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

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

I. Introduction

The Stalingrad-Urda section of the Volga-Caspian Lowland includes about 20,000 square miles and extends from 44°15'E to 48°E and from 47°35'N to 49°20'N. Administratively it includes parts of three oblasts -- the Stalingrad and Astrakhan¹ Oblasts of the RSFSR and the West Kazakhstan Oblast of the Kazakh SSR. The area is not homogeneous physically or culturally. Most of it lies within the Volga-Caspian semidesert and desert regions, which stretch from the grassland belt of European Russia on the north to the Caspian Sea on the south. Along the western margin of the area are the hills and east-facing escarpment of the Volga Heights (Privolzhskaya Vozvyshennost¹) and farther south the Yergani 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, lies between the Yergani 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.

I. See Appendix I for more detailed administrative information.

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Sociological 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. In the driest, the sandiest, or otherwise least productive sections of the Caspian Lowland, villages are smallest and farthest apart.

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 Baskanchak 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. ^{1/} As a transportation and transshipping center, it is a focal point for routes to and from the southern Urals, the Donbass, 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, lumber is floated down the Volga from the Urals, and petroleum is carried by

1. A 1:25,000 annotated Target Photo Mosaic covers the Stalingrad area and is indexed on the attached USAF Target Complex Chart.

barge from Baku and other places. Fish, salt, and agricultural products arrive from various directions either for processing at Stalingrad or for reshipment.

In salt production, the Lake Baskunchak area alone supplies a quarter of the total Soviet needs. 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-Akh-tuba Floodplain and in small water-retaining depressions farther out on the plains. In the Stalingrad section of the Volga-Akh-tuba floodlands market gardening is important. A gigantic irrigation and reforestation program is apparently under way to counteract the restricting effects of soils and climate.

II. Climate (1-4)

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 degrees centigrade (59.4-64.8 degrees Fahrenheit). (See map CIA 12091, Climatic Chart 6.)

Annual precipitation is scant, with the bulk of it 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 and rainless 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 river valleys.

All of the study area falls under the Class D of the Köppen ¹/₁ 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 (DEWa) climate. (See CIA 12091, Chart 1.) 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 amount of moisture available sufficient for the successful growth of forest vegetation. The area of steppe climate extends south to

¹ As modified by the Soviet climatologist, A.V. Voznesenskiy.

within 200-300 kilometers (125-200 miles) of the Caspian Sea. The area immediately adjoining the Caspian is a true desert.

A. Temperature

The average annual temperature of the study area is $7-8^{\circ}\text{C}$ ($44.6-46.4^{\circ}\text{F}$) (see CIA 12091, Chart 5). The minimum monthly temperature occurs in January, when the average is between -9° and -10°C ($15.8-14.0^{\circ}\text{F}$). From February to May the temperature rises rapidly and reaches a peak of $24-25^{\circ}\text{C}$ ($75.2-77.0^{\circ}\text{F}$) in July. The highest and lowest temperatures recorded are 41.0°C (105.8°F) at Stalingrad and -38.7° (-37.7°F) at Akhtuba.

The duration of the warm season, which is here defined 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 CIA 12091, Charts 7-9). 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° 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 become 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.

B. Precipitation

The average precipitation ranges from 200 to over 300 millimeters (7.9 - 11.8 inches) per year (see CIA 12091, Chart 2), the highest occurring in the hilly western fringe of the study area. Records for a 23-year period at Stalingrad indicate that the yearly precipitation there reaches as much 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. The maximum precipitation, about 60-75 percent of the annual total, occurs during the warm season (see CIA 12091, Charts 1 and 3), with May and June being 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 one year to another, drought is a recurrent hazard to agriculture. A secondary

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precipitation peak, which occurs in October and November, supplies moisture for the 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 from the warm surface of the earth. Heavy rains are especially characteristic in the Volga Heights. Intensities 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. About 11-16 December a stable snow cover (see CIA 12091, Charts 10-12) sets in and 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 is difficult to estimate, however, 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, and in some cases forested, western fringe than on the open Caspian Lowland.

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C. 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. Chart 4 of 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 ^{1/} of 4.5 millimeters or more. During the warm season, the mean actual water-vapor pressure is of the magnitude of 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.

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

1. 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.

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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 fairly 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. Advection fogs, which are prevalent over most of the Russian plain, are less frequent here because the cyclonic storms with which advection fogs are commonly associated

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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. Regional Physical Characteristics (4-10)

A. The Hilly Western Fringe

The western margin of the study area includes two groups of low mountains and hills separated by a narrow trough just south of Stalingrad. The hills, which decrease slightly in altitude from north to south, are characteristically ridges, oriented in northwest-southeast direction, 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 Steppes.

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 cut in places by ravines and gullies with equally precipitous sides (Figure 1). The southern hill group, the Yergeni Hills, is less dissected and the bluffs are less pronounced. West of the bluffs of the northern section, the terrain

of the interfluve areas rises to elevations of 400 to 500 feet above the surrounding land within a distance of about four miles. The crests of the interfluves are about one-third of a mile in width and in some places are steeply rolling. The flanks are deeply cut by many branched gullies and slope abruptly into narrow, deep-cut valleys.

Rivers and streams flowing from the hills to the Volga are relatively small and spaced about 5 miles apart. Most of the rivers are 10 to 15 miles long, although the largest is 30 miles in length. The streams are characterized by steep gradients and very active erosion. Some of the shorter rivers, 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 watershed divide between Volga and Don River drainage is situated at a distance of 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 parts of shelter belts or in groves. A large proportion of the area is covered with natural grass and bush vegetation, including steppe fescue, feather grass, and white wormwood. The area is used primarily for cattle and sheep grazing, but hay and grain fields are found along the valley sides and on some of the interfluve crests. Many valley bottoms are

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are intensively cultivated, especially in the vicinity of Stalingrad. Soils in the area are typically deep, loamy chestnuts, black earths, and clays, all of which are fertile. Their utilization is limited only 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 Yergani Hills to the south. The city itself lies on very hilly ground cut by many ravines, which make city planning for postwar reconstruction difficult. Villages in the area are rather large and are conspicuously 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.

B. The Volga and Volga-Akhtuba Floodplains

The floodlands of the Volga and Akhtuba rivers, with their abundance of water, support dense, lush vegetation causing the area to stand out as a wide oasis in sharp contrast with the surrounding regions.

In the north, where the Volga flows in a south-southwest direction, the floodlands are narrow -- not more than 5 miles in width. To the east the elevation increases gradually to the low and almost flat Precaspian Lowland. On the west, the river abuts the high bluffs of the Volga Heights. Just north

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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. The joint floodplain between the two rivers stretches out across the semidesert area in a belt over 20 miles wide. Some 60 miles southeast of Stalingrad the rivers turn gradually to the southeast, and the floodplain narrows to about 10 or 12 miles.

1. Northern Section

The Volga Valley north of the divergence of the Akhtuba is characteristically asymmetric. The river, itself, hugs the western edge of the valley and at times even undercuts the bluffs. The main channel, which is locally constricted by large sandy islands, varies in width from 1/3 of a mile to 1 1/2 miles. East of the main stream is a strip of land 1 to 5 miles wide that is almost completely inundated annually. This area is divided into many small and inaccessible parcels 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 along the edges of the larger channels, where there are some 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

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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 marks the edge of the valley and the beginning of the dry steppes.

2. Southern Section

The broad southern section of the floodplain, between the small, seldom-navigable Akhtuba River and the wide, heavily traveled Volga, 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. In general, the area has a more varied relief than the northern section. Most elevated areas are sand dunes, remnants of natural levees, or eroded clay banks, which are strung out in narrow bands parallel to the major streams and their secondary channels. Such ridges are usually wooded and, because they lie above normal flood level, are the sites of the few small villages on the floodplain. Prior to World War II, large areas around villages and valuable fields were protected from inundation by earthen dams and dikes. Although most of these embankments were destroyed during 1941-1942, many have been rebuilt. Less than 10 percent of the Volga-Akhtuba lowland is high enough to escape annual flooding. The remainder of the area is usually submerged for from 4 to 6 weeks each spring and emerges considerably altered.

On both flanks, the Volga-Akhtuba Floodplain is separated from the adjacent steppe areas by stretches of steep banks. The right bank, along the Volga

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itself, is over 80 feet high in the vicinities of the Svetlyy Yar and Raygerod but decreases to 70 feet near Solenoye Zaymlshche and to 40-50 feet at southern end of the study area. This high right bank, however, is not continuous, and between Staritsa and Zubovka the break is about 9 miles long. The bank on the left side of the floodplain is much lower, but in many places forms bluffs or sharp slopes 15 to 18 feet high. Deep, steep-walled gullies that cut far back into the steppe zone are typical of the northwestern third of this bank. Frequent undercutting of the banks during floods causes crumbling and the formation of mounds or shoals at their bases. Except for the rocky bank at Kamsunyy Yar, almost all of the banks are composed of clay.

Floodplain features are greater in number and finer in detail on the lowland within 20 miles of Stalingrad than in the areas farther southeast. This part of the lowland is also the most densely populated and intensively cultivated.

Throughout the length of the floodplain, surface features along the Volga River side of the valley are more pronounced than those along the Akhtuba. The Volga River dominates the area, flowing in a channel one-fourth to one and one-half miles wide. For long stretches, it lies adjacent to the wall of the lowland, but in many places the direction of the course changes abruptly. Shoals, sand bars, small reed-covered sand islands, and larger densely wooded islands are numerous along the Volga. South of Vladimirovka, several large secondary channels of the Volga flow during all seasons and are up to one-half

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mile wide. Although there are many steep clay banks along the main stream and larger channels between the Volga and Akhtuba, most of the smaller streams are bordered by sand or marshes. The central and eastern part of the floodland is considerably flatter than that along the Volga. Only a few small, scattered strips are above the normal flood level; wooded patches and villages are correspondingly few. Between the narrow, shallow branch channels and elongated lakes, this part of the lowland is in grass- and reed-covered marsh or in meadow. Many of the water areas are clogged by silting or vegetation and have become stagnant. Such areas are breeding places for the hordes of malaria-carrying mosquitoes that have created a serious health hazard in the area.

3. Hydrography

All land forms and activities in the Volga-Akhtuba Floodplain are directly related to and influenced by the complex and continuously changing hydrography of the area. ^{1/} The outstanding feature of the hydrography is its seasonality. During the height of the spring flood the region becomes a huge lake with isolated hills protruding a few feet above the water level, late in the summer the streams are slow and sluggish and much of the meadow area is dry enough to be cropped or mown for hay, and in winter all the rivers

I. Because of the continuously changing hydrography of 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.

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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 those flowing from the Volga Heights. In other sections, the adjacent steppe areas are drained by numerous gullies that carry water only during spring thaw and after showers. The volume of water supply consequently is dependent on the flow of the Volga, itself, which in turn is determined by the amount of snow cover, rapidity of thawing, and the rainfall in the northern source regions. Perennial variations are therefore considerable. At Stalingrad the volume of water carried during the year with the greatest flow was one and one-half times that of an average year and two and one-third times that of the lowest year. The year with the minimum flow carries only a little more than half the normal load.

Seasonal flow is also highly variable, but on the average the volume carried by the Volga in April, May, June, and July is 50 to 65 percent of the yearly total. The annual fluctuation of the navigation level of the river is correspondingly great, being 35 feet at Stalingrad. The spring flood normally begins in late May or early June and lasts from 4 to 6 weeks or more. It reaches the highest level in the second half of June. In 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 from the beginning

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of flood to the peak is about 27 feet and during exceptional floods 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-Aldtuba section, where the water is divided among many channels, the rise is considerably less. Frequently, however, 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 filled in with mud and sand, and banks and shoals are eroded away and new ones are built up. 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. Following 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. Redredging of the Volga channel is a big job, which continues throughout the navigation period.

The summer season is characterized by gradual drying of the shallow waters and marshes, accompanied by lower water and decreased velocity in the main streams. During this season the Volga is restricted largely to a single channel with an average width of one-half mile. The section south-east of Stalingrad is usually dredged to only 7 feet over the numerous sand-bars. To the north the water is somewhat deeper. In both sections, however,

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there are many places with depths up to 10 feet or more. At the point where it diverges from the Volga, the Akhtuba River may dry up completely during periods of extremely low water. At such times the Akhtuba is fed by a net of shallow channels between it and the Volga.

Floods may also occur in summer and fall. They are caused by summer rains and are of short duration. At Stalingrad they raise the water level on an average of about 6 feet, but at times they are not large enough to completely fill the shallow channels paralleling the main streams. Late season floods cause considerable damage because of their unexpectedness and because they occur at the time when hay has been gathered in the fields, grains are almost ripe, and lumber and other supplies and equipment are stacked along the river banks. Usually there are one to three and sometimes as many as a half dozen minor floods each year. The period of lowest water level for the entire area is early September to mid-October.

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

4. Trafficability and Vegetation

Trafficability in the Volga-Akhtuba Floodplain is essentially dependent on the seasonal conditions of hydrography, vegetation, and soils.

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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.

