byt	48 57 00 N 45 58 00 E
Peskovatka	49 06 00 N 44 52 00 E
Pologoye	48 29 00 N 45 58 00 E
Raygorod	48 25 00 N 44 55 00 E
Sarashun	48 21 00 N 46 51 00 E
Saykhin	48 48 00 N 46 48 00 E
Shungay	48 32 00 N 46 46 00 E

Name	Coordinates ° ' "
Skudry	48 46 00 N 44 40 00 E
Solodovka	48 40 00 N 45 23 00 E
Solotukha	47 48 00 N 46 45 00 E
Spartak	49 06 55 N 44 31 30 E
Sredne-Pogromnoye	48 52 25 N 44 44 30 E
Srednyaya Akhtuba	48 44 00 N 44 52 00 E
Stalingrad I (Tsaritsyn)	48 45 00 N 44 30 00 E
* Stalingrad-Beketovka	48 33 00 N 44 24 00 E
* Stalingrad-Gorodishche	48 50 00 N 44 35 00 E
* Stalingrad-Gumrak (Gumrak)	48 46 00 N 44 22 00 E
* Stalingrad-Konnaya	48 52 00 N 44 22 00 E
Stalingrad/Krasnoarmeysk	48 32 00 N 44 36 00 E
Stalingrad/Orlovka	48 50 00 N 44 31 00 E
Stalingrad/Pichuga	48 58 00 N 44 41 00 E

* Active airfields.

Name	Coordinates ° ' "
Stalingrad-South	48 39 00 N 44 25 00 E
* Stalingrad-Southwest (Voroponovo)	48 40 00 N 44 20 00 E
Staritsa	48 14 00 N 45 53 00 E
Stolyarov	49 13 00 N 45 30 00 E
Svetlyy-Yar	48 28 00 N 44 47 00 E
Tsatsa	48 11 45 N 44 40 35 E
Tumak	48 37 00 N 44 40 35 E
Ushakovka	48 24 35 N 45 09 00 E
Verkhne-Pogromnoye	48 58 00 N 44 54 00 E
Verkhniy Baskunchak	48 12 00 N 46 42 00 E
Verkhniy Baskunchak-East	48 14 00 N 46 44 00 E
Verkhnyaya Akhtuba	48 46 00 N 44 46 00 E
Vladimirovka	48 18 00 N 46 10 00 E
Vladimirovka-North (Pokrovka)	48 27 00 N 46 11 00 E

* Active airfields.

Name	Coordinates ° ' "
Vyazovka	48 17 00 N 45 41 00 E
Yerzovka	48 55 30 N 44 38 00 E
Zaplavnoye (I)	48 43 00 N 45 00 00 E
Zhitkur	48 57 00 N 46 17 30 E
Zhitkur-South (Repeva)	48 53 00 N 46 14 00 E

b. Description of Active Airfields

(1) Stalingrad-Beketovka (21, 102, 103)

Coordinates: 48°33'N - 44°24'E.

Date latest information: December 1949.

Location: 12-1/2 miles SSW of Stalingrad and 3-1/4 miles WSW of Beketovka; 5 miles west of the Volga River. The airfield is located on a plateau which is approximately 260 feet above the Volga River. Terrain conceals airfield from observation from town.

Landing area:

Field:

Dimension and orientation: 9,840 x 5,570 feet ENE/WSW.

Surface: Sod.

Runway: Prepared or concrete runway reported but unconfirmed.

Extensibility: Extensible S and W for undetermined distance.

Taxiways: No information.

Parking: A minimum of 15 revetments reported.

Obstructions: Probably none.

Facilities:

Radio: Radio station reported in one of the buildings.

Communication: Teletype.

Weather service: Station at field.

Lighting: Air base not equipped with night lighting facilities.

Fuel: Refueling by truck reported in 1949.

Oil: No information.

Hangars: Two small hangars reported in 1949. Primitive construction, consisting of steel framework and metal sheets, with barrel-type sheet-metal roof.

Misc. buildings: None visible. Minor servicing probably carried out in an open compound situated beyond western boundary of airfield.

Access:

Road: Secondary road leading to Stalingrad.

Railroad: Stalingrad-Sal'sk Railroad located 4 miles to the east of airfield.

Users and operators: Used by the Soviet Air Force as a training field for paratroopers. Jumps being made from gliders at altitudes of 700 feet.

Photo coverage: Figure 26.

(2) Stalingrad-Gorodishche (Alternate name: Stalingrad 4) (21, 102)

Coordinates: 48°50'N - 44°35'E.

Date latest information: June 1948.

Location: 9-1/4 miles NE of Stalingrad and 5-1/4 miles NE of Gorodishche; 3-1/4 miles west of Volga River.

Landing area:

Field:

Dimension and orientation: Rectangular shape; 3,600 x 2,050 feet WNW/ESE.

Surface: Sod.

Runway: No runway reported 1942.

Extensibility: Extensible NNE 2,300 feet.

Taxiways: No information.

Parking: Open.

Obstructions: Probably none.

Facilities:

Radio: Probable station located SW of airfield.

Communication: No information.

Weather service: No information.

Lighting: No information.

Fuel: No information.

Oil: No information.

Hangars: 1 small hangar, severely damaged in August 1942.

Misc. buildings: 2 small auxiliary buildings, minor repair facilities.

Access:

Road: Secondary road, Stalingrad-Dubovka, just east of airfield.

Railroad: Railroad service at Stalingrad.

Users and operators: No information.

Photo coverage. Figure 27.

(3) Stalingrad-Gumrak (Alternate name: Gumrak) (21, 66, 102-106)

Coordinates: 48°46'N - 44°22'E.

Date latest information: May 1951.

Location: 7-1/2 miles NW of Stalingrad and immediately west of the rail junction at Gumrak; 9-3/4 miles west of Volga River.

Landing area:

Field:

Dimension and orientation: Roughly rectangular shaped; 7,870 x 5,200 feet NNW/SSE.

Surface: Sod with good natural drainage.

Runway:

Dimension and orientation: Old runway 3,800 x 250 feet ENE/WSW; newly constructed runway seen in 1947.

Surface: Concrete.

Extensibility: 1,600 feet to WSW.

Taxiways: Taxiway connecting both ends of runway.

Parking: 35 revetments to SE.

Obstructions: Probably none.

Facilities:

Radio: Station at Stalingrad.

Communication: No information.

Weather service: No information.

Lighting: No information.

Fuel: No information.

Oil: No information.

Hangars: 1-4 hangars reported in 1949. Blister type, approximately 130 x 95 feet.

Misc. buildings: A small number of shops and domestic buildings, reported in 1942; situated at the east side of the field.

Access:

Road: Secondary road to Stalingrad.

Railroad: Gumrak railroad station located SE of field.

Users and operators: Field is used by Soviet Air Force. Was reported as badly damaged in 1943. Recent information indicates possible use as a long-range bomber base. Source stated that he saw some

4-engined aircraft similar to B-29's flying in formation over Stalingrad. Believed the air base was located about 3.1 miles west of Stalingrad since planes circled low and disappeared at this point. A German PW interned in Stalingrad from July 1949 - April 1950 reported jet aircraft with swept-back wings flying in the vicinity of Gumrak airfield. No night-flying reported at base in 1949.

Photo coverage: Figure 28.

(4) Stalingrad-Konnaya (102)

Coordinates: 48°52'N - 44°22'E.

Date latest information: October 1947.

Location: 11-3/4 miles NW of Stalingrad and just NE of Konnaya railroad station; 13 miles W of Volga River.

Landing area:

Field:

Dimension and orientation: Limits of the field are not clearly defined, appears to

be a rectangular area; 7,630 x 2,920 feet ENE/WSW.

Surface: Sod.

Runway: No information as of 1942.

Extensibility: No information.

Parking: 11 revetments to the SE.

Obstructions: Probably none.

Facilities:

Radio: Station at Stalingrad.

Communication: No information.

Weather service: No information.

Lighting: No information.

Fuel: No information.

Oil: No information.

Hangars: None.

Misc. buildings: None.

Access:

Road: Secondary road to Stalingrad.

Railroad: Stalingrad-Saratov Railroad located just SE of field.

Users and operators: Field is reported as a training base for paratroopers.

Photo coverage: Figure 29.

(5) Stalingrad-Southwest (Alternate name: Voroponovo) (102)

Coordinates: 48°40'N - 44°20'E.

Date latest information: May 1951.

Location: 7-1/2 miles SW of Stalingrad; 6-3/4 miles NW of Beketovka and just S of Voroponovo RR station.

Landing area:

Field:

Dimension and orientation: Rectangular shape; 6,840 x 4,620 feet E/W.

Surface: Sod.

Runway: None.

Extensibility: No information.

Taxiways: None.

Parking: Open parking reported in 1950.

Obstruction: Probably none.

Facilities:

Radio: Station at Stalingrad.

Communication: Telephone and telegraph.

Weather service: No information.

Lighting: No information.

Fuel: Refueling by tank-truck of 1,000-gallon capacity (estimated).

Oil: No information.

Hangars: 2 small blister hangars reported in 1942; in 1950, no hangars observed.

Misc. buildings: 3 shops, 3 probable warehouses, and 4 unidentified buildings along the north and west sides of the field.

Access:

Road: Secondary road to Stalingrad.

Railroad: Service at Stalingrad.

Users and operators: Soviet Air Force uses field for training purposes (1947); Civil air line, Aeroflot, operates DC-3 type planes from field.

Photo coverage: Figure 30.