As the floods recede from the moisture-saturated meadows in early summer, the lush vegetation that develops 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 reeds such as brome grass. The rootstalks of these plants frequently form hillocks that are filled with stagnant water and covered with water hemlock, swamp fern, and flowers such as buttercups and forget-me-nots. These small mounds are not fit for mowing. They are a common feature in the central and eastern parts of the Volga-Aichtuba lowland. The numerous depressions in the floodplain retain swamp vegetation throughout

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the summer, and many of the small reed-covered lake areas are impassable.

The winding channels separating the partially wooded islands also are bordered by tall reeds and rushes, which in some places attain heights of 10 to 20 feet. Long stretches of riverbank meadow covered with quackgrass are found along the larger rivers, where there are also many stretches of sandy mounds that support rush-like beach grass and wild rye.

Most of the wooded areas in the Volga-Akhtuba Valley 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 follow many of the natural levees, which are higher and drier than surrounding areas but normally less than 1,000 feet wide. Many islands, inaccessible areas, and other slightly elevated patches 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. Scattered individual trees and isolated clumps are not uncommon. Most of the wooded patches are bordered by a narrow zone of dwarfed trees and dense tangle of undergrowth. The hops, bindweed, and ivy that entwine themselves around the shrubs and trees after the spring flood form a barrier that is difficult to penetrate.

The predominant soils in the Volga-Akhtuba Floodplain are sand, silty clay, muddy new alluvium, and meadow bog. Sand is most prevalent along the river banks and on islands along the channels. In the south there are several

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areas of dunes, some of which are partially 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 lowland 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 not deep, many are too deep for motor vehicles. According to available maps the depths of fords range from $\frac{1}{2}$ foot to $1\frac{1}{2}$ feet at normal water level, most of them being a little over a foot in depth.

C. The Caspian Lowland

The Caspian Lowland extends eastward from the foot of the Hilly Western Fringe area in a barren, nearly-level plain. The seemingly endless expanse of salty, almost lifeless semidesert is nearly devoid of outstanding relief features. Elevations generally range from about sea level to 90 feet, with only a few isolated higher spots. West and south of the Volga-Akhtuba Floodplain, altitudes of over 35 feet are rare. To the north and east the highest areas are (a) the inconspicuous divide paralleling the southern section of the valley at a distance of 10 to 15 miles, (b) the sandy plain to the north and west of Lake Bakunchak, and (c) a low ridge south of Lake El'ton. None of these areas rise more than 50 feet above the surrounding plain, and all their slopes are very gentle. In the entire Caspian Lowland area, only

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three hills stand out conspicuously above the surrounding land -- Bol'shoye Bogdo Mountain (elevation 499 feet) along the steep southwest shore of Lake Baskunchak, Maloye Bogdo Mountain (elevation 112 feet) about 30 miles to the northeast of Bol'shoye Bogdo, and Ulagan Mountain (elevation 219 feet) just north of El'ton.

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

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 support vigorous vegetational growth that stands out in sharp contrast to the surrounding dry barren plain. Surface streams are found only along the Volga Valley and in the immediate vicinity of the largest salt-lake depressions, but even these rivers are dry for long periods.

Along the edges of the Volga-Akhtuba Floodplain intermittent streams have formed deep gullies that extend far back into the plains. A gully near Leninisk has eaten its way 26 miles back into the plain.

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

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1. Typical Lowland Terrain Features

Most of the Caspian Lowland is semidesert steppes that supports only occasional bunches of coarse grass, desert shrubs and cactus, between which the predominantly clay ground is bare and hard, and is commonly cracked by the summer heat. The characteristic depressions or "dips" that dot the surface of the lowland and play so critical a part in the utilization of the area locally cover 30 to 50 percent of the Caspian Lowland within the study area. They vary greatly in size, shape and surface conditions, but most of them are less than 12 feet deep 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, lopainy, rostosha, zapadina, and limany. The limany, the largest, are 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 an area of over 500 acres and at their centers they are 5 to 7 or more feet lower than the surrounding plain. The limany are most prominent in the northwest part of the plain, in the area adjacent to the southwest bank of the Volga-Akhituba Floodplain, and in the area north and west of Lake Baskul⁰. In some places the depressions are linked together in chain-like groups; other depressions

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are completely isolated. The majority are elongated in shape, but some are round and others irregular in outlines.

Following spring rains and thaws, water flows toward the center of the depressions. Where the ground is sufficiently permeable, the seeping waters leach and wash 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 on 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 annual grasses and flowers. Later, with the intense summer heat, the highly mineralized ground waters are drawn to the surface and evaporated, and salt gradually accumulates on the parched surface. 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.

2. Typical Soils, Vegetation, and Fauna

A complex, mottled pattern of soils and vegetation has developed on the Caspian Lowland as a response to details of terrain configuration and the relative effectiveness of the moisture supply. The liman depressions usually have several concentric rings of varied soil and vegetation. Where water remains at the liman center, dark colored meadow soils occur, and the area is covered with thickets of reeds, rushes, and other swamp vegetation. Scattered clumps of salt grass surround the central swamp. Areas farther out

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but with plenty of soil moisture support a thriving stand of couch grass, steppe fescue, feather grass, and steppe shrubs. In some of the depressions without swampy cores, such vegetation occurs at the center. These are the areas most widely used for grazing and cultivation. On the drier, slightly elevated spots, 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.

Throughout the Lowland plain wormwood is the most typical plant. It is used locally for fuel and to obtain oil for absinthe. Wormwood is a hard, many-branched shrub one to three feet high, and is similar to the 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 in the zone northwest of Lake Baskunchak. The most highly salinized patches on the surface of the Caspian Lowland are completely devoid of vegetation. They have a hard, white salt crust, known as solonchak. The wormwood shrubs impart a grayish-green hue to the landscape, which forms 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 from lack of moisture, and by late summer the plain

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has become a dry, cheerless area, on which only scattered wormwood and prickly pear have survived.

Animal wildlife in the steppe-desert zone of the Caspian Lowland is typically small 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 most numerous. Small mounds that indicate suslik burrows literally 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, small sand boa constrictors, common domestic mice, and multitudes of green night toads and hares. Throughout the steppe beasts of prey are common -- the Tartar fox, steppe polecats, ermines, weasels, and different kinds of eagles, owls and hen-herrisers. In the winter, wolves invade in the southern parts. 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.

3. Salt Lakes and Salt-Mud Flats

There are about a dozen large depressions on the Lowland plain in which there are salt-lakes in various stages of formation and disintegration. Lakes that are currently little more than seasonal marshes with boggy soils are found in four locations -- (a) the area now called Bcl'shoy Liman about 9 miles northeast of Srednyaya Aldtuba, (b) the Khak-Bersh-Aral in the

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northeastern tip of the study area, (c) the area of scattered sands between Lake Baskunchak and Azgir settlement in the southeast corner of the study area, and (d) the Great and Small Karakul⁹ area along the boundary of the Kazakh SSR and 20 miles northeast of Vladimirovka. In the last area, several concentric rings of 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 each of the vanishing lakes varies from 12 to 60 square miles.

Among the four large present day salt lakes, Lake Baskunchak is the best known and economically the most important. It supplies about one-fourth of all salt production of the USSR. Lake Baskunchak 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 highest and 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 rise is much more gradual and is interspersed with areas of marsh. 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 periods of high water the brine may completely cover the muddy clay. During the summer, however, the water evaporates almost

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completely, leaving only a small patch of lake about 4 inches deep in the southwestern corner of the basin. Most of the lake bed becomes a snow-white plain covered by a hard crusty salt surface in the summer dry period. 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 pock mark the entire circumference of the lake, being especially numerous in the north. The higher western area includes many long and spacious caves. Mt. Bol'shoye Bogdo at the southwest corner of the lake is also noted for its caves and for the weird, deep niches and protrusions that have been carved on the steep, denuded eastern and southern slopes 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, 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 (or about 50 feet below sea level). On the west and northeast the banks along the shore are rather steep and deeply gullied. The northwest and southeast sections merge more gradually into the plains and

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contain most of the small salt-water rivers that flow into the lake. A zone of deep, black, salty mud about one-fourth of a 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 it, the lake is 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) in a liman area about $2\frac{1}{2}$ miles northwest of the lake. The area surrounding the lake basin is made up primarily of sandy clays. White writing 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.

Straddling the Stalingrad Oblast-Kazakh SSR boundary 20 miles south of Lake El'ton is Lake Batkul'. The level of this very 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 by a muddy, swampy 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

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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 3 miles long enter the lake from the northwest and south. The Solenaya River in the west flows through an area of almost completely denuded solonchak. A notable feature of Lake Batkul¹ 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. These lakes also are of low salinity and are exploited for their large fish reserves. The northernmost and longest lake is about 15 miles long and 1 $\frac{1}{2}$ miles wide. Several of the southern lakes have become completely overgrown with reeds and marsh vegetation. On the east the Sarpinsk lakes are bordered by dark colored solonchak soils that support only a few scattered patches of scrub grasses that are highly salt tolerant. The vegetation of the narrow western shore, between the lakes and the Yergeni Hills, is somewhat richer. This zone is crossed by the large number of streams that flow from the Yergeni Hills to the Sarpinsk Lakes.

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The arc-shaped Shor Khaki salt-mud flat lies entirely within the Kazakh Republic. It covers an immense area stretching for 60 miles from northwest to southeast. The average width of the Khaki 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 center of the depression, and a number of small saline streams flow into them through the mud. The surface of the Khaki is generally smooth, but especially near the outside edges the Khaki 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 of the Khaki 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 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 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 of the salt-flat is bordered by the Sands of Naryn.

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4. Sand Areas

Within the study area, sands are concentrated primarily in the south. Except for the distinctive Sands of Naryn region, scattered patches of sands occur in the form of (a) ridge-like formations between Lake Baskunchak and the southern part of the Khaki, (b) slightly elevated sand plain to the west and north of Lake Baskunchak, and (c) 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. East of Baskunchak there are also numerous large but unexplored sinkhole-like formations that are probably associated with karst conditions. Notably characteristic of all sand areas within the study area is the relative abundance of fresh ground water and the ability of the depressions to support lush vegetation even late in the summer.

The Naryn Sands region is composed primarily of alternating strips of sand dunes and level, sandy steppes with a pronounced northeast-southwest orientation. The two contrasting landscapes parallel each other for more than 30 miles in winding bands that vary in width from several to 5 or 6 miles. Because of the relative abundance of fresh water and absence of soil salinity, this region is particularly significant and is far more favorable to human activity than the surrounding areas.

Most of the dunes are 20 to 25 feet in height, and a few reach 50 feet. They are normally flat-topped and not particularly steep. Shallow interdunal

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hollows of various shapes and strings of hollows occupy 20 to 30 percent of the area of the sand dune strips. Many of the larger inter-dune areas are covered with thick growths of trees, bushes, and grass. Some have been over-grazed, and have become dusty, lifeless basins surrounded by shifting dunes. It is believed that up to 10 or 15 percent of the area in the sand dune strips is currently covered with vegetation. The basic vegetation of the area includes sagebrush (which grows to 5 feet), reed grasses, bunch grass, licorice, and sandwort. The last reaches $1\frac{1}{2}$ feet in height and bears seeds that are high in nutritive value. The seeds are collected by the local population and used in making bread, kasha, and other various foods. Woods in some of the inter-dune valleys are fairly dense, consisting mainly of willow, with some species of poplar, oleaster, pine, and, in the lowest areas, cottonwood. Laurel is also widespread.

The margins of the sand dune areas form a transitional zone between the hilly dune country and the level strips of steppe. In these areas the terrain is rolling, and the mound-like sand dunes usually do not exceed 12 feet in height. With proximity to the steppe areas, the dunes become fewer in number, and the amount of turf cover and agricultural utilization increases. Much of the transitional area is used for grazing and hay cutting. There are also numerous garden areas and fruit orchards. Although successful afforestation with pine, alder, acacia, and poplar has been practiced in this area since 1890, shifting dunes and dust storms still present a problem.

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The elongated steppe zones that separate the belts of dunes are smooth-surfaced and slightly concave and slope gently towards the Khaki mud-flat in the southwest. 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 area is widely used for hay-pasture. In the springtime small scattered ponds 3-8 feet deep and up to a square mile in area are formed both in the sand-mound transition zones and in the steppes. These waters are fresh during the early part of the summer, but later become saline as a result of evaporation. There are also some permanent ponds of stagnant, saline water. Fresh ground water is found throughout the Sandy Maryn area at shallow depths. In the valleys of the sand dune strips, it may be reached at 2 feet and seldom at depths greater than 20 feet. In the steppe areas, ground water is a little more likely to be salty, but it is usually found at depths of $3\frac{1}{2}$ to 10 feet.

The alternation of steppe and sand dune strips disappears on the northeastern and southern flanks of the Maryn Sands, but in other characteristics the two types of terrain are very similar. Further to the north there is a more abrupt transition from the sands to the plains of clay and clayish loams, which typically are desert-steppes covered with grass, wormwood, and saltwort and contain scattered areas of salt lakes and mud flats. The transition to the Khaki on the southwest is marked by narrow belts of steppe and low sand dunes that parallel the mud flats and lie nearly at right angles to the general orientation of the Maryn. The combined width of these belts averages about 3 miles. The descent to the Khaki is slight but abrupt.

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5. 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, hazards 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. The lakes, marshes, and intermittent rivers are shallow enough to be forded without great difficulty in many places. However, where gullies are present (especially along the Volga-Akhtuba Valley), they are normally steep-sided and very deep. Loose sands are a hazard only locally, chiefly in the southernmost regions.

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

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In general, the availability of drinking water for man and animals is the most serious restricting factor to movement across the lowland. 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 no potable ground water is found at less than 600 feet. This is especially characteristic of the area east of the Saratov-Astrakhan⁸ Railroad line. In the vicinity of 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. Ground water is also generally adequate in the vicinity of the Sarpinsk Lakes and in the southern sands where lenses of fresh water form as precipitation collects.

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 Maryn Sands where there is a very heavy sagebrush growth, passage is difficult locally. Wooded areas dense enough to provide concealment are limited to small, widely scattered patches in moist freshwater depressions. Throughout most of the open plains area, shelter and cover is extremely scarce except for the huge hay stacks in the liman areas after the first mid-summer mowings. These scattered mounds are normally about 25 feet long and 12 to 15 feet high. Although they are periodically reduced to provide feed for stock, they usually remain through the winter and can be dug into to provide shelter and warmth.

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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 weeks. They not only greatly reduce visibility, but at times they render outdoor activity almost impossible.

IV. EconomyA. Agriculture (4-13)

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 agriculture. Although animal husbandry predominates, grain cultivation is also widespread and truck gardening is highly significant locally. The intensity of agriculture corresponds closely to the availability of water and the density of population. The seeding dates for grains and various vegetables grown within the study area 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 September 10, depending on weather conditions (15).

1. 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 areas around Stalingrad form a very large

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part of all of those in the entire Stalingrad Oblast (1940) (Figure 6). Field crops, including wheat, rye, maize, sunflowers and fodder crops, are grown 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), about 10 percent of which is in the study area. Much of the higher, drier areas are 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 western hilly region and help meet the demand for dairy products in the Stalingrad urban area. Large-horned 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 gardening crops as well as excellent grain yields are also obtained. The combination of soils and climatic conditions, accompanied by scientific agro-technical methods, makes possible 3 harvests of vegetables, 5 mowings of lucerne, and 2 harvests of grains each year, but these are seldom achieved. Most of the productive land of the floodplain is in meadow, which is mowed for hay. The area used for grazing

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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 its peculiar advantages for specialty crops, the crops of the floodplain are much the same as those of 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 berry patches -- are scattered 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 all the floodplain islands are devoted to agriculture, the greatest development is in the area near Stalingrad. The administrative rayons that are most progressive agriculturally 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 largely concerned with the production of fruit, vegetables, and animal products. In prewar days the area delivered 1.5 million quarts of milk a month to Stalingrad. In 1939 the cultivated area of this rayon was

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about 26 percent of the total area. Of this, about 15 percent was devoted to truck gardening. By far the most numerous of the livestock in the rayon are long-horned 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. By 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 northwestern part of the Volga-Alkhuba Floodplain is much better protected from floods than the areas more to the southeast. Many thousands of acres here are enclosed by dikes and embankments that provide protection against normal high waters. Further south where there are fewer protected areas, the floods are an especially severe hazard because they occur in the second half of May and in June, just after the grains, vegetables, and melons normally are planted. Most of the southern area therefore is not cultivated, but is left in meadow. Hay harvests from the seasonally flooded meadows are exceptionally high.

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

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southwest to northeast. A much smaller, but very important proportion of the plains is in meadow, which provides hay for winter fodder. Meadow averages from 8 to 12 percent of the area. Another 10 percent of the land is under cultivation. Sheep and long-horned 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 25-37,000 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 certainly practiced to a considerable degree. 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 the source area. How effective the governmental 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

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pastured for 225-265 days (including some 50-70 days of winter pasturing) and are stall-fed on 100-110 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 natural irrigation is employed in the liman areas, where weirs and embankments are built to retain the waters from the spring thaw and rains. Some parts on 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 saline soils that give very low yields. Many such plowed areas have become wastes of wind-blown sand, even though wind breaks and snow fences of sorghum planted in strips are common.

Some parts of the Caspian Lowland are more productive than others. For example, in the sandy areas west and south of Lake Baskunchak, farming is considerably less important than in areas to the 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

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(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 Sands of Naryn, where many exotic crops and fruit trees thrive. Fruits grown in this area are noted for their large size and high quality.

2. 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, fulfillment of plans, use of materials, and adoption of new methods and ideas.

On the basis of natural conditions the Caspian Lowland is a submarginal agricultural area. Droughts are experienced on an average of one year in four. Numerous 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 economy of the whole region, which is based primarily on agricultural activity, experiences great 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) Svetlyy Yar, on the south bank of the Volga about 11 miles east of Krasnoarmeysk, (b) the Nikol'sko-Zaplavnoye area, on the north bank

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of the Akhtuba River east of Srednyaya Akhtuba, and (c) the northwestern end 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 9 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 have been many incidents of lack of effort and general indifference on the part of the peasants. Although it is potentially one of the outstanding truck-gardening sections of the USSR, the area does not meet its own agricultural 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 vegetables, melons, etc. the range in yields is very 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 Stalingrad vicinity reveals that the brigades composed of reliable workers received from 1 to 4 tons more

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per acre than those with indifferent workers (6). Except on a few outstanding kolkhozes and sovkhoses, recommended rotations, optimum planting dates, measures for combating pests, etc. have been almost completely ignored. 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 2). 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 season, thus helping to prevent the destruction of crops by drying winds. Furthermore, more equipment and special privileges are given to kolkhozes and sovkhoses. In 1936, for example, a new experimental type 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 this additional plot, which is usually undeveloped land, the farmer may keep for himself everything above an established quota (16). It is not known whether this system is still in effect.

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Agricultural machinery in the study area has been inadequate even though the great Dzerzhinskiy tractor factory is located in Stalingrad. In 1935, there were about 1700 acres of cultivated land for every tractor in the northern part of the Volga-Akhtuba Floodplain. For other parts of the study area the acreage per tractor ranged from 1100 to 2000 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 poor. The little effort that has been expended by the tractor stations has 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

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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).

3. Industry

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 southward from Rynok to Krasnoarmeysk. The industrial development of Stalingrad owes much to its location at an important junction for river and rail traffic between the north and south. The heavy industries of Stalingrad are dependent almost entirely upon imports of raw materials. 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. Most of these smaller industries are also 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.

1. The Stalingrad Industrial Core

Among the chief industries of the Stalingrad industrial core are metallurgy, metal fabrication, machine building, lumber processing and wood-working, manufacture of chemicals, and shipbuilding. The major metals industries include the production of high quality steel, refinery and field

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equipment for the petroleum industry, excavation and mining equipment, tractors, tanks, and ordnance; repair of ball bearings; and 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 practically 75 percent of the wood industry (19), but plain types of furniture are also made. Minor industries include textiles (clothing and hosiery), manufacture of prefabricated houses, brickmaking, production of leather and shoes, canning of vegetables and meat, and grain 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 still valid. 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 metal 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

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Barrikady ordnance and munitions plant. All are of national importance.

To the south are the two smaller nodes at Beketovka and at Krasnoarmeysk.

Administratively both of these settlements are part of the City of Stalingrad, though they are distinct satellite or suburban communities. In southern Stalingrad and Beketovka lumbering and woodworking industries are located adjacent to 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 Oktyabr⁸ steel mill is a large producer of high quality alloy steel. The plant has 15 open hearths (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 in by rail from the Donets Basin, scrap steel is gathered in the immediate environs of Stalingrad and is also brought in by barge from other industrial centers along the Volga. Some quality limestone, however, is available from quarries just north of the city. The mill is the principal supplier of steel for three large local enterprises -- 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 chief industry of Stalingrad is the manufacture of tractors, and the Dzerzhinskiy plant is one of the four leading tractor producers in the

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USSR, making caterpillar-type agricultural tractors of 35 to 50 horsepower.

The plant is situated in the heart of one of the country's largest agricultural areas, where the demand for tractors is great. The Dzerzhinskiy plant also manufactures tank engines, which are shipped to Gorkiy or other nearby assembly plants (22). Estimates of number of workers employed range between 20,000 and 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 is estimated at 7,000 to 10,000 (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, which seems small in comparison with some other plants of the USSR (for example, the chemical plant in Dzerzhinsk), produces a fairly large proportion of the total USSR output for several chemicals. It is one of the largest chlorine-producing plants in the USSR. The 1951 production is 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

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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 saw milling operations is repeatedly mentioned as a raw material for the Beketovka chemical industry. The Beketovka 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 kw (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 50,000 kw, (b) that of the Krasnyy Oktyabr' steel works, whose capacity is estimated at 50,000 kw (25), and (c) the 6,000 kw plant of the Krasnyye Barrikady ordnance and munitions plant. Some other industries have small generating stations with capacities generally under 1,000 kw. In spite

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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 in the area. The three large industrial stations are tied into the system, but they are primarily users rather than contributors of energy. Thus the regional transmission system is principally a distributor 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 Oktyabr¹, 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, Astrakhan¹-Saratov-Kazan¹, 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 or industry. The greatest concentration of industry is in two large urban areas -- Dubovka, the only other city of the area, and Krasnaya Sloboda, on the Volga opposite Stalingrad. Small industrial

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establishments are scattered throughout the agricultural hinterland, especially along the Volga-Akhtuba River system.

The major enterprises at Dubovka are wood processing, principally sawmilling, and flour milling. The city also has a plant that equips tanks with guns, an agricultural-machinery repair shop, a fairly large sewing combine, a meat plant, a quarry, and a printing establishment.

Krasnaya Sloboda, with a population of over 10,000, ranks second to Stalingrad in size but is classed as a "workers' settlement" 1/ rather than a "city." It is primarily a river-craft repair center. Maintenance activity consists of overhauling of 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 as a winter storage site 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 east has even less industrial development. With the exception of salt extracting and processing, the industries are scattered among the agricultural villages on the banks above the Volga-Akhtuba Floodplain, 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

1. A workers' settlement (rabochiy poselok) is defined as having no less than 65 percent of its workers engaged in non-agricultural pursuits.

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significance. Of the total USSR salt production, 25 percent is attributed to the Baskunchak operations (27). The industries representative of the area as a whole are grain processing, brick manufacture, 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. In a few settlements the maintenance of river craft and sawmilling attain significant size. These two industries have larger plants and employ more workers per plant than any of the other industries, with the exception of salt works. Areas away from the rivers 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 salt; and Petropavlovka, the chief processing center and Volga shipping point. Of these settlements, only Petropavlovka is a river port.

Although the extraction of salt started 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

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a year-round operation, whereas in the past the season usually extended from April through November. At Petropavlovka, seven mills process the salt and then dispatch it to barges that transport it either up or 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 fishing industry.

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

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 beyond 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,

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the harbor facilities are used for winter storage of barges. Between 100 and 200 barges can be accommodated. The settlement also has the usual range of 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 Mt. Bol'shoye Bogdo at the southern extremity of Lake Baskunchak. 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, where operation probably began 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. Fish-catching kolkhozes are located in the Vladimirovskiy, the Chernoyarskiy, and the 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 or diesel engines, with capacities generally under 100 kw. The largest is associated with the salt combine of Nizhniy Baskunchak. There are no indications of the existence of any transmission systems. Power

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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 which utilizes Lake El'ton radioactive muds for medicinal purposes.

C. Mineral Resources

The only minerals present in economic quantities in the study area are various types of salts, gypsum, tripoli earth, building stones, and natural gas. Of these, salt is the only resource whose exploitation has attained nation-wide 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. There are two extensive salt lakes in the area, Lake Baskunchak and Lake 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. It ranks among the four chief salt producing regions of the USSR (30) and is reported to supply about one fourth of the total salt production of the Soviet Union. Some of the salt is obtained from natural brine by solar evaporation, but most of it is mechanically extracted from bedded salt deposits (Figure 10). Only a shallow depth of

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brine overlays an enormous reserve of sedimentary salt deposits which are interbedded with clay. The actual depth of sedimentary salt 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 essentially three 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 the springs flowing into 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

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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. Much of the deposit consists of sodium chloride, 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 nineties at most places.

Lake El'ton has a higher potassium, magnesium, and bromine salts content than Lake Baskunchak. For this reason it is less desirable as a food salt but may be of greater industrial value. In 1947 an expedition of the Academy of Sciences of the USSR obtained satisfactory 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 tons (29).

In 1931, a bed of high quality rock salt with a reserve of not less than 100 million 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, Lake El'ton, and the Chernyy Yar vicinity (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

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northwestern shores (4). As of 1 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 a building stone and deposits in the Stalingrad area are used for flux in the Krasnyy Oktyabr¹ steel plant. Quartzitic sands are also widely distributed, and quality tripoli is found near Kamenny 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, friable, loose sand that has been found to be of value as glass sand. Along the right bank of the Volga northward from Beketovka are deposits of sand of optical-glass grade. The status of exploitation of these sands is not known (29).