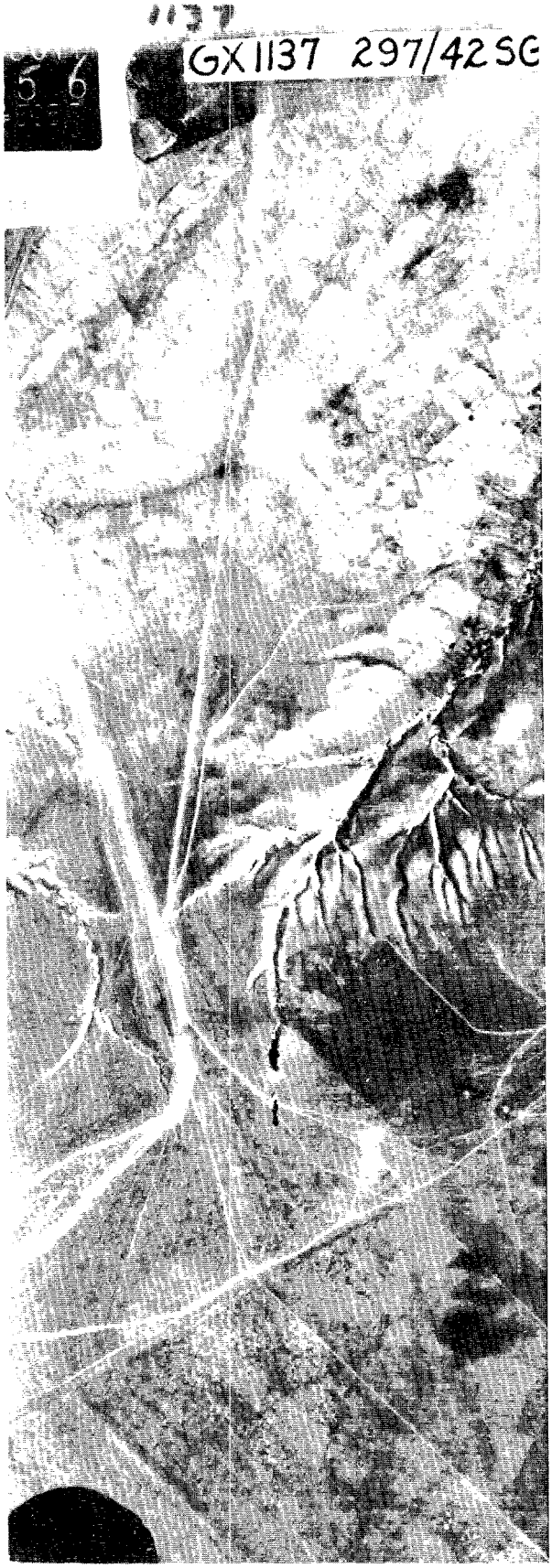


Figure 26. Air photo of Staling

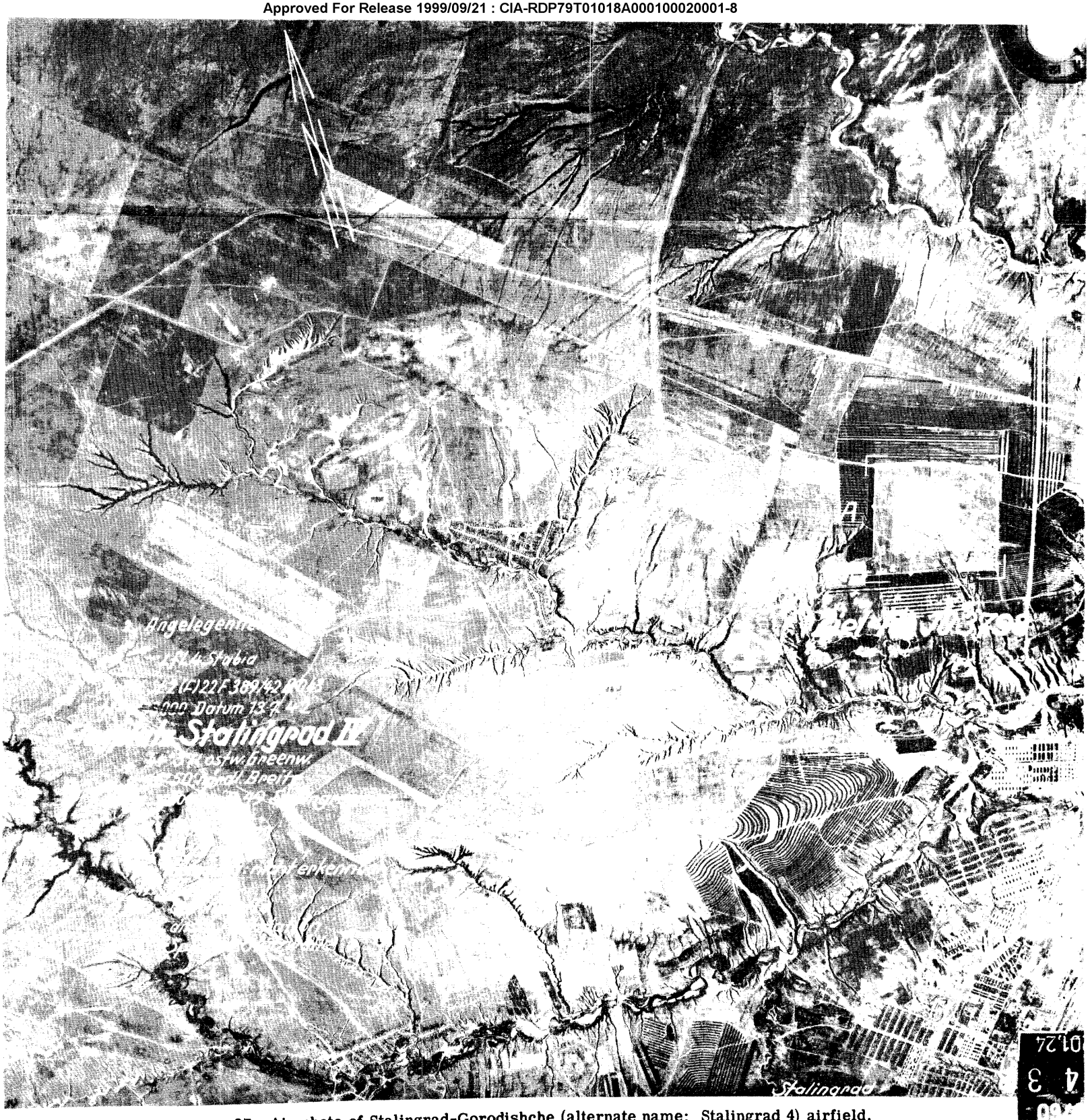


Figure 27. Air photo of Stalingrad-Gorodishche (alternate name: Stalingrad 4) airfield, 48°50'N 44°35'E, 19 July 1942. SECRET

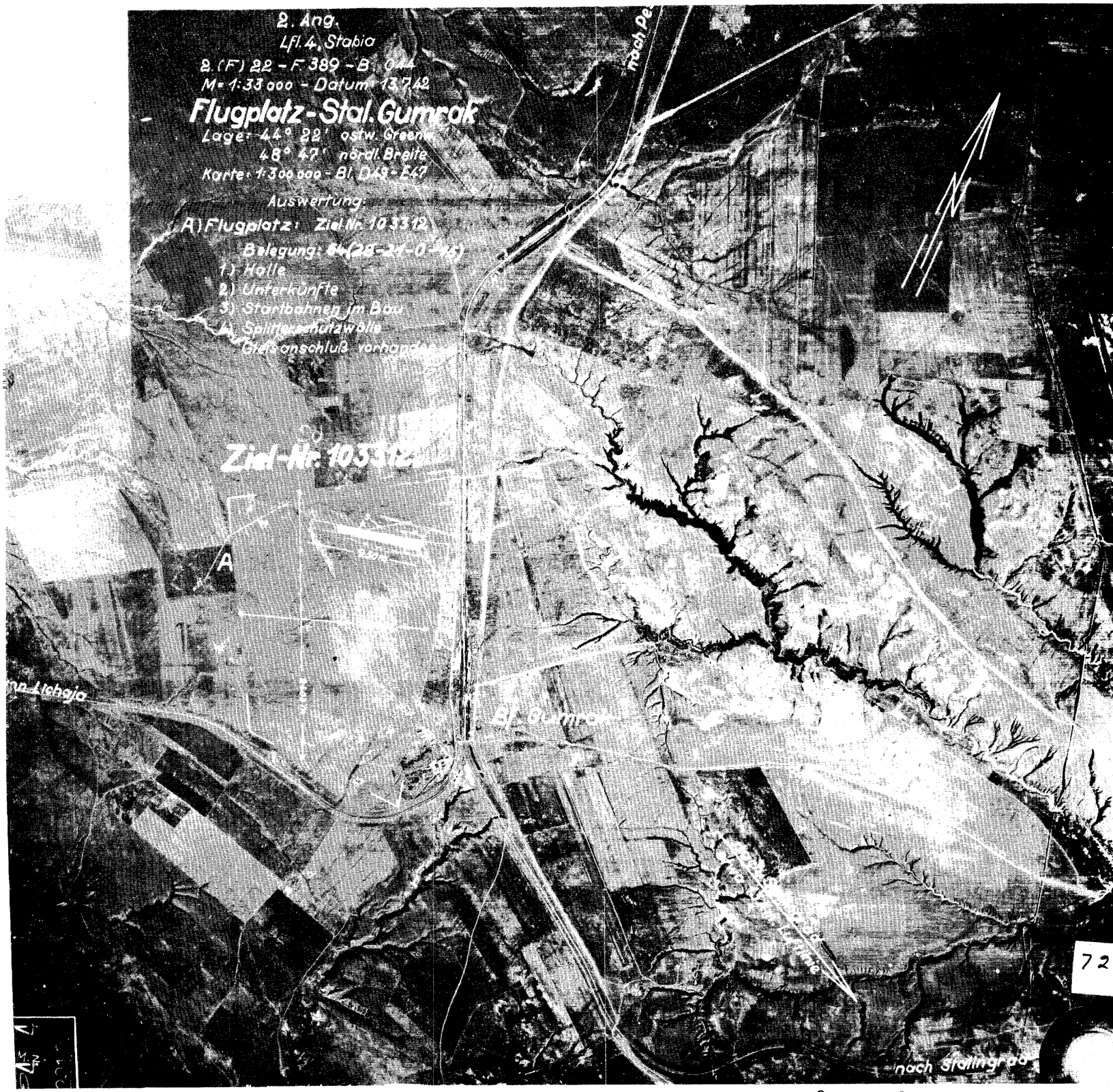


Figure 28. Air photo of Stalingrad-Gumrak (alternate name: Gumrak) airfield, 48°46'N--44°22'E. 13 July 1942. SECRET

Figure 29. Aerial photo of Stalingrad-Konnaya airfield, 48°52'N, 44°22'E, 24 July 1942.