In the coastal strip along the southwestern part of the western 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 was known to exist in the study area, but exploration and study were not undertaken until about 1928. As of 1935, 5 gas-bearing regions were established; Kargale, Kamenny Yar, Lake El'ton, Lake Baskunchak, and Mt. Bol'shoye Bogdo. The Kargale field is located 19 miles east-southeast of Urda (4). The Kamenny Yar deposit, associated with

a known anticlinal fold, is located on the right bank of the Volga, 3.7 miles south of Kamenny 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 a greater number of natural gas deposits have been discovered since 1935. Insofar as can be determined, none of the natural gas fields is currently being exploited.

D. Projects and Plans

Several far-reaching Soviet projects directly concern 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 parties investigating various phases of the projects are known to be working in many parts of the study area. 1/

1. Shelter Belts

Although small-scale and highly localized reforestation and shelter-belt planting has been carried on in the area for centuries, the present planting program is thought by the Soviets to be of sufficient magnitude to

1. Details on the Volga-Don Canal project are given under Inland Waterways (p. 133).

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change the nature of the environment (Figures 7 and 8). Large-scale plantings of protective shelter belts are expected to (a) reduce wind velocity, (b) help retain soil moisture, (c) collect snow for water supply, and (d) anchor loose sands. According to the plan, the city of Stalingrad will be at a point of junction of three state forest belts. On the divide along the west bank of the Volga River, the Kamyshin-Stalingrad forest belt will approach the city from the north, and the Stalingrad-Cherkessk state forest belt will run southwest from the city. The third, a part of the Saratov-Astrakhan¹ belt, will parallel the entire length of the Volga 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 Batkul¹ and extending to the Volga just north of Vladimirovka. Except for the Saratov-Astrakhan¹ belt, each state forest belt is to include 3 or 4 parallel forest strips 200 feet wide and about 1,000 feet apart. The Saratov-Astrakhan¹ forest belt consists of a 330-foot strip on each bank of the Volga River. Other smaller belts will be established throughout the study area by the individual collective and state farms. Besides these belts, trees are being planted in ravines, hollows, etc.

The main types of trees being planted are oak, poplar, pine, alder, acacia, and willow. Many of these trees are said to have acquired a dense growth by the end of the second year. The acacias and maples reach a height of 7-8 feet. Black poplar planted along the Mechetka River (north Stalingrad)

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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 3½ 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. 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.

2. The Stalingrad Power and Irrigation Project

The second major project concerns a hydroelectric-power dam at the north end of Stalingrad City, accompanied by 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 10,000,000,000 kwh, which is to be distributed far beyond the confines of the Stalingrad area (36). The completion of the dam should greatly stimulate the industrial development of Stalingrad (as well as the completion of the Volga-Don navigation canal).

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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 published report as Lotoshinok. ^{1/} Indications that work is already in progress are expressed in a 1951 report that mentions blasting, which was very likely associated with this project (124). A gravity-flow outlet canal, which will be about 370 miles long, will leave the reservoir from the east side and pass across 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-Astrakhan² Railway, where it turns northeastward arcing around the short Gorkaya River, then southeastward into the area south of Urda, and finally northeastward again towards the Aral-Sea, which is beyond the study area. A network of gravity-flow branch canals will extend from the Stalingrad Canal southward. These canals will supply water to local canals and irrigation networks.

In July of 1951, three survey parties were working in the area along the proposed route. Two were operating in the Stalingrad Oblast part of the area and the other in the area within 60 miles 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:

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

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- (1) Work on the canal is to begin "next year."
- (2) Before beginning construction on the canal "it is necessary to carry out thoroughgoing and scientific research work...."
- (3) "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.
- (4) "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."

A second water-supply canal, the Sarpinsk, will leave from the west side of the reservoir and run southward through the arid steppes and the Sarpinsk lakes, which will form a chain of enormous interconnected reservoirs.

In connection with the Stalingrad Project, it is planned that the Akhtuba River will be dammed near its point of divergence from the Volga and that the water will be diverted from the reservoir to the Akhtuba by a canal, with locks to permit continuous navigation. Below the locks, another canal will be constructed to connect the Akhtuba with the Volga.

The chances that the project will be completed and in operation at full capacity by 1956 are very slim. This is indicated by the facts that important technical aspects still seem to be in the exploratory stage, that much machinery essential to maintain a rapid construction pace is still being designed, and that there is a shortage of skilled labor necessary to operate the machinery if it becomes available. The project, however, has important propaganda implications -- a demonstration to the outside world that the Soviet Government is building for peace. It also provides another rallying point for

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the morale of the Soviet people themselves. At any rate, a person traveling east or south from Stalingrad may expect to encounter parties working on this project in any part of the area.

V. 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. 1/ From the Stalingrad area eastward the population density becomes progressively less, dropping from a density of from over 100 persons per square mile to less than 3.

The general historical trend, particularly in the western part of the area, seems to be toward concentration of population in cities, towns, and workers' settlements 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 the Stalingrad Oblast was 8 to 6, which indicates a loss of population to other areas of greater economic activity, primarily industrial.

1. 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.)

A comparison of prewar and postwar data, however, indicates that there was a large population increase in the Krasnoslobodskiy Rayon, immediately east of Stalingrad in the Volga-Akhtuba Floodplain (9, 16). The prewar emigration-immigration ratio for the Kazakh SSR was about 3:15 (37), which is probably characteristic of 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 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 estimates for this city range from approximately 445,500 in 1939 to 650,000 at present (Air Force estimates). 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 the war and to a disproportionately large postwar increase in the population of other cities in the USSR.

Of the settlements with over 1,000 inhabitants, the great majority are located along the banks of the Volga and Akhtuba rivers -- 41 of the 62 towns. The remainder are located throughout the western third of the study area and near lakes Baskunchak and El'ton. Five-sixths of the villages with populations of over 1,000 have fewer than 4,000 inhabitants. Seven of the eight known settlements in the study area with populations of over 5,000 inhabitants are known to have some type of manufacturing activity and 5 are administrative centers (see map CIA 11995). A conspicuous concentration of the settlements with over 1,000 persons is found along the northern shore of the Akhtuba River. These large villages are basically agricultural centers (usually with a machine tractor station), administrative centers, and the focal points for cultural activities. They are spaced at an average distance of about seven miles apart and are usually the termini of the principal roads leading from the Caspian Lowland plains.

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The vast majority of the settlements have fewer than 200 inhabitants and are exclusively agricultural (Figure 2). 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 much of the Caspian Lowland area, these smaller villages are fairly evenly distributed, but availability of potable water is an important factor in determining their exact location. Some areas, such as the extreme northern extension of the Kalmyk Steppe and the Shor Khaki, are almost complete devoid of settlements.

In general, the distance between settlements in the section of the plains along the left bank of the Volga and Akhtuba valleys averages 2 to 4 miles. Farther eastward, villages become progressively farther apart, notably to the east of the Saratov-Astrakhan¹ railroad line, which cuts across the study area. In the extreme east a small northern extension of the Sands of Maryn has a noticeably denser population than surrounding areas.

Throughout the plains there are a large number of temporary and seasonal settlement sites that are used by migrant herders. Many of these sites apparently have permanent buildings, even though they are used only for one to three months a year. ^{1/} In addition, there are probably a large number of temporary 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

¹. 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 or more buildings.

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of population was 26 per square mile or, if villages of over 1,000 population were excluded, 6.5 per square mile. Figured on the same basis the population densities of the Volga-Akhtuba Floodplain near Stalingrad were 108 and 65, of the Caspian Lowland near Stalingrad 20-38 and 13-18, of the Caspian Lowland farther from Stalingrad but near the Volga-Akhtuba Floodplain 15-23 and 4-7, and of the Caspian Lowland in the east 8 and 5. If the population of villages over 500 were excluded, the rural population density would be again reduced by about half throughout most of the area (9).

Specific postwar information on population shifts or conditions is available for four localities within the study area: (a) the area east of Kapustin Yar, from which some 3,000 persons are reported to have been evacuated for military security reasons (125); (b) the northern outskirts of Stalingrad, where construction of new settlements along the Mechetka River and in nearby areas has taken place (38); (c) the Krasnyy Oktyabr' Kolkhoz of the Krasnoslobodskiy Rayon, where 110 households were reported both before the war and in 1946, when the total population was 340 persons (including a working force of 119 persons, of whom 87 percent were women (16); and (d) just north of Verkhnyaya Akhtuba on the Akhtuba River, where a new town is reported as under construction in connection with work on the new Stalingrad GES 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

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including the Kazakhs, the Tatars, and a small number of 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 the Volga-Akhtuba Floodplain. With few exceptions, Great Russians dominate all of the larger settlements. In 1936, the greater proportion of Ukrainians were located (and probably still are) in small settlements northeast of Stalingrad on the east bank of the Volga. ^{1/}

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 Lowlands. 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 the major branches of their groups, which occupied the areas of the Kalmyk ASSR and the German-Volga ASSR. Both of these autonomous republics were abolished in 1943 and their peoples deported for alleged collaboration with the German invaders.

^{1/} 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 in several large villages and many smaller settlements strung out along the Chervlenaya and Rassoshka valleys.

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Since the study area is in the European-Central Asiatic transition zone, physical characteristics for the population of different ethnic groups are not sharply defined (Figures 3-6 and 16-17). The predominant characteristics of the Great Russians are fair hair; blue, grey, or brown eyes; round heads; and usually stocky frames of medium height. The Ukrainians (also referred to as Little Russians) tend to have darker hair and 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, although they were nominally subject to the khans or sultans,

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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

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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, the winter habitations, and agricultural and meadow 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 even 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 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 had experienced many changes, but changes have been most radical in the last few generations. 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 age 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 in 1951 decry the indifference and lack of cooperation among the peasants in the Stalingrad Oblast and particularly in the vicinity of Stalingrad City. Although there are several outstanding pro-Bolshevik sovkhoses 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 in some cases has bred an atmosphere of anti-Sovietism. 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 the case of Party cadre, the people are likely to be trouble-shooters or Party 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 and

urban and rural settlement. 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. Nevertheless, in times of war, civil strife, or food shortages, diseases of normally low morbidity can flare up to epidemic proportions.

Five years before World War II, a record of medical facilities for Stalingrad Oblast as a whole listed the average hospital cot accommodations as 4.6 per 1,000 persons and 1.2 per 1,000 in the rural villages. Yearly visits to medical dispensaries averaged 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 raise cot facilities to 7.2 per 100 persons in urban centers and 2.0 per 100 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 at present are still included in the area of study, medical facilities are as follows: (a) number of hospitals per rayon ranging from 1 to 5, with more than five rayons having 2 hospitals; (b) number of cots per hospital ranging from 17 to 50, with the largest number of hospitals having 20 cots; (c) medical dispensaries ranging from 2 to 6 per rayon, with an average of 4 per rayon; and (d) number of first-aid stations ranging from 4 to 9, with an average of 7 per rayon. In addition, there are a few sanatoria and workers' rest homes within the study area.

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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 the rayon, sanitation work is directed by the rayon sanitation inspector. Occasionally one inspector will serve several rayons under an inter-rayon setup. In the rural areas, a district sanitation inspector is in charge, sometimes with an assistant. Each rayon sanitary epidemic station has a laboratory, disinfecting point, a disinfecting chamber, a mobile disinfecting unit, 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).

According to a 1929 survey, 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 record for the USSR is 1,000 or more cases per year per 10,000 population in the southern Caucasus. The floodplain of the Volga and Akhtuba rivers is infested with malaria-carrying mosquitos 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 (0.9 per 10,000 persons per year) in the USSR. This disease affects a maximum number of patients in February (43).

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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 settlements 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 has the second lowest number of occurrences of smallpox in the USSR, with an average of 1.0 patient per 10,000 persons. 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 peniculous 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 (ixodidae) 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

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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 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. 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 highly polluted. Even away from densely populated areas the water supply is not good and becomes considerably poorer in the dry season. According to an official 1934 source the water in the area north of Stalingrad "in seventy percent of the inhabited places is polluted by discharges, 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 9 administrative rayons of the Stalingrad Oblast that are located in the study area included approximately 115 elementary or primary schools, 33 incomplete secondary schools, 5

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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, Kamenny 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.

Kazakh higher education is primarily oriented toward the more densely populated eastern areas of the Kazakh SSR beyond the study area, particularly towards 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

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nation-wide program. The expanding organization of so-called "correctional" camps has divided the Soviet Union 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 systems, under the supervision of Gulag, are subdivided into districts (otdeyeleniye), 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. All sections within this organization have their set economic tasks. The slave-labor system is administered by the secret police of the Soviet Union (MVD).

There are three main types of detention for civilian forced labor -- (a) at the worker's normal place of employment, (b) in exile, and (c) in a place of detention. All three are represented in the study area. The first is the usual punishment for breaches of labor discipline, such as absenteeism. It covers most terms up to six months, and is usually accompanied by a wage cut up to 25 percent. The second calls for the removal of the condemned to another locality, accompanied by disciplinary education by means of corrective labor. Although the penalties are more severe, the accompanying wage cuts are usually lower, with a maximum of 15 percent. The third is closely related to the theory of "class war" and the practice of "re-education." It is subdivided into five forms of detention--solitary confinement cells, deportation points, corrective labor colonies, medico-sanitary institutions, and institutions for minors (46).

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In addition to Soviet civilians, forced laborers have been impressed from the ranks of wartime 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 (47). The emphasis of long-range economic activity of Gulag in this district is (a) canal, road, and railroad construction and maintenance, (b) building of fortification works, (c) construction of factories and installations for war industries, and (d) some factory work. All activities include 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 some 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.

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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 surrounded by concrete walls and wooden or barbed-wire fences.

The largest utilizers of forced industrial labor are the Krasnyy Oktyabr^s iron and steel plant and the Krasnyye Barrikady armament plant. 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, producing construction-lumber planks, beams, rail sleepers, timber for mines, furniture, telegraph poles, and plywood. The mills occupy an area about 3½ miles long and have 30 large brick buildings housing 28 multiple saws. 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, several concentrations of forced laborers and political prisoners are located at the sites of former German prisoners-of-war camps. The transition of installations from prisoner-of-war camps to camps for Soviet civilian prisoners was taking place while the prisoners of war were being repatriated. The transition could be identified by the replacement of barbed-wire fences by high wooden fences to prevent visual contact between prisoners and the outside.

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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 stated that the last of their group was removed in December 1949, at which time Soviet political prisoners moved into the enclosure. The barbed-wire fence was removed during the summer of 1949 and 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 PWE 7362/1. It was a hospital enclosure with about 7 wooden barracks, each about 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

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plant (49). It consists of 8 or 10 earth bunkers with windows and 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 3 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 about 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 search lights. Two of the brick buildings also had search lights. About 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. A small number of prisoners of war, about 200, were employed at the Dzerzhinskiy plant. During the summer of 1949 the barbed-wire fence was replaced by a wooden fence 10 feet high. The last of the German prisoners left on 23 April 1950. The erection of the wooden fence indicates the camp will probably continue in existence as an enclosure for civilian prisoners (48).

Former Prisoner of War Enclosure 7362/11 is located approximately one mile south of the Dzerzhinskiy plant on the west side of the main double-track railroad to Stalingrad. The layout consists of 4 bunkers about 50 feet long and 15 feet wide, with only the flat, paper-covered roof and small windows above ground. Another bunker of the same dimensions and same type

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of construction (except that about half of the building was above ground) is located beside the 4 earth bunkers. Each bunker can accommodate some 90 men. Three additional flat-topped wooden barracks, measuring about 50 feet long and 20 feet wide, housed operational facilities, such as bath house, tailor shop, and shoe repair shop. The enclosure has 5 or 6 wooden guard towers, each about 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 1600 feet west of the 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 3 earth bunkers about 50 feet long and 25 feet wide, with sod roofs and windows above the ground level. A wooden fence 15 feet high surrounds the area. On either side of the wooden fence and 15 feet away from it is a barbed-wire fence about 5 feet high. In

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1949 the enclosure contained about 1,000 prisoners, 300 of whom were employed on canal construction, together with civilian laborers, both men and women. German prisoners in this camp were replaced by Soviet civilian prisoners in late September or early October 1949 (48).

Another German prison camp is located at the southwest edge of Stalingrad 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 5 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 the center of forced labor for 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 5 forced-labor camps along the course of the canal between Krasnoarmeysk and Tundutovo, which will be spaced at intervals of from 6 to 9 miles (51).

A settlement of Russian forced laborers, Gorodok Volkra, is located on the southeastern outskirts of Krasnoarmeysk. In May 1949, the settlement consisted of three wooden barracks 170 feet long, 40 feet wide, and 15 feet high. The barracks provided accommodations for workers, a kitchen and mess hall, and a kennel for dogs. Three additional barracks of the same size were in early stages of construction. The buildings are surrounded by a double wooden fence 6 feet high (49).

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 were between the ages of 17 and 20 years. 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, 4 additional barracks had been built, and others were under construction. At that time, forced laborers had begun to arrive. Former Prisoner of War Enclosure 7108/T was also converted into a forced-labor camp housing 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. One camp consists of two sections, one for men and the other for women. Laborers at these 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 employ prison labor either in construction or operations are: (a) the shipping station, which employed 300 prisoners of war and 200 civilians in

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3 shifts, 6 days a week; (b) a saw mill, which 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).

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VI. Transportation

The transportation network within the study area is densest around Stalingrad and near the Volga-Akhtuba Floodplain. In this area it consists of major railroads and of gravel or improved dirt roads that are well maintained and trafficable throughout the year, supplemented by river traffic on the Volga. Air transportation is also centered in the Stalingrad area, where five active airfields are maintained.

To the east and northeast of the Volga and Akhtuba floodplains, there are few railroads and the road net becomes much thinner. A good railroad line runs from Post Paromaya, opposite Stalingrad, to the Volga port of Vladimirkova and eastward to the rail center of Verkhniy Baskunchak. Here it connects with the Saratov-Astrakhan' railroad, the only north-south line that crosses the study area east of Stalingrad. These railroads are important for transporting salt from the Lake El'ton and Lake Baskunchak areas to ports on the Volga River and the Caspian Sea. Except for a new improved dirt, or possibly gravel, road that is under construction from Urda westward toward El'ton or Zhitkur (117) and short sections of improved-dirt roads near Lakes El'ton and Baskunchak, the highway net in the eastern part of the study area consists of seasonal, unimproved dirt roads, trails, paths, and caravan routes. North and south of Shor Khaki, there are few routes other than caravan routes.

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A. Railroads

Railroad facilities in the study area can be divided into the following three units: (a) the Stalingrad center, at which three major railroads from the north, west, and south converge; (b) the railroad line from Post Paromnaya, via Vladimirovka to Nizhniy Baskunchak; and (c) the railroad from Saratov to Astrakhan^o, which connects the important salt-producing areas of Lakes El^oton and Baskunchak with Astrakhan^o. Administratively, the first unit is a part of the larger Stalingrad Railroad System and the other two units belong to the Ryazan^o-Ural Railroad System.

1. The Stalingrad Railroad Center

Stalingrad is an important rail center for all of southeastern European USSR. It is linked by rail with Astrakhan^o (200 miles southeast), with the main Transcaucasus line at Tikhoretsk (240 miles southwest); with the Donets Basin via Likhaya (175 miles west); and with Saratov (210 miles northeast) and 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).

Almost all passenger and freight traffic within the Stalingrad railroad center, as well as most of the railroad repair work, is handled at one of eight stations or yards (see accompanying photomosaic of Stalingrad). Three of these, including the main passenger station for the entire area, are in Stalingrad proper. Three others are located in the towns of Yel^oshanka,

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Beketovka, and Krasnoarmeysk, south of the main city. 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, named 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 (10 to 15 tracks), and several warehouses, as well as minor locomotive 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 third significant installation in Stalingrad proper is the Bannaya station and yard which parallels the southern section of the port area. In

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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 Oktyabr³ steel plant (21).

Immediately to the south of Stalingrad proper is the Stalingrad Railroad Classification Yards "Yel³shanka," 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 (see photomosaic of Stalingrad). The installation handles local and Caucasus-bound traffic.

The station at the northwest end of Krasnoarmeysk is listed as the Stalingrad Railroad Station, Classification Yards, and Shops "Sarepta." It is the main station in Krasnoarmeysk and has been described as the "southern gateway to Stalingrad." An important function here is the transloading of freight from railroad to Volga River 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 locomotive and car repair shops, a roundhouse of 9-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 belt line and the main line leading northwestward towards 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 "Krutn'kiy"). Like Gumrak, it is located at a junction of the belt line 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 lines, exact information as to location or construction is available for only two, both of which are on the northern belt line. The Orlovka River is spanned by a

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single-track, arch-type bridge 200 feet long, possibly of masonry construction. Near the eastern end of the northern belt line, a single-track bridge 350 feet long, possibly of masonry-arch construction, crosses the Sukhaya Mechetka River (21). The Koremaya River also is crossed by a bridge located on a branch line (from the vicinity of Dzhherzhinsk) that connects with the northern belt line. It is a single-track, nine-span bridge 275 feet long, of arch-type masonry construction (21).

Within the dock area, a steel-girder bridge crosses the Banniy Ravine. This three-span bridge carries a single track and is 335 feet long (21). It is located on a short branch line (mostly double-track) 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 had 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 in 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 be constructed around the entire 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

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railroad bypass. Freight entering Stalingrad will be distributed by means of the new lines to the appropriate freight terminals. At both ends the peripheral railroad will be connected with the dock area to permit the transfer 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 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).

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 of the lines are single-tracked. An inter-urban 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.

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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 town, and it is reported that 3 daily workers trains run between the industrial areas of Beketovka and Krasnoarmeysk (57, 21).

2. Lines Converging at Stalingrad

a. Stalingrad-Tikhoretsk-Krasnodar

This line is double-tracked from the main station, Stalingrad North, to Krasnoarmeysk, then single-tracked west 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, lumber from the northern areas, fish from the Caspian 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). Available reports indicate that this line was completed and put into operation in autumn of 1949 (62). Where the railroad intersects

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the Volga-Don Highway a railroad bridge is planned to replace the present level crossing. Surveying for the bridge was underway in December 1949 (82).

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 trainloads of all kinds of building and construction materials (65). The Beketovka freight consist largely of coal, wood, and scrap iron, which are sent to the Stalingrad Chemical and Chemical Warfare Plant "Beketovka" 91 and to the Stalingrad Thermal Power Plant, Gres I. Southwest of the main Stalingrad passenger station, the line passes through the Yel'shanka railroad yards (21).

b. Stalingrad-Likhaya

This is a double-track line from the main or north station of Stalingrad west to the Stalingrad Railroad Station and Yards "Voroponovo" (also referred to as "Krutenkiy"), then single-track to Likhaya, where it joins the Voronezh-Rostov line. The line provides direct communication between the Donets Basin and the Stalingrad industrial complex. The heavy

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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). Lumber from the northern areas makes up a large portion of the return freight to the Donets Basin.

c. Stalingrad-Balashov-Saratov

This line 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, where one branch runs northeast to Saratov and thence east to the Urals and the other branch to Gryazi, where it joins the double-track line to Moscow (21). The latter is the most direct route between Stalingrad and Moscow. It 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).

3. The Post Paromnaya-Vladimirovka-Nizhniy Baskunchak Line

This railroad line is important primarily because it connects Stalingrad with the important salt-producing center located at Lake Baskunchak

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and provides rail service to the Caspian Sea port of Astrakhan⁹. Large quantities of salt are transported yearly over this rail line to Petro-pavlovka, the salt port of Vladimirovka, where the salt is transferred to Volga barges. Recent military activities at Kapustin Yar have greatly increased the strategic importance of the line (125). 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 (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 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 2 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. [REDACTED] and recent reports indicate that a railroad bridge has been constructed over the Volga River to replace the time-consuming ferry service. The structure reportedly is located immediately north of the ferry and is said to be 2.8 miles long. Apparently the bridge serves both railroad and highway traffic. No airphoto coverage is available (21, 70).

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From Post Paromnaya to Verkhniy Baskunchak the line is single tracked and of Russian standard gauge. The sector from Post Paromnaya to Vladimirovka was built as a vital supply route for the defense of Stalingrad. ^{1/} Leaving Post Paromnaya, the railroad passes the stations of Paromnaya, Bezrodnoye, and Zaplavnoye. West of Leninsk and $1\frac{1}{2}$ 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 $1\frac{1}{2}$ 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 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 $3\frac{1}{2}$ miles southeast to Malyayevka. The Leninsk station has no permanent buildings, platforms, or repair facilities. Its principal function appears to be the handling of supplies for the Leninsk airfield.

Available information indicated that in 1942 the branch line to Malyayevka terminated at a quarry one-fourth mile northeast of the center of the village. By February 1943 this spur reached the north bank of the Akhtuba River about a mile west-northwest of the center of Malyayevka, where a landing pier

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

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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 this spur line from a point just southeast of the old quarry.

In the Malyayevka area the main line crosses 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 the clear spans are 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 air photographs of 1943, but they 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.

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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-northeast 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 Tokarev the station is located 2.5 miles north 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 stocks of freight of some type around the station.

Approximately 5 miles southeast from the Tokarev railroad station is the important town of Kapustin Yar. The railroad station is located 2 miles

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east-southeast of the center of town. A loop spur approximately 1200 yards long runs to the south of the main line, and a dead-end siding extends 800 yards westward from its eastern end. 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 sharply 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 of the main line and rejoins it just east of Akhtuba (72). Vladimirovka and its port facilities at Petropavlovka (approximately 2 miles to the south) is the main salt transshipping center for crude salt received from Lake Baskunchak. From the Petropavlovka railroad station, located on the Volga River, spur lines run north and south, connecting docks and shipyards. Petropavlovka is connected by a single-track railroad line with Akhtuba, where there is a railroad engine depot (73). Leaving Akhtuba, the 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 shops and stations, as follows: stop "Kilometer 15," Kochevaya station, stop "Kilometer 33," and Solonchak station. About a half mile north of Verkhniy Baskunchak the line joins the north-south Saratov to 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 right 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 (73, 74).