SECRET

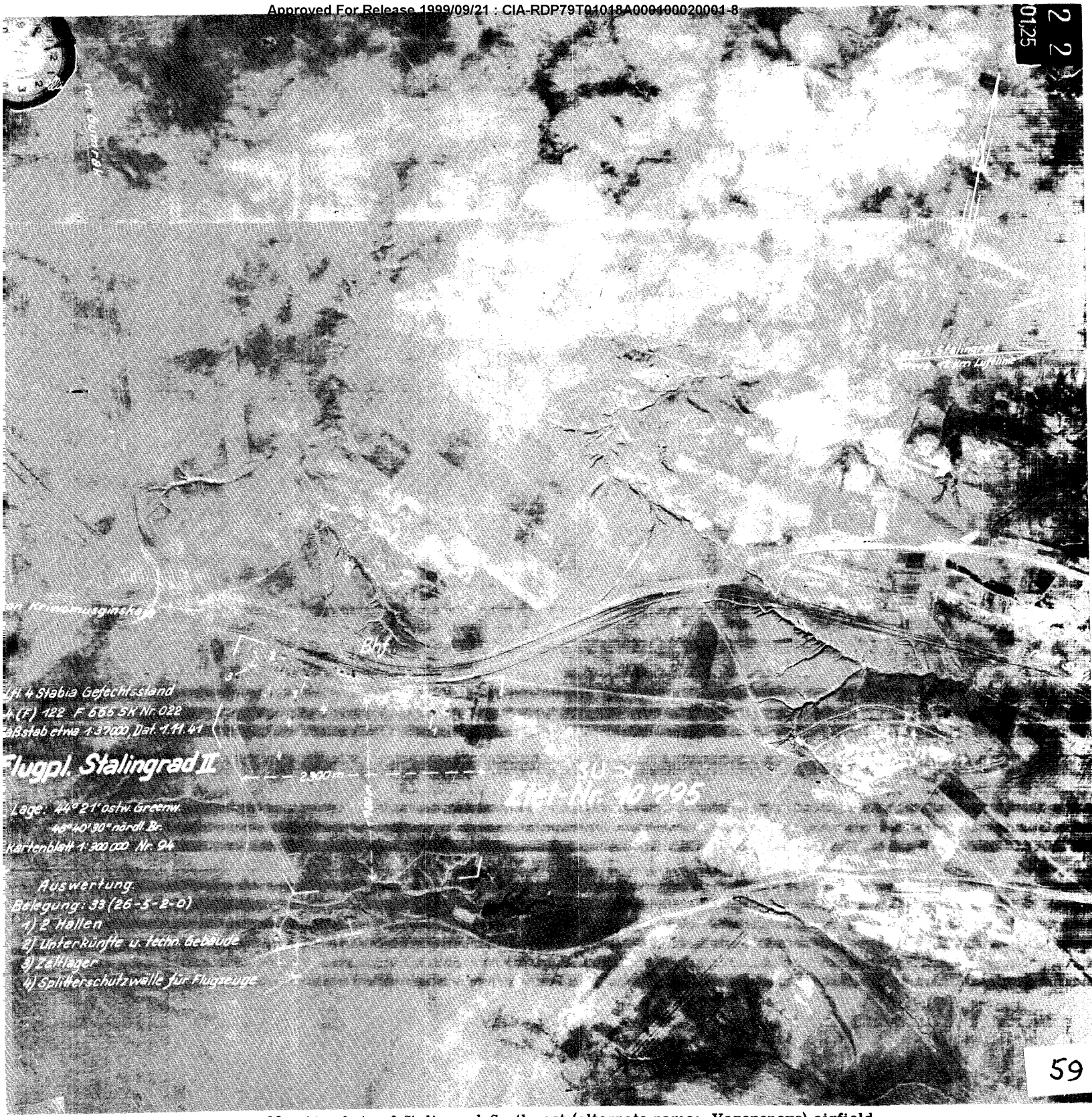


Figure 30. Air photo of Stalingrad-Southwest (alternate name: Voroponovo) airfield, 48°40'N - 44°20'E, 1 November 1941.

APPENDIX D

GAZETTEER

The following list includes every settlement shown on the base map of the study area. Population data were obtained from Sources 9, 122, and 123. Significant non-agricultural activities and lower-order administrative centers and administrative designations are noted under Remarks. All settlements for which an administrative designation is not listed are agricultural villages.

Name	Coordinates (° ′)	Population	Remarks
Abrashov	48 57 N 46 08 E	less than 100	
Agbayev Pervyy	48 49 N 46 54 E	less than 100	
Agbayev Vtoroy	48 57 N 46 56 E	less than 100	
Akatovka	48 53 N 44 40 E	341	Sel'sovet center
Akelin	49 12 N 45 13 E	31	
Akhtuba	48 16 N 46 12 E	1,621	
Akpuka	47 52 N 47 52 E	a/	
Aksayev	48 47 N 46 54 E	a/	
Aksenov	48 53 N 46 31 E	less than 100	

a/ Population undeterminable, probably less than 500.

Name	Coordinates ° '	Population	Remarks
Aleksandrovka	48 47 N 44 25 E	192	
Alekseyevka	48 41 N 44 20 E	178	
Amancha Shalash	48 20 N 46 51 E	a/	
Andreyev Prud	49 10 N 44 37 E	less than 100	
Anikin	49 13 N 46 12 E	less than 100	
Antonov	48 18 N 45 24 E	a/	
Antoshkin	48 48 N 46 13 E	34	
Arakantsev	49 02 N 44 14 E	less than 100	
Asiy-Stan	48 24 N 46 55 E	a/	
Aubeker	48 54 N 46 54 E	less than 100	
Aulet	48 21 N 46 40 E	a/	
Aulet	48 21 N 46 51 E	a/	
Auz-Ashik	48 40 N 47 26 E	a/	
Avdeyenkov	48 47 N 46 18 E	less than 100	
Aymeken	48 37 N 47 40 E	a/	

Name	Coordinates	Population	Remarks
Azerbayev	48 43 N 46 50 E	a/	
Azgir	47 50 N 47 54 E	a/	
Azhen	48 57 N 47 17 E	less than 100	
Babkin	48 25 N 46 28 E	151	
Baboshin	48 33 N 45 49 E	37	
Bakhtiyarovka	48 43 N 45 09 E	323	Sel'sovet center
Balkuduk	47 49 N 47 33 E	a/	
Baranovka	48 07 N 46 05 E	399	
Bashkov	48 36 N 46 01 E	less than 500	
Batayevka	48 08 N 46 18 E	493	Sel'sovet center
Bater Bek	47 58 N 47 49 E	a/	
Bavanov	48 43 N 46 47 E	a/	
Baykadan	49 12 N 47 01 E	112	
Bazarkin	48 23 N 46 17 E	less than 100	
Bedin	48 17 N 46 03 E	35	

Name	Coordinates ° '	Population	Remarks
Bednyy	48 44 N 46 13 E	a/	
Beketovka	48 34 N 44 26 E	2,000-10,000	Urban Rayon of Stalingrad; chemicals; sawmilling
Bek-Saut	48 33 N 47 53 E	a/	
Bektas	48 31 N 47 37 E	a/	
Belonosova	48 39 N 45 51 E	a/	
Bereykin	48 16 N 45 23 E	a/	
Bezuglov	48 11 N 46 31 E	a/	
Bibul	48 36 N 47 30 E	a/	
Birkali	49 20 N 46 53 E	a/	
Biyatov	48 42 N 46 53 E	a/	
Biryukov	48 51 N 46 35 E	a/	
Bobrov	48 11 N 45 29 E	a/	
Bobrov	48 43 N 44 34 E	a/	
Bobyli	48 41 N 44 29 E	a/	
Bodgo	47 58 N 46 49 E	a/	

Name	Coordinates	Population	Remarks
Bolkhuny	47 59 N 46 25 E	4,418	Sel'sovet center
Bol'shaya Karakul'	48 26 N 46 37 E	331	
Bol'shaya Kazinka	47 45 N 46 34 E	455	
Bol'shaya Khanata	48 53 N 46 24 E	14	
Bol'shoy Lemeshkin	48 44 N 46 04 E	a/	
Bol'shevik	49 02 N 45 54 E	35	
Bol'shiye Chapurniki	48 25 N 44 36 E	1,777	Sel'sovet center
Bol'shoy	49 18 N 45 20 E	a/	
Bol'shoy Ostrov	48 06 N 46 11 E	291	
Bondarenko	49 17 N 46 16 E	a/	
Bondarev	48 54 N 46 07 E	46	
Bondarev	48 31 N 46 04 E	a/	
Bor'ba s Zasukhoy	48 42 N 45 28 E	164	
Borkulev	48 17 N 46 23 E	a/	
Borodin	48 04 N 46 13 E	a/	

Name	Coordinates o '	Population	Remarks
Bosov	48 30 N 46 22 E	less than 500	
Botkhul'	48 43 N 46 36 E	a/	
Botov	48 59 N 46 37 E	a/	
Boykiye Dvoriki	49 13 N 44 35 E	a/	
Brekharin	48 52 N 46 38 E	a/	
Breusova	48 38 N 45 53 E	a/	
Bruny	48 44 N 44 44 E	361	
Brykov	48 40 N 46 06 E	a/	
Budennyy	48 55 N 45 36 E	815	Sel'sovet center
Bugryanskiy	48 11 N 46 38 E	a/	
Bukash	48 12 N 47 32 E	a/	
Bundareva	48 33 N 45 57 E	a/	
Bundin	48 25 N 45 28 E	286	
Burkovskiy	48 42 N 44 40 E	199	Sel'sovet center
Burov	49 19 N 46 51 E	a/	

Name	Coordinates	Population	Remarks
Buryakov	48 46 N 46 15 E	a/	
Bushnev	48 33 N 46 27 E	less than 100	
Bychkova	48 40 N 45 59 E	a/	
Bykhalov	48 44 N 46 10 E	less than 100	
Chandy	48 03 N 47 10 E	a/	
Chapayevets	48 35 N 44 51 E	a/	
Chapurniki	48 27 N 44 31 E	184	Small shipyard for river craft
Chekay	48 23 N 46 41 E	a/	
Chelyuskin	49 03 N 44 39 E	233	
Chenin Pervyy	49 18 N 46 47 E	164	
Chernaya Polyana	48 29 N 45 07 E	101	
Chernikin	48 29 N 46 07 E	a/	
Chernoguzov	48 35 N 46 26 E	less than 100	
Chernoguzov	48 27 N 46 28 E	less than 100	
Chernyshev	48 16 N 46 29 E	a/	

Name	Coordinates ° '	Population	Remarks
Chernyy Yar	48 04 N 46 07 E	3,865	Rayon center; sel'sovet center; brick making; food processing
Chervlenyy	48 25 N 44 22 E	620	Sel'sovet center
Chirkov	48 58 N 45 08 E	less than 500	
Chivilenkov	48 28 N 46 31 E	less than 100	
Chungunkin	49 07 N 45 22 E	a/	
Chugunov	49 16 N 45 51 E	a/	
Dalbun	48 48 N 46 50 E	less than 100	
Danil'chenko	48 13 N 46 27 E	a/	
Daum	48 00 N 47 13 E	a/	
Davlit	48 49 N 46 48 E	a/	
Davydechko	48 43 N 46 22 E	a/	
Davydovka	49 18 N 44 39 E	721	Sel'sovet center
Dayunov	49 00 N 46 45 E	a/	
Demchenkov	48 23 N 46 22 E	a/	

Name	Coordinates	Population	Remarks
	o '		
Demidov	49 13 N 45 22 E	161	
Demin	49 12 N 44 49 E	less than 100	
Demkin	48 44 N 45 58 E	15	
Derevyanskiy Val	48 50 N 46 20 E	a/	
Deryabin	48 50 N 45 58 E	a/	
Dikova Balka	49 04 N 44 38 E	56	
Dmitriyevka	48 25 N 46 00 E	118	
Dobryakov	48 52 N 46 30 E	a/	
Dolgiy	48 31 N 45 06 E	214	
Doroshev	48 03 N 46 42 E	a/	
Drobakhin	47 59 N 46 17 E	a/	
Dryukov	48 31 N 46 22 E	less than 100	
Dubinin	48 10 N 46 35 E	a/	
Dubovka	49 03 N 44 50 E	2,000-10,000	City of rayon subordination; rayon center; sawmilling; food processing