The section of the line from Verkhniy Baskunchak to the terminus at Nizhniy Baskunchak is 7.4 miles long. Here junction is made with electrified spurs running north and south that serve salt industries along Lake Baskunchak and with a spur 4.3 miles long that 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. A 1930 Soviet map indicates that the northern railroad spur was being extended along the north-western shore line.

4. 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 Moscow and the industrial Ural region by way of Saratov.

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 Krasnovodak. The route is also important for the transport of salt from Lake 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 siding "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 Kharkov locomotive works (76).

Entering the study area from the north, the line follows a straight southerly course, passing sidings "Kilometer 299" and "Kilometer 307." 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). At El'ton there is an industrial spur 3.7 miles long that 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 .5 mile.

Between El'ton and Saykhin (northeast of Lake Datkul') stations, the railroad crosses 4 small bridges, located 1.1 miles, 1.9 miles, 4.8 miles, and 19.4 miles, south of El'ton. The main bridge crosses over the Samaroda

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River. From Saykhin, the line follows a south easterly direction for a distance of 5.5 miles, crossing a railroad bridge about 2.5 miles southeast of Saykhin (78).

Beyond the bridge the line then turns sharply to the south toward Verkhniy Baskunchak, passing siding "Kilometer 365," Shungay station, and sidings "Kilometer 401" and "Kilometer 408" (77). At Verkhniy Baskunchak the line is joined by the Verkhniy Baskunchak-Nizhniy Baskunchak branch of the Ryazan'-Ural System. Approximately 2.5 miles south of Verkhniy Baskunchak, a spur line branches 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 numerous 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).

B. Roads

Road facilities of the study area are relatively poor. Although maps of the area show a dense network of roads, most of them are improved dirt roads of a seasonal character, trails suitable only for foot or animal traffic, or caravan routes. The normal classification of first-, second-, and third-class

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roads, therefore, does not apply within the area. All of the eight major roads of the area lead out from Stalingrad and are trafficable throughout the year. Of these, only the three leading westward, northwestward, and northeastward are classed as highways; at least a part of each is paved or has a metalled roadbed. On entering Stalingrad, the quality of the major roads improves and they become part of the street pattern of the city.

1. Major Roads

a. Stalingrad-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-Ilovinskaya 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, however, states that at least part of the road has an asphalt surface and is wide enough to carry two streams of traffic (79).

b. Stalingrad-Saratov Highway

The highway from Stalingrad to Saratov is part of a second principal road to Moscow. The alignment generally parallels the high right

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bank of the Volga from 1-4 miles inland, cutting across the alternating interfluves and deep valleys at right angles. The road connects all of the larger villages situated along the bluffs and in the tributary stream valleys. It is in fairly good condition, having either a gravel or an improved dirt surface and an average width of 30 feet. On entering Stalingrad the road widens considerably and merges into the general street pattern. The road, which forms one of the main north-south routes in Stalingrad City, is approximately 40 feet wide, asphalt-surfaced, and in very good condition (56, 66).

c. Stalingrad-Kalach Highway

The highway from Krasnoarmeysk to Kalach is a sector of 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 under the administration of the Volga-Don Highway and Volga-Don Canal companies, and the administration is 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. As shown on the base map of the study area, the highway runs approximately 2 miles west of Andreyevka, generally parallel to the route of the Volga-Don Canal.

Available reports agree that the highway to a point north of Tundutovo runs 1000-1300 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

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that it crosses the canal north of Tundutovo and then proceeds along the south side of the canal in a northwesterly direction (82, 83). This route lies 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 shoulders 6.5 feet wide and about 1.6 inches higher than the surface of the highway. The elevation of the road above the surrounding land varies from 5 to 10 feet (82). Road signs and drainage ditches are lacking. 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.

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 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 both sidewalks and rails.

A wooden emergency bridge is reported to be in use at the highway crossing over the Volga-Don Canal site. Plans call for the replacement of

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this temporary structure by a reinforced concrete bridge, as well as for the construction of three new bridges west of the canal site, which will span ravines ranging from 20 to 33 feet in depth.

The culverts, which are placed in the smaller earth-filled 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-Karpovskaya Road

The road to Karpovskaya follows the general line of the Stalingrad-Likhaya railroad line, over fairly flat terrain (66). It connects Stalingrad with Kruten'kiy and its important railroad yards and leaves the study area near Karpovskaya. [REDACTED] 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-Abganerovo Road

This road, with an improved-dirt or gravel surface, 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-

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Tikhoretsk-Krasnodar railroad line southwestward. At the Abganerovo station the road turns southeast to Abganerovo village. The road, which follows fairly level terrain, is generally straight, with only a few sharp curves. It is approximately 30 feet wide (117, 66).

f. Stalingrad-Astrakhan' Road

The course of this road follows the right bank of the Volga 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 earth trails run alongside the road, making a total width of some 160 feet. Approximately 10 miles east-southeast of Krasnoarmeysk, the road joins an improved dirt road that connects the Volga port of Svetlyy Yar with Bol'shiye Chapurniki, by way of Lake Sarpa. The latter road is still under construction between Lake Sarpa and Liman Tarmanskiy.

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-southeast of Solodniki, a number of dirt tracks converge on the main road and cross a bridge 220 feet long and 25 feet wide. There is evidence that vehicles use the water course as a road during 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 water gap 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 Kamenny Yar. About 8 miles east-southeast of Solodniki, a causeway 35 feet wide carries the main road above ground that appears to be low and marshy. An improved dirt road from Kamenny Yar rejoins the main road at a point 2 miles northwest of Vyazovka, and a branch road joins it from the north side of the causeway about $1\frac{1}{4}$ miles west-northwest of Vyazovka. Available information indicates that work on the causeway had not been completed as of September 1942, at which time the causeway extended as far as the west bank of a small tributary of the River Vyazovka 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 north. 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 via Pady and rejoins the main road $2\frac{1}{2}$ miles northwest of Staritsa.

In the Vyazovka-Staritsa area the road no longer runs on an embankment 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, near the edge of the study area. As an improved dirt or gravel-surfaced road with an average width of 30 feet, it continues to run roughly

parallel to the right bank of the Volga River, passing through the river ports of Chernyy Yar and Nikol'skoye. The urban areas of Grachi and Vetlyanka are connected with the main road by improved dirt or gravel-surfaced roads. Between Solenoye Zaymishche and Prishib, several bridges cross small water-courses and ravines, but no information is available as to their lengths or widths.

g. Stalingrad-Mikhaylovka Road (71, 117)

The Stalingrad-Mikhaylovka road, paralleling the northern and eastern edge of the Volga-Akhtuba Floodplain, is part of a second main road between Stalingrad and Astrakhan'. It has an improved dirt or gravel surface, is approximately 30 feet wide, and is well maintained and useable 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 Rybachiyy. At the town of Srednyaya Akhtuba the road reaches the Akhtuba River, which is crossed by what appears to be a dam or an embankment (117).

In Srednyaya Akhtuba the road connects with improved dirt or gravel-surfaced roads that lead west-northwest to Verkhniy Akhtuba and Sredne-Programnoye

and then northeast to a point about 2.8 miles north of the "ur.Bol'shoy Liman."

Eastward from Srednaya Aldtuba the main road follows the north bank of the

Aldtuba River, passing through the western outskirts of the town of Zaplavnoye

to the center of Leninsk, where it divides into three main thoroughfares.

For 3 miles these roads run roughly parallel in a southeasterly direction.

The three roads converge

The southernmost is generally used for through traffic. The three roads

converge at the eastern end of town. Approximately 1.5 miles east of Leninsk

an improved dirt or gravel-surfaced road about 25 feet wide branches off the

main road northeast to Budenny. By now, it 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 Aldtuba on a bridge 120 feet long and 20 feet wide. At this point,

the shore-to-shore width of the river bed is 60 feet. On the northern out-

skirts of Solodovka, an improved dirt road forks to the northeast for a stretch

of 5.5 miles. 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

southeast 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,

75 feet.

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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 of these terminates at the village Konstitutsiya, in the immediate vicinity of Kapustin Yar airfield (Figure 35 photo).

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.

One mile 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.

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Thereafter, the road follows a generally southeastward course to Vladimirovka. In Vladimirovka an improved dirt or gravel-surfaced road 26.2 feet wide branches off in a 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 dirt or gravel-surfaced road branches off the main road and runs northeast to the center of Verkhniy Baskunchak. At Verkhniy Baskunchak this road turns northward, then westward, doubling back for 8 miles toward Vladimirovka. This stretch runs parallel to the south side of the Saratov-Astrakhan' railroad. It is anticipated that the road will ultimately be extended to Petropavlovka, thus forming a second traffic route for salt shipments from Lake Baskunchak to the Volga River.

Southeast of Novonikolayevka the main improved section of the 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 continues as an improved dirt or gravel highway to Mikhaylovka. North of Mikhaylovka, it connects with 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

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dirt roads connect Mikhaylovka with Sasykoli.

h. Stalingrad-Tsatsa-Malye Derbety 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 Malye 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 shoreline of Lake Sarpa and at Malye 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. At Dubovyy Ovrage, 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 Ovrage the road passes east of the Dol'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

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narrow water passage between Lakes Darmantsak 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 Steppnoy and eventually connects with the Tbilisi highway system near Dzauzhikau.

2. 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 in 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 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 town. 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 cobblestone. A drainage ditch parallels the road on each side. The soft shoulders were originally 4 inches higher than the sides of the highway, but heavy traffic has now lowered them to the highway level (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 1946. Equipment for the new road came from the Krasnyy Otkryabr' plant in Stalingrad and sand from a pit located southwest of Beketovka. 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 5 or 6 culverts consisting of 1 or, in some cases, 2 parallel concrete pipes. No drainage ditches, kilometer markers, or road signs have been reported. A row of wooden telephone poles parallels the east side of the road (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 U.S.S.R. (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 Alleye 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. Stalin (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 or north 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. Recent reports describe both of these sections as cobbledstoned 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. [REDACTED]

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[REDACTED] 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 IV-A.

3. Roads near Urda (117)

A significant road construction development is noted in Urda area. A Soviet map series at 1:200,000, published in 1942 by the General Staff of the Red Army (117), shows three improved dirt or gravel-surfaced roads 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-Astrakhan⁹ railroad line. The existence of these improved road facilities to Urda, a rather isolated urban area, probably indicates some recent developments of significance in that area.

4. 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 unimproved dirt roads (Figures 4 and 8),

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 in 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 better roads with improved dirt or gravel surfaces 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 impassible even by 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 had outward from larger populated settlements on the right bank of the river, usually in a southwesterly direction.

East of the Saratov-Astrakhan¹ 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.

C. Inland Waterway Transport

Inland waterway transportation within the study area is concentrated along the broad, navigable Volga River. Little traffic uses the Akhtuba River owing to its many obstructions and shallowness. 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.

Port installations are concentrated in the Stalingrad area (Stalingrad-Deketovka-Krasnoarmeysk) and at Petropavlovka, the port of Vladimirovka. The major ports are especially equipped to handle the various 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.

1. Volga River Traffic

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The Volga River is the most important inland water-transport route in the USSR. [REDACTED] place the tonnage carried by the river and its tributaries, the Kama and the Oka, at about one-half the total inland shipping of the USSR. About one-tenth of the Volga shipping is concentrated in the 400-mile section between Stalingrad and the Caspian Sea (38).

Through its major tributaries and connecting canals, the Volga links a number of the most economically important regions of the USSR. The Volga system provides the route of traffic for crude oil and fish of the Caspian area, cotton from Turkestan, ores from the Urals, cereals from the middle and lower reaches of the Volga Region, lumber 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 (37).

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^s Section for the stretch from Vladimirovka to the mouth of the river. Volga shipping is also handicapped by freezing 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 April 7 (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. Low-decked iron or wooden barges (barksy), used to transport lumber 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 lumber and petroleum. An estimated 40 percent of the total freight in 1933 consisted of south-bound lumber (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. Thirty percent of the total river freight 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 means 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 $3\frac{1}{4}$ miles along the river near the center 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 lumber 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 is the Red Army's shipyard, which has 11 wharves. Of these, 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, approximately 150 yards from the east bank, with an underwater pipeline to the oil-tank farm on the west bank (124).

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 central section of the city (124).

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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 across the Volga the Stalingrad-Astrakhan' road and rail traffic. Recent reports, however, indicate that a dual-purpose bridge spanning the Volga just north of the ferry line has been completed 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 Aldtuba 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 salt produced from Lake Baskunchak, which is brought in by rail for processing at the 7 salt mills of the vicinity. 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

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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 did not 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 landing facilities in the study area are of two types: those with docking installations, and those without any installations. The first group includes the following: Dubovka, Pichuga, Latashanka, Svetlyy Yar, Gromki, Raygorod, Chernyy Yar, and Nikol'skoye. The second group includes Legkodinov, minor landing points in the Stalingrad and Beketovka areas, and a small ferry service south of Krivusha (117).

2. Alhtuba River Traffic

Traffic on the Alhtuba 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 Alhtuba 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 Alhtuba and Volga rivers near the site of the planned dam (96).

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3. 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. 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 towards 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, however, it is very doubtful that this canal will be completed in 1952 or be in operation by 1953. With the completion of the canal the volume, composition, and the direction of traffic flowing along the more important waterways of the Soviet Union will be materially 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 eliminated, and the center for freight transshipments may be shifted from Stalingrad to some point possibly as far west as Rostov (97). It has been estimated that the total freight turnover within the Don Basin will be increased 5 or 6 fold (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 x 39½ feet; maximum draught, 9.4 feet; and maximum number of vessels during the navigation period, 9,400 (101).

D. Airfields (21, 58, 71, 102-106, 108-112, and 126)

Within the study area there is a total of 77 airfields (see Appendix IV-B). These airfields were all 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 IV-B). 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. No information is available as to the current use or facilities of this field. 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 (Voronovo) 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-Aldtuba Floodplain to the Saratov-Astrakhan' Railroad. Information on these fields is based primarily on 1942-44 sources, supplemented by some postwar intelligence data for a few of the fields. Consequently, the inactive airfields are described substantially as they were during World War II. At that time, many airfields were developed hastily

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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).

Of the 72 inactive fields, 20 are considered important for the purpose of this study. All of these are located north and northeast of the Volga-Alhtuba Floodplain within a 35-mile radius of Kapustin Yar. Detailed descriptions for 11 of these fields are presented in Appendix IV-B. Virtually no information is available for the remaining 9 fields.

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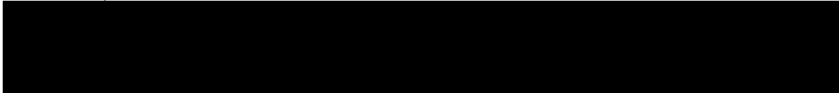
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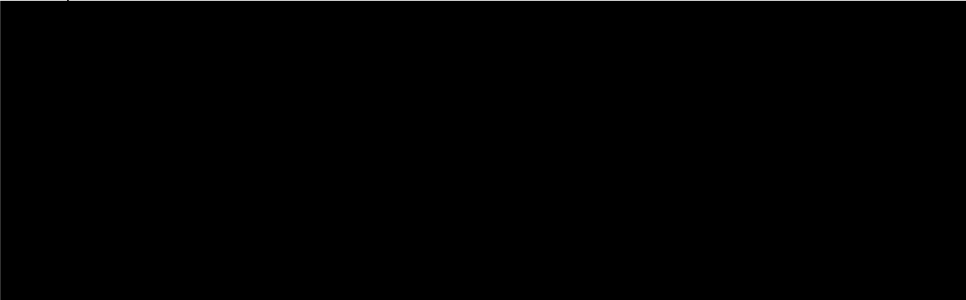
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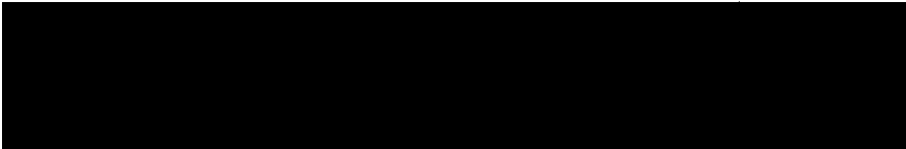
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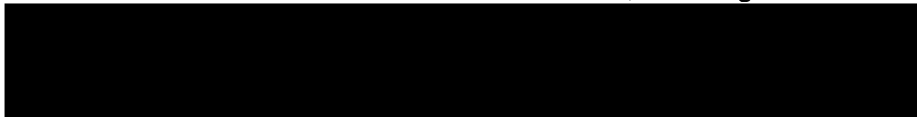
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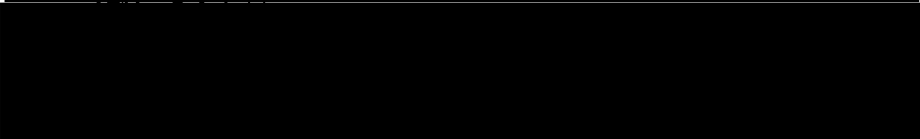


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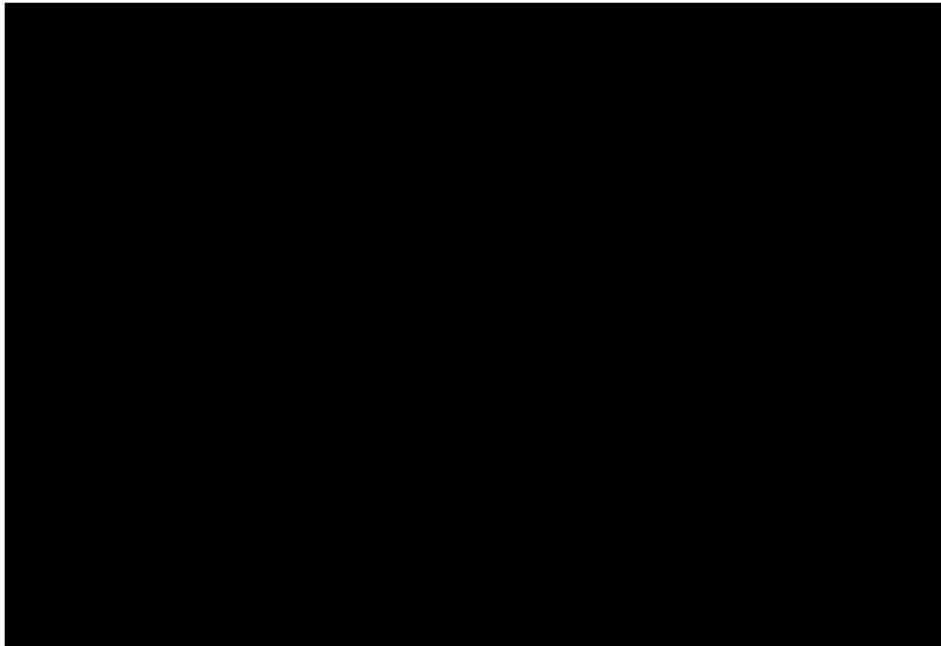
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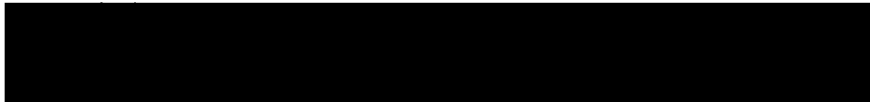
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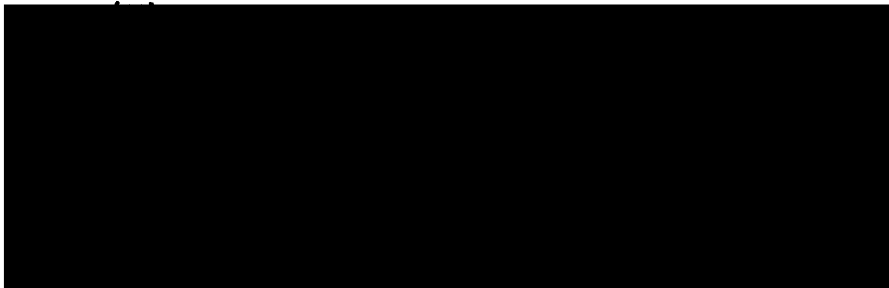


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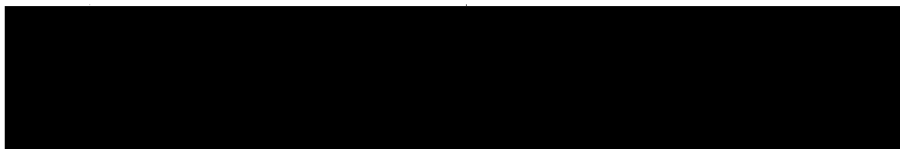
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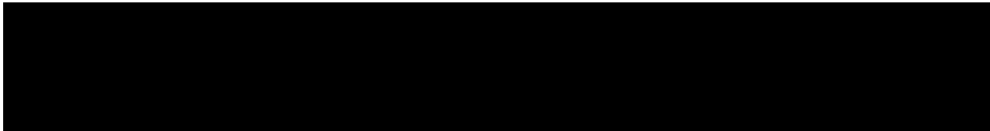
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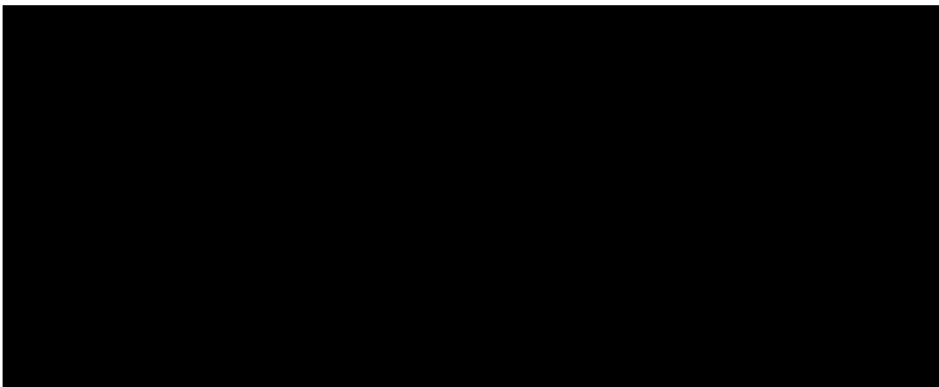
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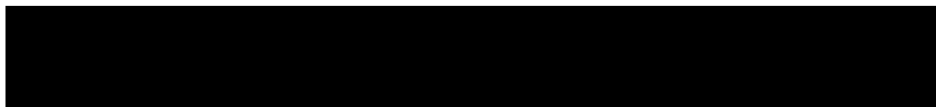
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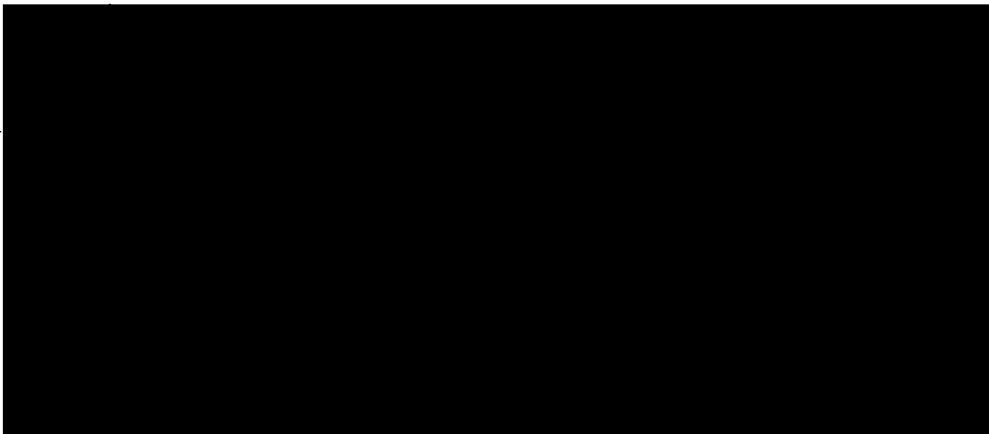
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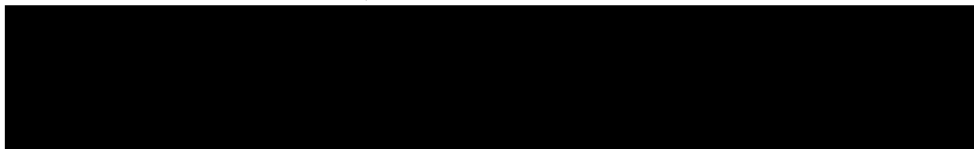
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APPENDIX I: ADMINISTRATIVE DIVISIONS

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

<u>Administrative Unit</u>	<u>Administrative Center</u>
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
T'onskiy Rayon	Zhitkur village
B. Astrakhanskaya Oblast (RSFSR)	Astrakhan' City
Entire area of:	
Vladimirovskiy Rayon	Vladimirovka village
Kapustinoyarskiy Rayon	Kapustin Yar village
Parts of:	
Nicol'skiy Rayon	Nicol'skoye village
Sasykol'skiy Rayon	Sasykoli village
Chernoyarskiy Rayon	Chernyy Yar village
C. Zapadno-Kazakhstanskaya Oblast (Kazakhskaya SSR)	Ural'sk City
Part of:	
Urdinskiy Rayon	Urda village

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SECURITY INFORMATIONAPPENDIX II: CLIMATIC DATA

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

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SECURITY INFORMATION

PRECIPITATION

Station	No. of Years Observed	Mean, Maximum, and Minimum Precipitation in Millimeters												Annu- al
		Monthly												
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Kamyshin	38	16	19	16	18	27	33	34	60	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