Name	Coordinates ° '	Population	Remarks
Dubovyy Ovrag	48 20 N 44 37 E	2,841	Sel'sovet center
Dulin	49 11 N 45 30 E	a/	
Duynovo	48 23 N 45 44 E	a/	
Duyunov	49 09 N 46 19 E	294	
Dvor Kolkhozny	47 43 N 46 04 E	a/	
Dvoynoy	48 20 N 46 25 E	a/	
Dyatiny	48 38 N 45 08 E	a/	
Dzhalpak	48 13 N 47 55 E	a/	
Dzhamantau	48 28 N 47 06 E	less than 500	
Dzhan-Gendyr	48 01 N 47 11 E	a/	
Dzhanzapsn	48 07 N 47 22 E	a/	
Dzhasankol'	47 57 N 47 15 E	a/	
Dzhasbuyn	47 57 N 47 30 E	a/	
Dzhas-Kayrat	47 46 N 47 41 E	a/	
Dzhauken Kstau	47 54 N 47 53 E	a/	

Name	Coordinates ° '	Population	Remarks
Dzhmangaliyev	48 38 N 47 35 E	a/	
Dzhuldubayev	48 44 N 46 48 E	a/	
Dzhumatka	48 46 N 46 36 E	less than 100	
Dzhumugale-Karambayev	48 36 N 46 44 E	a/	
Dzhurpash	48 09 N 47 47 E	a/	
El'ton	49 08 N 46 51 E	1,524	Sel'sovet center; bromine plant; health resort
Enbek	48 38 N 46 54 E	a/	
Faleyev	49 11 N 46 08 E	a/	
Filimonov	48 31 N 46 42 E	a/	
Finogenov	49 19 N 46 34 E	a/	
Finogenov	49 15 N 46 23 E	a/	
Fokin	48 48 N 46 40 E	a/	
Fomin	49 03 N 46 18 E	less than 100	

Name	Coordinates ° '	Population	Remarks
Frolov	48 01 N 44 38 E	a/	
Frunze	48 40 N 44 40 E	a/	
Ganshin-Tsagan	48 04 N 45 16 E	a/	
Gashuk	48 04 N 44 56 E	a/	
Gatka	48 14 N 46 04 E	a/	
Gavrilov	49 12 N 46 01 E	a/	
Gavrilovka	48 31 N 44 11 E	a/	
Gema	48 19 N 46 35 E	a/	
Glazov	48 06 N 46 57 E	a/	
Glukhov	49 04 N 45 23 E	a/	
Glukhoy	48 28 N 45 23 E	298	
Glushchenko	49 04 N 46 32 E	83	
Gnedykh	48 40 N 45 50 E	a/	
Gnutenkov	48 50 N 46 03 E	a/	
Godunov	48 12 N 45 06 E	a/	

Name	Coordinates	Population	Remarks
Golyy	48 42 N 46 23 E	a/	
Gonchara	48 47 N 44 17 E	93	
Gorbachenko	48 54 N 46 20 E	a/	
Gorbanev	48 49 N 46 09 E	154	
Gorbanev	48 51 N 46 38 E	19	
Gor'kogo	49 13 N 45 58 E	a/	
Gorno-Vodyanoye	49 15 N 44 57 E	1,438	Sel'sovet center; grain milling
Gorodishche	48 49 N 44 29 E	3,031	Rayon center; sel'sovet center; brick making
Gorodyanov	48 13 N 46 32 E	a/	
Govorunov	48 10 N 46 38 E	a/	
Grachev	48 45 N 45 46 E	a/	
Grachi	48 28 N 45 36 E	2,183	
Grachi	47 48 N 46 16 E	a/	Sel'sovet center
Grachi	48 57 N 44 18 E	114	

Name	Coordinates	Population	Remarks
Grishakovka	48 12 N 46 17 E	100-500	
Grishin	49 19 N 46 39 E	a/	
Grishin	49 09 N 46 04 E	a/	
Gromki	48 30 N 44 54 E	153	
Gromov	48 33 N 46 03 E	672	
Gromova	48 21 N 45 54 E	a/	
Groshev	48 57 N 46 38 E	a/	
Groshev	48 29 N 46 19 E	a/	
Gubanov	48 59 N 46 13 E	32	
Gudkov	49 18 N 45 32 E	a/	
Gumrak	48 46 N 44 23 E	273	
Gunazin	48 12 N 46 27 E	a/	
Gupikin	49 12 N 45 33 E	a/	
Gurkin	49 15 N 45 21 E	a/	
Gurkin	48 45 N 46 04 E	28	

Name	Coordinates ° '	Population	Remarks
Gusareva	48 35 N 45 56 E	a/	
Gusarov	48 40 N 46 15 E	17	
Gushchin	48 36 N 46 03 E	a/	
Igolkin	48 48 N 46 24 E	less than 100	
Iki-Malan	48 01 N 45 40 E	a/	
Iksbay	47 55 N 47 39 E	a/	
Il'chenkov	48 39 N 46 22 E	a/	
Il'enchkov	48 26 N 46 08 E	a/	
Ileskin	48 25 N 45 37 E	a/	
Il'ichev	48 41 N 45 47 E	a/	
Il'inka	49 12 N 44 44 E	18	
Imeni Chapayeva	48 35 N 46 54 E	a/	
Imeni Kalinina	48 40 N 44 57 E	611	
Imeni Kalinina	48 53 N 46 35 E	a/	
Imeni Kuybysheva	48 41 N 44 51 E	a/	

Name	Coordinates	Population	Remarks
Imeni Lenina	48 57 N 46 52 E	a/	
Imeni Stalina	49 00 N 46 58 E	a/	
Imeni Voroshilova	49 06 N 45 47 E	1,288	
Irkatan	48 02 N 47 15 E	a/	
Isintayev	48 42 N 46 47 E	less than 100	
Istyk-Pay	48 37 N 46 36 E	less than 100	
Ivanovka	48 28 N 44 23 E	761	Sel'sovet center
Izbachenkov	48 43 N 46 01 E	a/	
Kabakovo	48 06 N 46 42 E	16	
Kalabukov	49 07 N 46 09 E	a/	
Kalashnikov	48 45 N 45 56 E	13	
Kalinkin	49 02 N 46 25 E	a/	
Kalinovka	48 55 N 46 33 E	less than 100	
Kalkhan-Kul'	48 54 N 46 51 E	a/	
Kalman	47 54 N 47 43 E	a/	

Name	Coordinates	Population	Remarks
Kal'novka	48 19 N 45 38 E	421	
Kamennyy Buyerak	48 48 N 44 23 E	118	
Kamennyy Yar	48 27 N 45 34 E	1,950	Sel'sovet center; brick making
Kand-Kuduk	48 23 N 46 35 E	a/	
Kapustin Yar	48 35 N 45 45 E	9,487	Rayon center; sel'sovet center
Karabidachka	49 03 N 46 55 E	a/	
Karagalinskiy	48 51 N 47 42 E	a/	
Karagay	48 39 N 47 38 E	a/	
Karagay	48 23 N 46 38 E	a/	
Karagay Khuduk	47 48 N 47 55 E	a/	
Karantinka	49 04 N 46 42 E	a/	
Karasev	48 07 N 46 59 E	a/	
Kardayev	48 34 N 46 15 E	16	
Karev	49 13 N 46 59 E	a/	
Kargin	48 06 N 46 12 E	a/	

Name	Coordinates	Population	Remarks
Karpov	48 07 N 45 40 E	a/	
Karpov	49 13 N 46 53 E	187	
Karpov	49 00 N 46 40 E	a/	
Kasin	48 29 N 46 35 E	a/	
Kasymtay	48 36 N 46 55 E	a/	
Katarkul	47 59 N 47 14 E	a/	
Katkov	48 29 N 46 10 E	23	
Kayp	48 36 N 46 49 E	a/	
Kayudino	48 00 N 46 42 E	a/	
Kazachkov	48 34 N 46 23 E	a/	
Kazanchenkov	48 04 N 46 56 E	a/	
Kazennyy	48 19 N 45 29 E	a/	
Kenzhegora	48 16 N 47 30 E	a/	
Khara	49 14 N 46 39 E	89	
Khara-Usun	48 25 N 44 19 E	a/	

Name	Coordinates ° '	Population	Remarks
Kharbulya	48 05 N 44 54 E	a/	
Kharlashkin	48 17 N 45 10 E	a/	
Khleborob	49 14 N 46 11 E	83	
Khlynov	49 03 N 46 32 E	a/	
Khokhlatskiy	48 28 N 45 34 E	146	
Khomichev	48 11 N 45 01 E	a/	
Khonut	48 06 N 45 16 E	a/	
Khrenovoy	48 55 N 46 22 E	22	
Khutora Solodovskiye	48 34 N 45 16 E	a/	
Kilyakovskiy	48 44 N 44 47 E	92	
Kirichkov	48 49 N 46 05 E	less than 100	
Kirova	49 06 N 44 57 E	a/	
Kirovets	48 46 N 44 44 E	a/	
Kirnosov	48 24 N 46 20 E	a/	
Kirsanov	48 38 N 46 23 E	a/	

Name	Coordinates ° '	Population	Remarks
Kletskiye	48 37 N 44 44 E	379	
Klimenkov	48 34 N 46 20 E	a/	
Klimkin	48 45 N 46 22 E	less than 100	
Klochkov	48 40 N 46 18 E	124	
Klochkov	48 36 N 46 23 E	less than 100	
Kobylin	48 20 N 46 20 E	a/	
Kochergin	49 02 N 46 16 E	70	
Kochevaya	48 16 N 46 26 E	53	
Kochevnoy	49 00 N 46 31 E	a/	
Kochkurov	48 57 N 46 42 E	a/	
Kolkhoz Imeni Kaganovicha	48 52 N 45 20 E	a/	
Kolkhoz Imeni Kirova	48 28 N 44 30 E	398	
Kolkhoz Imeni Kuybysheva	48 00 N 47 18 E	a/	
Kolkhoz Imeni Shestnadsatogo Parts"yezda	49 00 N 45 55 E	a/	
Kolkhoz Imeni Voroshilova	48 48 N 45 31 E	30	

Name	Coordinates	Population	Remarks
Kolkhoz Imeni Vtoroy Pyatiletki	48 57 N 45 10 E	150	
Kolkhoz Lenin Zhol	49 20 N 47 07 E	a/	
Kolkhoz Novyy Put'	48 00 N 47 08 E	a/	
Kolkhoz Put' Il'icha	48 56 N 45 52 E	525	
Kolkhoz Vpered	49 17 N 46 19 E	less than 100	
Kolkhoz Yekpenderkurlus	47 49 N 47 17 E	a/	
Kolkhoznaya Akhtuba	48 42 N 44 48 E	36	
Kolobovka	48 40 N 45 28 E	356	Sel'sovet center
Kolomiytsev	48 56 N 46 45 E	a/	
Komarov	48 14 N 45 03 E	a/	
Komissarov	48 58 N 46 06 E	a/	
Kommunar	48 49 N 45 13 E	a/	
Komrakta	47 48 N 47 33 E	a/	
Kondrashov	49 10 N 46 11 E	a/	
Konev	48 09 N 45 10 E	a/	

Name	Coordinates o '	Population	Remarks
Konovalov	48 27 N 46 06 E	a/	
Konovalov	48 31 N 46 14 E	a/	
Konstitutsiya	48 40 N 45 45 E	a/	
Korchevataya	48 34 N 44 44 E	188	
Kordon	48 10 N 46 50 E	362	
Korochin	48 39 N 46 12 E	a/	
Korolev	48 52 N 45 57 E	a/	
Korolevskiy	48 59 N 46 25 E	29	
Korneyev	48 27 N 46 12 E	a/	
Korshavityy	48 27 N 45 19 E	760	
Korzhov	48 19 N 46 29 E	a/	
Koshmanov	48 14 N 46 33 E	a/	
Kosopan	48 33 N 46 36 E	less than 500	
Kostenkov	48 47 N 46 08 E	less than 100	
Kostin	49 12 N 44 50 E	299	
Kosukhin	48 51 N 46 06 E	less than 100	

Name	Coordinates	Population	Remarks
Kosunov	48 54 N 46 16 E	a/	
Kovalev	48 36 N 46 12 E	a/	
Kovalev	48 56 N 46 30 E	less than 100	
Kovalev	48 15 N 46 16 E	a/	
Kovzalov	48 46 N 46 00 E	less than 500	
Kozelin	47 43 N 46 13 E	a/	
Kozhanov	48 40 N 46 49 E	a/	
Kramarev	48 33 N 46 10 E	less than 100	
Kramarev	48 46 N 46 07 E	a/	
Krasnaya Derevnya	49 08 N 46 30 E	35	Sel'sovet center
Krasnaya Sloboda	48 42 N 44 34 E	over 10,000	Rayon center; workers' settlement; river craft repairing
Krasnaya Zvezda	49 16 N 45 47 E	308	Agricultural machinery repairing
Krasnoarmeysk	48 31 N 44 34 E	over 10,000	Urban rayon of Stalingrad; river ship-building

Name	Coordinates ° '	Population	Remarks
Krasnoye Selo	48 03 N 45 13 E	a/	
Krasnyy	48 37 N 44 48 E	787	Sel'sovet center
Krasnyy Buksir	48 43 N 44 42 E	a/	
Krasnyy Oktyabr'	48 40 N 44 44 E	a/	Sel'sovet center
Krasnyy Oktyabr'	49 08 N 45 38 E	less than 500	
Krasnyy Sad	48 40 N 44 54 E	a/	
Kravtsov	48 41 N 46 09 E	17	
Krestovyy	48 34 N 44 30 E	a/	
Krivusha	48 32 N 44 45 E	117	
Kruten'kiy	48 41 N 44 20 E	a/	
Kryachkov	49 03 N 46 38 E	a/	
Kryk-Kuduk	48 06 N 47 14 E	a/	
Krylov	49 08 N 44 46 E	a/	
Krysalov	48 52 N 46 18 E	a/	
Kryuchkov	49 14 N 46 56 E	130	

Name	Coordinates	Population	Remarks
	o '		
Kubayev	48 40 N 46 51 E	a/	
Kubek	48 46 N 46 46 E	a/	
Kulkin	49 02 N 45 20 E	a/	
Kumak Vtoroy	48 54 N 46 49 E	a/	
Kumkuduk	48 47 N 46 46 E	less than 100	
Kupriyanov	48 00 N 46 35 E	a/	
Kursanov	49 08 N 45 27 E	a/	
Kurtkuk	48 04 N 45 09 E	a/	
Kuyandy	48 03 N 47 18 E	a/	
Kuyandy	47 59 N 47 18 E	a/	
Kuygen Kul'	49 18 N 47 59 E	a/	
Kuzhnoy	49 16 N 45 15 E	a/	
Kuzmicheyvskiye	48 36 N 44 40 E	286	
Kuz'michi	48 54 N 44 22 E	413	Sel'sovet center
Kuznetsova	48 35 N 45 51 E	a/	

Name	Coordinates	Population	Remarks
	o '		
Kylykov Sad	49 17 N 45 47 E	a/	
Kyporoshoye	48 40 N 44 29 E	a/	
Kyzyldzhar	48 31 N 47 00 E	a/	
Kzyl-Tu	49 11 N 47 31 E	a/	
Lanin	48 51 N 46 12 E	a/	
Lankin	48 36 N 46 33 E	a/	
Lantsiya	49 15 N 46 31 E	257	
Lantsug	49 14 N 46 37 E	a/	
Lapin	48 40 N 46 06 E	less than 500	
Larin	47 41 N 46 12 E	a/	
Latanov	48 49 N 46 07 E	less than 100	
Latashanka	48 51 N 44 39 E	a/	
Laykov	48 16 N 46 46 E	a/	
Lebedev	48 34 N 46 11 E	a/	
Legen'kin	48 17 N 46 02 E	a/	

Name	Coordinates ° '	Population	Remarks
Legkodimov	48 59 N 46 16 E	229	
Lekseyenko	49 05 N 46 27 E	a/	
Lemyakin	49 18 N 46 37 E	a/	
Leninsk	48 42 N 45 13 E	4,537	Rayon center; sel'sovet center; iron foundry; food processing
Lesobaza	48 33 N 44 29 E	a/	
Lin'kovo	48 39 N 46 00 E	a/	
Lis'ya Balka	49 18 N 46 42 E	103	
Litvinov	49 06 N 46 22 E	less than 100	
Litvinov	48 23 N 46 23 E	a/	
Lomakin	49 04 N 46 02 E	a/	
Lopanev	49 09 N 46 14 E	a/	
Lopinskiye	48 31 N 45 24 E	a/	
Loshchina	48 58 N 46 14 E	278	
Loznoye	49 17 N 44 26 E	1,163	Sel'sovet center

Name	Coordinates ° '	Population	Remarks
Lugo-Shirokoye	49 17 N 45 01 E	917	
Lugo-Vodyanoye	49 15 N 45 01 E	1,578	Sel'sovet center
Lukpan	48 34 N 47 31 E	a/	
Lyagushatnyy	48 36 N 44 34 E	a/	
Malakhov	47 57 N 46 12 E	less than 100	
Malaya Karakul'	48 26 N 46 32 E	a/	
Malaya Kazinka	47 45 N 46 34 E	a/	
Malaya Solyanka	48 30 N 45 54 E	a/	
Malaya Solyanka	48 30 N 46 54 E	86	
Mal'tsev	48 20 N 46 18 E	a/	
Malyayevka	48 41 N 45 17 E	126	Sel'sovet center
Malyy Lemeshkin	48 43 N 46 04 E	a/	
Malyye Chapurniki	48 29 N 44 35 E	1,670	Sel'sovet center
Mamayev	48 48 N 46 59 E	a/	
Mamtsev	48 17 N 46 35 E	a/	

Name	Coordinates ° '	Population	Remarks
Mamtsev	48 11 N 46 34 E	a/	
Mars	49 10 N 46 25 E	a/	
Martykhin	48 55 N 46 31 E	a/	
Maseykin	48 16 N 45 19 E	a/	
Maslov	49 12 N 46 56 E	a/	
Matveyevskiy	47 59 N 46 09 E	209	
Mayak Oktyabrya	49 14 N 45 39 E	49	
Mednikov	48 46 N 46 13 E	less than 100	
Medvedev	49 08 N 45 19 E	a/	
Medyanka	48 12 N 46 37 E	a/	
Melekhin	48 47 N 46 11 E	49	
Men'gdvay	47 53 N 47 10 E	a/	
Merezhkin	49 06 N 46 12 E	a/	
Meshchanskiy	49 16 N 46 19 E	a/	
Mikhaylovka	47 39 N 46 52 E	2,399	Sel'sovet center

Name	Coordinates o '	Population	Remarks
Milayev	48 57 N 46 23 E	less than 100	
Milovodskiy	48 49 N 46 02 E	less than 100	
Minina	48 42 N 44 26 E	a/	
Mirskoy	48 29 N 46 15 E	a/	
Mishakov	49 18 N 45 21 E	a/	
Misyurin	48 35 N 46 00 E	a/	
Misyurki	49 05 N 46 24 E	a/	
Mochazhki	48 29 N 46 05 E	a/	
Molokanskiy	48 13 N 45 13 E	a/	
Molokanskiy	48 15 N 46 45 E	less than 100	
Mololkin	49 03 N 46 56 E	a/	
Morozkov	48 23 N 46 30 E	a/	
Morozov	48 24 N 46 32 E	less than 500	
Morozov	49 15 N 46 48 E	113	
Morozovka	49 02 N 46 55 E	a/	

Name	Coordinates	Population	Remarks
	o '		
Moskal'tsov	48 23 N 46 25 E	a/	
Mostovoy	48 02 N 46 41 E	a/	
Mukhambet	49 18 N 46 53 E	a/	
Mukhet	48 15 N 47 20 E	a/	
Mukovnikov	48 14 N 45 08 E	a/	
Mumantsin	48 08 N 45 23 E	a/	
Murat-Say	49 13 N 47 10 E	a/	
Myshkin	48 26 N 45 25 E	a/	
Nachevkova	48 37 N 45 59 E	a/	
Nachevnov	49 04 N 46 47 E	a/	
Nagol'nyy	48 04 N 46 11 E	278	
Narezki	48 57 N 45 57 E	a/	
Nariman	49 14 N 47 29 E	a/	
Neserin	49 09 N 45 18 E	a/	
Nevidimka	48 36 N 44 48 E	86	

Name	Coordinates	Population	Remarks
Nezhintev	49 01 N 46 19 E	a/	
Nikol'skoye	47 46 N 46 24 E	4,929	Rayon center; sel'sovet center; brick making; fish processing
Nikonovo	48 31 N 45 42 E	25	
Nitipanov	48 31 N 46 01 E	a/	
Nizhnaya Kilyakovka	48 43 N 44 47 E	a/	
Nizhne-Pogromnoye	48 52 N 44 43 E	less than 100	
Nizhneye Zaymishche	48 01 N 46 07 E	a/	
Nizhniy Baskunchak	48 13 N 46 50 E	3,628	Workers' settlement; salt extraction; gypsum processing; railroad car repairing
Noskov	49 19 N 46 27 E	a/	
Nov'	48 54 N 45 26 E	less than 100	
Novaya Derevnya	49 06 N 46 18 E	a/	
Novaya Nadezhda	48 50 N 44 18 E	250	
Noven'kiy	48 06 N 45 28 E	a/	

Name	Coordinates ° '	Population	Remarks
Noven'kiy	48 37 N 46 15 E	a/	
Noven'kiy	48 18 N 46 28 E	a/	
Noven'kiy	48 58 N 46 46 E	a/	
Novikov	49 18 N 46 48 E	a/	
Novokalinovka	49 16 N 46 24 E	less than 500	
Novokalinovka	49 04 N 46 12 E	a/	
Novonikolayevka	48 04 N 46 22 E	2,561	Sel'sovet center
Novonikol'skoye	49 08 N 45 00 E	2,513	Sel'sovet center
Novyy	48 15 N 46 24 E	a/	
Novyy	47 41 N 46 10 E	a/	
Novyy Byt	48 57 N 45 58 E	less than 500	
Novyy Klochkov	48 44 N 46 27 E	a/	
Nozdrin	49 09 N 45 28 E	a/	
Oblova	48 36 N 45 51 E	a/	
Ogloblin	49 04 N 45 30 E	a/	

Name	Coordinates	Population	Remarks
	o '		
Ogurtsova	48 22 N 45 52 E	a/	
Okhon-Kul'	48 55 N 46 59 E	a/	
Olen'ye	49 10 N 44 53 E	544	Sel'sovet center
Omet	48 18 N 46 32 E	a/	
Opytnaya Stantsiya	48 44 N 44 23 E	168	
Orlov	48 30 N 46 07 E	a/	
Orlov	48 50 N 46 14 E	less than 100	
Orlova	48 22 N 45 51 E	a/	
Orlovka	48 51 N 44 32 E	1,346	Sel'sovet center
Osadnaya Balka	48 48 N 44 43 E	260	
Ostapenkov	48 49 N 46 29 E	less than 100	
Otgonnyy	49 02 N 46 33 E	a/	
Otgonnyy	48 37 N 46 18 E	a/	
Pady	48 15 N 45 53 E	811	
Panichkin	49 07 N 46 56 E	81	

Name	Coordinates ° '	Population	Remarks
Pashchenkov	48 26 N 46 21 E	less than 100	
Pavlovskiy	48 35 N 44 29 E	a/	
Pechenevka	48 21 N 46 07 E	198	
Pechenov Ugol	48 41 N 44 57 E	a/	
Perevayev	49 05 N 46 19 E	a/	
Perevayev	48 30 N 45 05 E	a/	
Pervomayskiy	48 38 N 44 54 E	a/	
Peschanka	48 40 N 44 20 E	1,900	Sel'sovet center
Peschanka	48 30 N 45 28 E	a/	
Peschanyy	48 40 N 44 35 E	89	
Peschanyy	48 38 N 44 42 E	197	
Peskovatka	49 07 N 44 52 E	1,114	Sel'sovet center
Peski	48 19 N 46 15 E	a/	
Petropavlovka 1/	48 16 N 46 10 E	6,078	Workers' settlement; salt processing; salt shipping

1/ Petropavlovskiy on most recent Soviet maps.

Name	Coordinates o '	Population	Remarks
Pichuga	48 59 N 44 43 E	1,399	Sel'sovet center
Pirogovka	47 53 N 46 37 E	2,398	Sel'sovet center
Pisakin	49 07 N 45 11 E	a/	
Piskunov	48 01 N 46 51 E	a/	
Plaksina	48 34 N 45 59 E	a/	
Plodovitoye	48 08 N 44 22 E	a/	
Pochta	49 30 N 44 48 E	20	
Pochtarev	48 40 N 46 08 E	31	
Podbereznikov	49 07 N 45 31 E	a/	
Podsobnoye Khozyaystvo	48 51 N 44 14 E	a/	
Pokrovka	48 22 N 46 04 E	1,268	Sel'sovet center
Pokrovka	48 28 N 45 03 E	574	Sel'sovet center
Polenevskiye	48 35 N 44 40 E	a/	
Pologoye Zaymishche	48 30 N 45 56 E	2,186	Sel'sovet center
Polovnikov	48 02 N 46 09 E	94	

Name	Coordinates	Population	Remarks
Polubabkina	48 37 N 45 48 E	a/	
Polyanskiy	49 10 N 46 20 E	a/	
Popovichev	48 37 N 46 07 E	a/	
Popovicheva	48 37 N 45 56 E	67	
Poselok	48 50 N 46 43 E	a/	
Predkov	48 22 N 46 15 E	less than 500	
Presnyakov	48 53 N 46 40 E	a/	
Presnyy Liman	49 09 N 46 31 E	a/	
Prishib	47 41 N 46 29 E	3,164	Sel'sovet center
Pronin	49 20 N 46 38 E	127	
Pron'kin	48 37 N 46 36 E	a/	
Pronyashina	48 36 N 45 55 E	a/	
Pryamaya Balka	49 14 N 44 43 E	723	Sel'sovet center
Pryshchenkov	48 27 N 46 14 E	a/	
Pryshchevskiye	48 36 N 44 40 E	a/	

Name	Coordinates	Population	Remarks
	o '		
Pshenichnyy	48 21 N 46 20 E	a/	
Pshenichnyy	48 14 N 46 08 E	less than 100	
Pupuskov	47 57 N 46 15 E	a/	
Pushnin	48 11 N 45 12 E	a/	
Putilin	48 03 N 46 40 E	less than 500	
Pyatov	48 03 N 46 58 E	a/	
Pylev	48 39 N 46 31 E	a/	
Rakhinka	49 02 N 44 50 E	1,655	Sel'sovet center
Rakov	49 13 N 45 18 E	a/	
Rassvet	49 09 N 46 23 E	a/	
Raygorod	48 25 N 44 55 E	2,527	Sel'sovet center; grain milling
Razgulyayevka	48 46 N 44 30 E	202	
Rep'ino	48 33 N 44 49 E	107	Sel'sovet center
Repnev	48 40 N 45 50 E	28	
Reshetnikov	48 31 N 45 24 E	a/	

Name	Coordinates	Population	Remarks
Reshetnyakov	48 55 N 46 24 E	a/	
Rodniki	49 18 N 44 56 E	436	
Rogozhin	49 09 N 46 28 E	32	
Rogozin	48 42 N 46 02 E	less than 500	
Romanenkov	49 02 N 46 23 E	90	
Romanov	47 41 N 46 09 E	a/	
Rozhdestvenka	48 06 N 46 20 E	692	Sel'sovet center
Rudenkov	48 48 N 45 42 E	less than 100	
Ryaboy	48 13 N 46 30 E	a/	
Rybachiy	48 42 N 44 45 E	a/	
Rybnikov	49 06 N 45 14 E	a/	
Rybvod	48 35 N 44 30 E	a/	
Rybzavod	48 24 N 45 39 E	a/	
Rykunov	49 10 N 46 15 E	a/	
Rynok	48 33 N 44 42 E	a/	

Name	Coordinates	Population	Remarks
	° '		
Rynok	48 50 N 44 38 E	a/	
Sabinin	49 12 N 46 18 E	a/	
Sadki	49 11 N 44 26 E	229	
Sagunov	48 26 N 46 18 E	a/	
Sakhnov	49 03 N 46 14 E	a/	
Sakhnov	48 31 N 45 25 E	a/	
Salipov	48 31 N 46 08 E	a/	
Salygbay	48 21 N 46 43 E	less than 100	
Samarina	48 20 N 45 16 E	a/	
Samilov	48 10 N 46 43 E	a/	
San'-Mantsyn	48 02 N 45 22 E	a/	
Sarafanov	48 34 N 45 27 E	a/	
Saranzhin	48 20 N 46 46 E	less than 100	
Sarbasta	48 18 N 47 03 E	a/	
Sarepta	48 31 N 44 32 E	a/	

Name	Coordinates	Population	Remarks
	o '		
Sareptskiy Perekat	48 34 N 44 36 E	a/	
Sarpiyev	48 22 N 46 36 E	a/	
Sartul'gen	49 00 N 47 04 E	a/	
Sartul'gen	48 55 N 47 03 E	a/	
Sarvasty	48 51 N 46 54 E	a/	
Sarvastykskiy Zhaylev	48 54 N 46 53 E	a/	
Sary-Kstau	48 50 N 46 51 E	a/	
Sary-Stan	48 24 N 46 51 E	a/	
Satanov	48 05 N 46 50 E	a/	
Saykhin	48 51 N 46 50 E	a/	
Saykhin	48 49 N 46 46 E	a/	
Sedenkov	48 42 N 45 45 E	a/	
Semiglazov	48 02 N 46 33 E	a/	
Semkin	48 06 N 44 35 E	a/	
Shamak	48 26 N 47 54 E	less than 100	

Name	Coordinates	Population	Remarks
	° '		
Shaposhnikov	47 40 N 46 07 E	a/	
Sharapka	48 58 N 46 18 E	a/	
Sharon	48 01 N 44 46 E	a/	
Shchelkunov	48 19 N 46 37 E	less than 100	
Shchepkin	48 09 N 45 17 E	a/	
Shcherbakov	48 59 N 46 32 E	a/	
Shcherbakov	49 00 N 46 10 E	a/	
Shchuch'ye	48 35 N 44 41 E	50	
Shilikhin	49 18 N 46 31 E	a/	
Shilov	48 50 N 46 19 E	a/	
Shinkarev	48 52 N 46 13 E	28	
Shirokov	49 07 N 44 16 E	a/	
Shishkin	49 11 N 46 22 E	a/	
Shishkin	49 12 N 46 36 E	a/	
Shishkin	48 17 N 46 26 E	a/	

Name	Coordinates	Population	Remarks
Shishkin	48 25 N 46 18 E	a/	
Shishkin	48 14 N 46 26 E	a/	
Shishkin	48 16 N 46 31 E	a/	
Shishkin	49 02 N 46 12 E	a/	
Shiyanov	48 28 N 46 21 E	a/	
Shiyanov	48 39 N 46 28 E	a/	
Shiyanov	48 54 N 46 39 E	a/	
Shkol'nyy Aul	48 49 N 47 24 E	a/	
Shovgyr	47 49 N 47 42 E	a/	
Shtyrev	48 40 N 46 37 E	a/	
Shtyrin	48 41 N 46 00 E	51	
Shubin	48 32 N 46 32 E	26	
Shubin	48 47 N 46 03 E	less than 100	
Shugayev	48 09 N 45 05 E	a/	
Shungay	48 32 N 46 46 E	a/	

Name	Coordinates	Population	Remarks
Shunguli	48 17 N 46 48 E	less than 500	
Shutovka	48 33 N 44 43 E	146	
Shutovy	48 33 N 44 41 E	a/	
Siyun	48 12 N 47 11 E	a/	
Sklady	47 52 N 47 41 E	a/	
Sklyarov	48 33 N 46 33 E	less than 500	
Skorikov	48 38 N 45 44 E	a/	
Smirnov	49 11 N 46 58 E	126	
Smolyakov	49 14 N 46 21 E	a/	
Smyslina	48 33 N 45 53 E	23	
Sokrutovka	47 55 N 46 32 E	1,937	Sel'sovet center
Sokur-Kart	48 28 N 47 43 E	a/	
Soldatskiy	48 35 N 44 41 E	168	
Solenoye Zaymishche	47 56 N 46 07 E	3,526	Sel'sovet center
Solenyy	48 37 N 44 55 E	424	

Name	Coordinates o '	Population	Remarks
Solodniki	48 25 N 45 17 E	3,924	Sel'sovet center; sawmilling
Solodovka	48 40 N 45 23 E	470	Sel'sovet center
Solokhin	49 01 N 46 15 E	a/	
Solonchak	48 15 N 46 43 E	a/	
Solov'yev	48 38 N 44 18 E	a/	
Solov'yev	49 05 N 45 16 E	a/	
Solyanka	48 25 N 45 22 E	91	
Solyanka	48 31 N 45 52 E	720	Sel'sovet center
Solyanka	48 26 N 44 28 E	421	
Soplyakov	48 48 N 46 16 E	14	
Sovin	48 27 N 46 26 E	a/	
Sovkhoz El'tonskiy	48 55 N 46 45 E	a/	
Sovkhoz Gornaya Polyana	48 38 N 44 23 E	a/	
Sovkhoz Lebyazh'ya Polyana	48 47 N 44 42 E	682	
Sovkhoz Opytnoye Pole	48 53 N 44 24 E	a/	

Name	Coordinates ° '	Population	Remarks
Sovkhoz Prigroyodnoye	49 04 N 44 54 E	a/	
Sovkhoz Privolzhskiy	48 14 N 44 36 E	a/	
Sovkhoz Proletariy	49 15 N 44 22 E	a/	
Sovkhoz Sila	49 19 N 45 02 E	a/	
Spartak	49 06 N 44 20 E	a/	
Spartakovets	48 49 N 44 37 E	a/	
Sredne-Pogromnoye	48 55 N 44 46 E	3,498	Sel'sovet center; wool washing
Srednyaya Akhtuba	48 44 N 44 52 E	5,610	Rayon center; sel'sovet center; wool washing; food processing
Stakhanovets	48 39 N 44 47 E	a/	
Stalingrad	48 42 N 44 30 E	1939 Census, 445,000 1950 estimate, 650,000	City of republic subordination; oblast center; machine manufacturing; metallurgy; sawmilling; woodworking; food processing
Stalingradets	48 37 N 44 47 E	a/	

Name	Coordinates	Population	Remarks
Stalingradskiy	48 46 N 44 26 E	a/	
Stamgazi	47 54 N 47 45 E	a/	
Staro-Dubovka	48 39 N 44 19 E	115	
Staraya Otrada	48 33 N 44 28 E	2,000-10,000	
Staren'kiy	48 45 N 44 39 E	176	
Staritsa	48 14 N 45 56 E	4,287	Sel'sovet center
Stasov	48 36 N 45 37 E	192	
Stolyarov	49 18 N 45 24 E	185	
Strel'no Shirokoye	49 18 N 44 56 E	608	Sel'sovet center
Stupino	48 19 N 45 48 E	828	Sel'sovet center
Subotnikov	48 53 N 46 05 E	59	
Suchiy	48 06 N 45 27 E	a/	
Sukhodol	48 37 N 44 54 E	481	Sel'sovet center
Surganov	48 55 N 46 09 E	44	
Surgol	48 34 N 47 03 E	a/	

Name	Coordinates ° '	Population	Remarks
Suyunduk	48 08 N 47 37 E	a/	
Svetlyy Byt	49 17 N 45 31 E	57	
Svetlyy Yar	48 29 N 44 47 E	3,052	Rayon center; sel'sovet center
Svitachev	49 01 N 46 09 E	a/	
Syangerdyk	48 08 N 44 58 E	a/	
Syrikov	48 24 N 46 10 E	a/	
Syrmolotov	48 10 N 45 35 E	a/	
Syytyk	48 37 N 47 07 E	a/	
Taldapan	48 10 N 47 08 E	a/	
Talovoy	48 35 N 44 59 E	112	
Tamarov	49 01 N 45 29 E	a/	
Tarabarin	48 33 N 46 18 E	a/	
Tarasov	48 37 N 46 16 E	a/	
Taskuduk	48 45 N 46 46 E	less than 100	
Tay-Gora	48 28 N 46 48 E	a/	

Name	Coordinates	Population	Remarks
	o '		
Tazikov	48 37 N 46 06 E	a/	
Terekhov Pervyy	48 50 N 46 32 E	less than 100	
Terekhov Vtoroy	48 51 N 46 22 E	less than 100	
Teren-Kuduk	48 24 N 47 11 E	a/	
Tereshkin	48 29 N 46 18 E	a/	
Teteryashnikov	48 20 N 46 02 E	a/	
Teteryatnikov	48 36 N 46 19 E	82	
Tinguta	48 13 N 44 25 E	a/	
Tishanka	49 09 N 44 40 E	a/	
Tkachev	48 19 N 46 21 E	less than 100	
Tkachev	48 02 N 46 53 E	a/	
Tkachev	48 18 N 46 42 E	less than 100	
Tokarev	48 35 N 45 40 E	163	
Toktarov	48 57 N 46 04 E	a/	
Tonkonozhkin	49 12 N 46 19 E	a/	

Name	Coordinates o '	Population	Remarks
Tonkonozhkin	49 01 N 46 27 E	less than 500	
Traktorstroy	49 03 N 45 34 E	602	
Tretiy Reshayushchiy	48 41 N 44 43 E	503	
Tri Khutora	49 00 N 46 49 E	a/	
Trishin	49 02 N 45 15 E	less than 100	
Trudolyubiye	48 15 N 44 51 E	a/	Sel'sovet center
Tsarev	48 40 N 45 22 E	972	Sel'sovet center
Tsatsa	48 12 N 44 41 E	3,846	Sel'sovet center
Tsatvalda	48 02 N 47 09 E	a/	
Tsyganskaya Zarya	48 41 N 44 40 E	a/	
Tul'skiy	47 56 N 46 14 E	a/	
Tumak	48 38 N 44 38 E	360	
Tumanov	49 19 N 46 41 E	a/	
Tumanov	49 01 N 46 54 E	a/	
Tundutovo	48 25 N 44 25 E	211	

Name	Coordinates	Population	Remarks
Turgay	48 19 N 46 56 E	a/	
Tutovyy	48 44 N 44 44 E	158	
Tveritin	48 48 N 45 54 E	a/	
Tyulyugen	48 08 N 47 42 E	a/	
Tyyu-Gostov	48 44 N 46 42 E	a/	
Udachnoye	47 44 N 46 45 E	1,693	Sel'sovet center
Udarnik	48 47 N 44 40 E	a/	
Ukolov	48 51 N 45 54 E	a/	
Ulzhatay	48 04 N 47 25 E	a/	
Umet	48 50 N 45 50 E	404	
Unege	49 15 N 47 24 E	a/	
Urda	48 46 N 48 26 E	2,000-10,000	Rayon center
Ushakovka	48 25 N 45 07 E	1,118	Sel'sovet center
Uspenka	48 13 N 46 15 E	1,420	Sel'sovet center
Uvarovka	48 48 N 44 28 E	a/	

Name	Coordinates	Population	Remarks
	° '		
Varakin	49 17 N 45 35 E	a/	
Varchenkov	48 38 N 46 35 E	a/	
Vasil'yev	48 03 N 44 35 E	a/	
Vendelovskiy	49 17 N 46 49 E	a/	
Verblyuzh'ya	47 43 N 46 53 E	a/	
Verkhne-Pogromnoye	48 58 N 44 51 E	605	Sel'sovet center
Verkhniy Baskunchak	48 14 N 46 44 E	4,988	Workers' settlement; food processing; transportation and storage hub for salt extracting industry
Verkhnyaya Akhtuba	48 48 N 44 44 E	2,214	Sel'sovet center
Vershinin	48 51 N 46 02 E	35	
Vetla	48 11 N 46 39 E	a/	
Vetlyanka	47 38 N 46 38 E	1,604	Sel'sovet center
Vinnovka	48 52 N 44 40 E	171	
Vitchinkin	48 15 N 46 02 E	a/	

Name	Coordinates	Population	Remarks
Vladimirovka	48 18 N 46 10 E	6,920	Rayon center; sel'sovet center; river craft repairing; brick making; iron foundry
Vlasov	47 45 N 46 06 E	a/	
Volgostroy	48 33 N 44 33 E	a/	
Volodarskiy	48 10 N 46 42 E	a/	
Vorob'yev	48 45 N 45 53 E	less than 100	
Voroponovo	48 40 N 44 20 E	304	
Vostok Pervyy	49 03 N 46 29 E	less than 100	
Vostok Vtoroy	49 04 N 46 28 E	less than 100	
Vyazovaya Griva	47 54 N 46 18 E	34	
Vyazovka	48 19 N 45 36 E	1,927	Sel'sovet center
Vyazovka	48 39 N 44 46 E	528	
Vyazovyy	48 33 N 44 33 E	a/	
Vyreznoy	48 15 N 46 38 E	25	

Name	Coordinates	Population	Remarks
	o '		
Yalkhi	48 34 N 44 17 E	68	
Yamy	48 39 N 44 40 E	347	
Yarkin	48 01 N 45 29 E	a/	
Yarmoshkin	48 13 N 46 22 E	less than 100	
Yefremkin	48 42 N 46 16 E	a/	
Tegrashkin	48 23 N 46 14 E	20	
Yekaterinovka	49 12 N 44 53 E	416	Grain milling
Yeksmeter	47 58 N 47 53 E	a/	
Yepikhin	48 16 N 45 14 E	a/	
Yermilin	49 19 N 46 44 E	a/	
Yerminay	48 11 N 47 51 E	a/	
Yershov	49 14 N 46 15 E	less than 100	
Yerzovka	48 57 N 44 38 E	12,557	Sel'sovet center; brick making; quarrying
Yevdokimov	49 03 N 46 53 E	a/	

Name	Coordinates	Population	Remarks
Yezhovka	48 43 N 44 22 E	a/	
Yurta	48 08 N 45 31 E	a/	
Zakurdayev	48 46 N 46 06 E	a/	
Zakutskiy	48 39 N 44 40 E	196	
Zaplavnoye	48 43 N 45 01 E	3,916	Sel'sovet center; grain milling
Zarya	48 43 N 44 41 E	a/	
Zaslavskiy	48 20 N 46 32 E	a/	
Zasypkina	48 39 N 45 48 E	176	
Zaychiki	48 37 N 44 33 E	a/	
Zelenskiy	48 17 N 46 31 E	a/	
Zemskiy	48 29 N 46 02 E	a/	
Zhanali	49 19 N 46 54 E	a/	
Zhas-Khayrat	49 19 N 47 40 E	a/	
Zheltukhin	49 01 N 44 38 E	75	

Name	Coordinates ° '	Population	Remarks
Zheltyy	48 23 N 46 13 E	a/	
Zhigalkin	48 15 N 46 36 E	less than 100	
Zhilga	48 14 N 46 14 E	451	
Zhitkov	48 54 N 46 04 E	a/	
Zhitkov	48 57 N 46 22 E	a/	
Zhitkur	48 57 N 46 16 E	2,000-10,000	Rayon center; sel'sovet center; agricultural machinery repairing
Zhivakov	48 36 N 46 10 E	a/	
Zhizhimov	49 02 N 46 38 E	65	
Zhukov	49 00 N 46 24 E	a/	
Zhurbin	48 29 N 46 14 E	a/	
Zhurbin	48 06 N 46 27 E	16	
Zimovka Dzhaysan	47 52 N 47 24 E	a/	
Zimovka Kara Bulak	47 50 N 47 11 E	a/	
Zimovka Kara Khuduk	47 57 N 47 07 E	a/	

Name	Coordinates	Population	Remarks
Zinin	49 09 N 45 15 E	a/	
Zloy	48 22 N 46 22 E	a/	
Zmeykin	49 11 N 45 22 E	22	
Zolin	48 00 N 46 33 E	a/	
Zolotukha	47 49 N 46 44 E	2,336	Sel'sovet center; grain milling
Zonal'nyy	48 44 N 44 42 E	a/	
Zorin	48 12 N 45 11 E	a/	
Zotov	48 35 N 44 44 E	94	
Zubovka	48 38 N 45 31 E	910	Sel'sovet center
Zubovka	48 09 N 46 02 E	103	Sel'sovet center
Zubrichev	48 34 N 46 31 E	less than 100	
Zubrichev	48 44 N 46 25 E	less than 100	

APPENDIX E

GAPS IN INFORMATION

The most critical gaps in information, with regards to both quantity and quality of data, concern the sociologic and economic conditions in the study area. Physical descriptions of terrain, vegetation, and soils are adequate for most of the area, but the detail of treatment is not consistent. In some cases, good descriptions were omitted because the limits of the areas to which they applied could not be determined precisely. Large-scale topographic map coverage is significantly deficient, except for the Stalingrad vicinity and a few smaller areas scattered throughout the Caspian Lowlands. Apparently the Russians themselves have explored parts of the study area only superficially. Documentary results from numerous detailed surveys that are known to have been conducted recently within the area are not available.

Postwar information concerning peoples, industry, and transportation is scant, spotty, and unreliable. The lack of population data is probably the most critical gap. Although Soviet legislation enacted since 1940 has undoubtedly resulted in radical changes in population distribution, ethnic composition, settlement pattern, and political attitudes, there are no positive quantitative or descriptive records of these changes. As regards industry, both current production data and information on the type and location

of industrial establishments are available for the area immediately adjacent to Stalingrad only. Transportation information concerning the volume of traffic flow and the commodities currently being carried is notably deficient. In the case of roads, descriptions of recent construction, realignment, and improvements are generally lacking. The numerous prisoner-of-war reports that mention road surface, width, or conditions are in many cases contradictory or apply to only very short stretches of road. Even P-W reports are not available for most areas beyond the immediate vicinity of Stalingrad. Although many airfields within the study area are known to have been in operation during World War II, their current status is not recorded. Only the five active airfields near Stalingrad are adequately described.

Normally physical features remain unchanged for long periods of time, but the gigantic canal construction, irrigation, drainage, and afforestation projects in progress within the study area are reportedly causing changes in the hydrography, vegetation, local soils, and microclimatic conditions. Climatic data are inadequate, chiefly because the number of stations for which records are available is insufficient and because the data collected at the various stations are not comparable from the point of view of factors observed, methods of measurement used, and length of records. Many of the records are old, dating back to the Tsarist period.

APPENDIX F

SOURCES AND EVALUATION OF SOURCES

1. Evaluation of Sources

The bulk of the descriptive information included in this study was taken from published Soviet sources. Although some of the sources were available in translation, most were in the Russian language. Soviet publications of a strictly scientific nature -- those concerning hydrography, climate, vegetation, soils, etc. -- are usually both comprehensive and completely reliable. Such studies are free of bias and propaganda, and their value is limited only by the quantity and quality of recorded data available at the time of publication. The less scientific studies used, such as the semi-popular textbook-type of regional study, are usually of more recent date, but facts are intermingled with propaganda. Although such publications usually tell the "truth," there are obvious omissions and disproportionate emphasis is given to minor achievements and plans. The same criticism applies to Soviet encyclopedias, and many articles in current technical and scientific periodicals, handbooks, instruction booklets, and other technical and informational pamphlets. Such sources provided fairly recent information on the status of agriculture, industry, and plans and projects. Soviet statistical publications, although official, show discrepancies that indicate

careless recording or editing. This applies particularly to population surveys. Soviet newspapers, nonscientific magazines, and radio broadcasts provided supplementary bits of information, few of which could be checked. Many Soviet sources of unknown reliability were used, chiefly for background information or for checking the validity of other reports.

The principal English-language materials utilized for this study include intelligence information (both raw data and intelligence reports) and academic studies. Most systematic studies are based on Russian-language publications, and consequently are even more general than their Soviet sources. Several intelligence reports are compilations rather than analyses, and much of the data included is incomplete and cannot be verified. Documents of this type were used extensively for topics such as airfields, but they were checked against each other wherever possible. Only one of the English-language sources (40) represents actual field work.

Many types of intelligence documents were used for the study. A large number were interrogation reports, principally from German prisoners of war; others were translations or abstracts of German or Soviet materials. Although information in many of the intelligence documents could not be checked, they are considered to be reliable in general. Additional data were supplied by travel reports of embassy personnel, which are recent and useful but are limited in area and in type of information presented.

Several topics are covered only by intelligence documents. In other cases, intelligence documents provide the only postwar information available. Interrogation reports, in general, are of limited scope and deal with conditions shortly after the end of World War II. Intelligence documents provided much of the information included in the sections on forced labor and transportation. If information from reports that contradicted other available sources or that could not be checked was considered significant enough to be included in the study, the limitations have been noted. Wherever possible, raw data were discussed with other components of ORR and other IAC units before they were included.

Maps comprised a principal source of information and provided an important basis for checking other sources. Soviet maps covering the study area are of high quality. The dates of those used range from 1935 to 1951. The main factor restricting the use of many of the maps was their relatively small scale and, in some cases, their early date. Maps were used extensively as sources for topics such as terrain, trafficability, population distribution, and transportation.

Photography provided detailed information on peoples (appearance, costumes, etc.), transportation, and vegetation. Most ground photos can be located and dated accurately. Aerial photography, with accompanying interpretations, was relied on heavily for airfield information and for information on several small areas for which

aerial photos were available. Most of the aerial photography, however, is dated 1942 to 1944, and some of the transportation data included are superceded by more recent information on changes and improvements.

Personal interviews with intelligence analysts provided considered estimates of current industrial production, its significance, and the trade characteristics of the study area.

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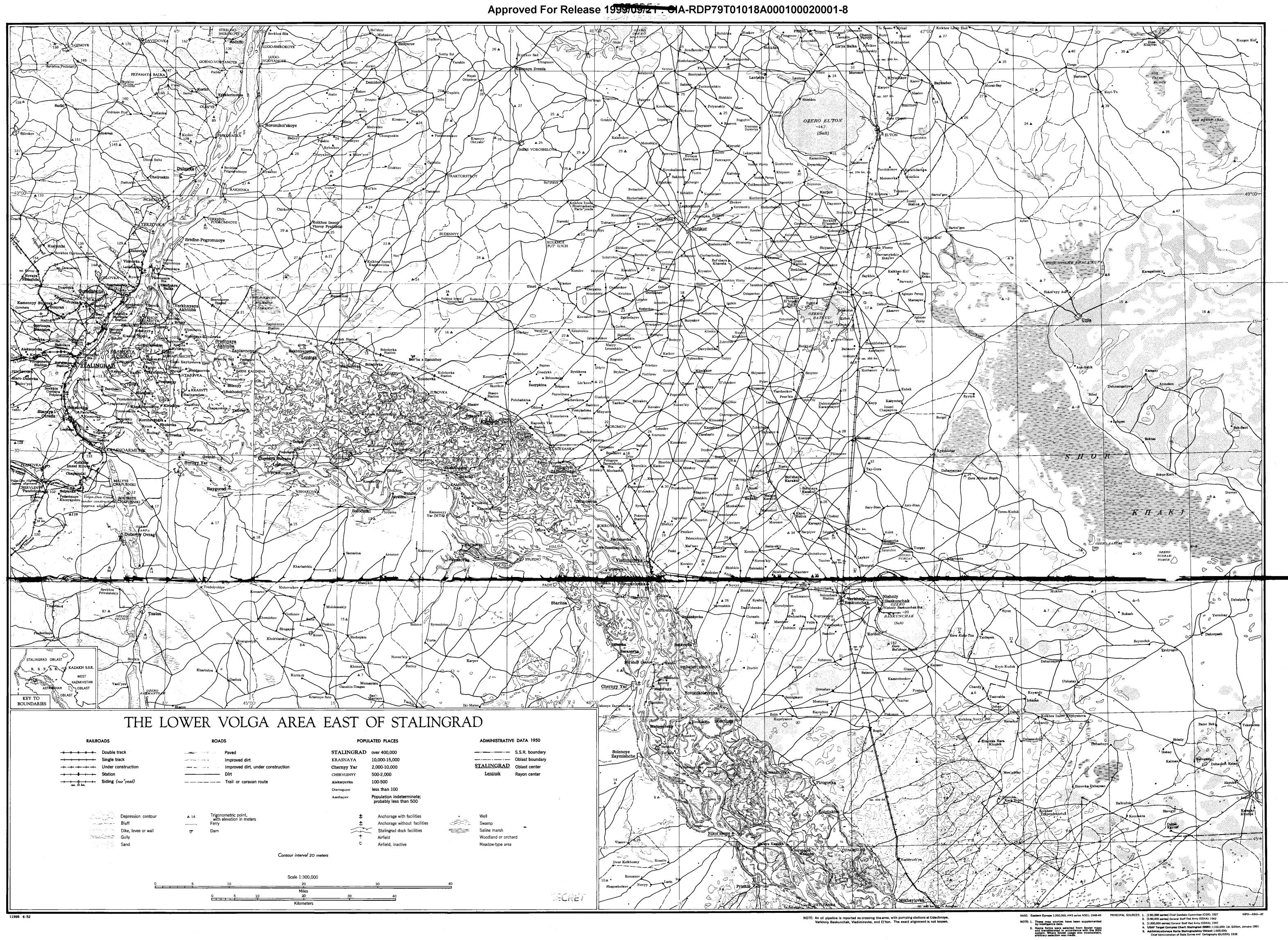
THE LOWER VOLGA AREA EAST OF STALINGRAD
RAILROADS
Double track
Single track
Under construction
Station
Siding (raz"yezd)
ROADS
Paved
Improved dirt
Improved dirt, under construction
Dirt
Trail or caravan route
POPULATED PLACES
STALINGRAD over 400,000
KRASNAYA 10,000-15,000
Chernyy Yar 2,000-10,000
CHERVLENYY 500-2,000
Alekseyevka 100-500
Chernoguzov less than 100
Azerbayev Population indeterminate; probably less than 500
ADMINISTRATIVE DATA 1950
S.S.R. boundary
Oblast boundary
STALINGRAD Oblast center
Leninsk Rayon center
Depression contour
Bluff
Dike, levee or wall
Gully
Sand
Trigonometric point, with elevation in meters
Ferry
Dam
Anchorage with facilities
Anchorage without facilities
Stalingrad dock facilities
Airfield
Airfield, inactive
Well
Swamp
Saline marsh
Woodland or orchard
Meadow-type area
Contour interval 20 meters
Scale 1:300,000
Miles
Kilometers
KEY TO BOUNDARIES
STALINGRAD OBLAST
R. S. F. S. R.
KAZAKH S.S.R.
WEST KAZAKHSTAN OBLAST
ASTRAKHAN OBLAST
OZERO ELTON
11995 6-52

SECRET