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SECURITY INFORMATION

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

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SECURITY INFORMATION

METEOROLOGICAL STATIONS

Akhtuba	48°18'N - 46°09'E
Astrakhan'	46°21'N - 46°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

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SECURITY INFORMATION

APPENDIX III: SUN-MOON PHASES

Date	Beginning of Morning Civil Twilight	Sun		End of Evening Civil Twilight	Moon		Moon Phase
		Rise	Set		Rise	Set	
FEBRUARY 1952							
1	0657	0730	1658	1731	0937	2411	2--First quarter
3	0656	0729	1700	1733	1019	0126	
5	0653	0726	1703	1736	1225	0347	
7	0650	0723	1706	1739	1308	0535	
9	0646	0719	1711	1744	1521	0645	
11	0644	0716	1714	1746	1739	0727	11--Full moon
13	0641	0713	1716	1748	1956	0757	
15	0638	0710	1719	1751	2217	0825	
17	0634	0706	1723	1755	2451	0902	18--Last quarter
19	0630	0702	1727	1759	0209	1002	
21	0627	0659	1730	1802	0429	1157	
23	0623	0655	1733	1805	0558	1446	
25	0619	0650	1737	1808	0648	1743	25--New moon
27	0616	0647	1739	1810	0723	2028	
29	0613	0644	1742	1813	0759	2306	

MARCH 1952

1	0613	0644	1742	1813	0821	2422	
3	0609	0640	1745	1816	0923	0133	3--First quarter
5	0605	0636	1748	1819	1059	0331	
7	0601	0632	1751	1822	1307	0448	
9	0557	0628	1754	1825	1526	0533	
11	0553	0624	1757	1828	1745	0605	11--Full moon
13	0549	0620	1800	1831	2006	0633	
15	0545	0616	1803	1834	2238	0708	
17	0541	0612	1806	1837	2513	0804	

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Date	Beginning of Morning Civil	Sun Rise	Set	End of Evening Civil	Moon		Moon Phase
	Twilight			Twilight	Rise	Set	
MARCH 1952 (continued)							
19	0536	0607	1810	1841	0220	0946	19--Last quarter
21	0532	0603	1813	1844	0356	1222	
23	0528	0559	1816	1847	0450	1513	
25	0523	0554	1819	1850	0527	1758	25--New moon
27	0519	0550	1822	1853	0601	2038	
29	0516	0547	1823	1854	0647	2313	
31	0511	0543	1826	1858	0759	2422	
APRIL 1952							
1	0507	0539	1830	1902	0849	0122	
3	0502	0534	1833	1905	1053	0247	2--First quarter
5	0458	0530	1836	1908	1311	0337	
7	0454	0526	1839	1911	1530	0411	
9	0450	0522	1842	1914	1751	0440	
11	0447	0519	1845	1917	2023	0514	10--Full moon
13	0442	0514	1848	1920	2302	0606	
15	0437	0510	1850	1923	2511	0741	
17	0434	0507	1854	1926	0156	1009	17--Last quarter
19	0430	0503	1856	1929	0254	1257	
21	0426	0459	1859	1932	0331	1538	
23	0422	0455	1902	1935	0405	1816	
25	0418	0452	1905	1939	0437	2051	24--New moon
27	0415	0449	1908	1942	0554	2309	
29	0411	0445	1911	1945	0736	2443	

APPENDIX IV. TRANSPORTATION

A. ROAD BRIDGES IN THE STALINGRAD AREA (66)

1. 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

2. 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

3. 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

4. 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

5. 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

6. 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

7. 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

8. 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

9. 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

B. ACTIVE AND INACTIVE AIRFIELDS IN THE STUDY AREA1. Complete List

<u>Name of Airfield</u>	<u>Coordinates</u>
	° ' "
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 Ovrage	48 20 00 N 44 37 00 E
** Dzhitkurinskiy	48 46 00 N 46 28 00 E
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
Ivanovka	48 28 15 N 44 23 45 E
** Kapustin Yar	48 40 00 N 45 44 00 E

* Active airfields.

** Strategically located inactive airfields.

<u>Name of Airfield</u>	<u>Coordinates</u>		
	<u>o</u>	<u>'</u>	<u>"</u>
** 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	
** Kolkhoz Imeni Shestnadsatogo Parta'yezda	49 00 00 N	45 55 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	
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	

<u>Name of Airfield</u>	<u>Coordinates</u>
	° ' "
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
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
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

<u>Name of Airfield</u>	<u>Coordinates</u>
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 41 00 E
Tumak	48 37 00 N 44 37 00 E
Ushakovka	48 24 35 N 45 09 00 E
Verkhneye-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
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 00 E
** Zhitkur-South (Repeva)	48 53 00 N 46 14 00 E

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SECURITY INFORMATION

2. 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 NE/WSW.

Surface: Sod.

Runway: Prepared or concrete runway reported but unconfirmed.

Extensibility: Extensible S and W for undetermined distance.

Taxiways: No information.

Parkings: 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.

TOP SECRET

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: Figures 26 and 27.

- (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 28.

TOP SECRET
SECURITY INFORMATION

(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/SSW.

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.

TOP SECRET

TOP SECRET
SECURITY INFORMATION

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. [REDACTED] 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.

25X1C

Photo coverage: Figure 29.

(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.

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TOP SECRET

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 30.

(5) Stalingrad-Southwest (Alternate name: Voroponovo) 1/ (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.

1/ Stalingrad Airfield (alternates Stalingrad North, Stalingrad 1, Tsaritsyn) was recently abandoned as an active airfield. Information received from

25X1A

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 31.

3. Strategically Located Inactive Airfields (for which some data are available)

(1) Akhtuba (102, 108, 126)

Coordinates: 48°17'N - 46°13'E.

Date latest information: 1947.

Location: 1 mile W of Akhtuba; 2-1/4 miles east of the Akhtuba River; 2-1/2 miles SE of Vladimirovka.

Landing area:

Field:

Dimension and orientation: 3,900 x 3,500 feet E/W.

Surface: Sod.

Extensibility: Field can be extended to the E, N, and W; limited only by small lakes.

Taxiways: No information.

Parking: No information.

Obstructions: No information.

Facilities: No information.

Hangars: No information.

TOP SECRET
SECURITY INFORMATION

Misc. buildings: 15 miscellaneous buildings near SW corner of airfield, probably serving as airfield facilities.

Access:

Road: Secondary road from Akhtuba.

Railroad: Vladimirovka-Akhtuba-Verkhniy Baskunchak.

Users and operators: Used by Soviet Air Force for fighters and medium bombers.

Photo coverage: Figure 32 (summer); Figure 33 (winter).

(2) Kapustin Yar (71, 102, 109, 126)

Coordinates: 48°40'N - 45°44'E.

Date latest information: July 1951.

Location: 6-1/4 miles NNW of Kapustin Yar and just NW of the village of Konstitutsiya; approximately 60 miles east of Stalingrad.

Landing area:

Field:

Dimension and orientation: 3,700 x 3,250 feet NNW/SSE.

Surface: Sod.

Runway:

Dimension and orientation: 3,800 x 400 feet NW/SE.

Surface: Graded earth.

Extensibility: Unlimited.

Taxiways: Taxiloop, about 40 feet wide and probably metalled, joins the two ends of the runway in D-form, on the SW side. Taxi-track runs alongside both edges of runway. Other tracks run from the SSE end of the runway to a group of temporary buildings at the SE corner of the field, as well as to small dispersed buildings.

Parking: 22 revetments and additional bomb-sheltered dispersal points, approximately 70 x 90 feet. On all but the SE side of the field, revetments are dispersed.

Obstructions: Probably none.

Facilities: No information.

Hangars: None.

TOP SECRET

Misc. buildings: 5 small buildings. Four buildings with average dimension 80 x 20 feet are located on the SE side of the field. Remaining accommodations appear to be in the village of Konstitutsiya. Information as of 5 July 1951 indicates the presence of large camp of at least 50 wooden hangars, some used to house PW's, technicians, and workmen.

Access:

Road: Secondary road to Kapustin Yar.

Railroad: Stalingrad-Verkhniy Baskunchak.

Waterway: Landing facilities on the Akhtuba River at Kapustin Yar.

Users and operators: Soviet Air Force.

Photo coverage: Figures 34-36.

(3) Kardayev (102)

Coordinates: 48°35'N - 46°17'E.

Date latest information: June 1943.

Location: 1-1/4 miles NE of Kardayev; 13-1/4 miles NE of RR line between Stalingrad and Vladimirovka.

Landing area:

Field:

Dimension and orientation: 5,741 x 5,085 feet.

Surface: No information.

Extensibility: No information.

Taxiways: No information.

Parking: No information.

Obstructions: No information.

Facilities: No information.

Hangars: No information.

Misc. buildings: No information.

Access: No information.

Users and operators: No information.

Photo coverage: Figure 37.

(4) Kovzalov (102)

Coordinates: 48°43'N - 46°01'E.

Date latest information: June 1942.

Location: 3-3/4 miles SSE of Kovzalov; 17-1/2 miles NE of Kapustin Yar and the road between Leninsk and Vladimirovka.

Landing area: No information.

Extensibility: No information.

Taxiways: No information.

Parking: No information.

Obstructions: No information.

Facilities: No information.

Hangars: No information.

Misc. buildings: No information.

Access: No information.

Users and operators: No information.

Photo coverage: Figure 38.

(5) Leninsk (71, 102)

Coordinates: 48°44'N - 45°13'E.

Date latest information: June 1943.

Location: 2-1/2 miles NNE of Leninsk; 2-1/2 miles NE of Akhtuba River; 32-1/4 miles E of Stalingrad.

Landing area:

Field:

Dimension and orientation: 7,400 feet E/W, 3,700 feet NE/SW.

Surface: Sod.

Runway:

Dimension and orientation: 3,800 x 300 E/W.

Surface: Graded earth.

Extensibility: Probably unlimited.

Taxiways: Taxiloop on N side. Heavy track activity south of runway.

Parking: 20 revetments NE and NW of landing strip. Information as of April 1943 indicates that approximately 80 blast shelters (circa 60 feet wide) are located on all sides of the field, except the south.

Obstructions: Probably none.

Facilities: No information.

Hangars: None.

Misc. buildings: None.

Access:

Road: Secondary road to Leninsk; intricate connecting road system around landing strip.

Railroad: Stalingrad-Verkhniy Baskunchak.

Waterway: Port facilities on Volga River.

Users and operators: No information.

Photo coverage: Figures 39 and 40.

(6) Leninsk-Kirov (Alternate name: Kirov) (102, 110, 111)

Coordinates: 48°48'N - 45°31'E.

Date latest information: September 1948.

Location: 16 miles ENE of Leninsk and 1-1/4 miles SW of Kirov collective farm; 10 miles NE of Akhtuba River.

Landing area:

Field:

Dimension and orientation: 4,593 x 4,396 feet.

Surface: No information.

Runway: No information.

Extensibility: No information.

Taxiways: No information.

Parking: No information.

Obstructions: No information.

Facilities: No information.

Hangars: No information.

Misc. buildings: No information.

Access:

Road: Located near improved-dirt road leading to Leninsk.

Users and operators:

Civilian: Field reported to be on airline in March 1947.

Military: Information as of September 1948 notes that large installation in the vicinity of the city is especially equipped for remote-control of flight between Kirov and Rybinsk. Aircraft utilized was the TB-Y type, latest Soviet Transport model.

Photo coverage: None.

(7) Pologoye (71, 102)

Coordinates: 48°29'N - 45°58'E.

Date latest information: June 1943.

Location: 1-1/2 miles NE of the center of Pologoye Zaymishche between the main road and the railway.

Landing area:

Field:

Dimension and orientation: D-shaped; curved side 5,700 feet, straight side 5,400 feet.

Surface: Grass.

Extensibility: No information.

Taxiways: No information.

Parking: 21 blast shelters (65 feet in width) are located on curved edge of field.

Obstructions: No information.

Facilities: No information.

Hangars: No information.

Misc. buildings: No information.

Access:

Road: Straight side of the field runs alongside and to the north of the main Stalingrad-Vladimirovka road.

Users and operators: No information.

Photo coverage: Figure 41.

(8) Vladimirovka (102, 112)

Coordinates: 48°18'N - 46°10'E.

Date latest information: June 1943.

Location: 1 mile NE of Vladimirovka; 12-1/2 miles NE of Staritsa;
25-1/2 miles W of Verkhniy Baskunchak.

Landing area:

Field:

Dimension and orientation: 3,900 x 2,800 feet NW/SE.

Surface: Sod.

Runway: No information.

Extensibility: Unlimited to NE and S.

Taxiways: None.

Parking: Dispersal to the W.

Obstructions: None.

Facilities: No information.

Hangars: 1 small hangar reported in 1942.

Misc. buildings: Probably 1 workshop at W edge.

Access:

Road: Stalingrad-Batayevka secondary road just west of the field.

Railroad: Stalingrad-Verkhniy Baskunchak RR just SW of the field.

Users and operators: Military; possibly site for 18 heavy and 25
medium bombers.

Photo coverage: Figure 42.

(9) Vladimirovka-North (Alternate name: Pokrovka) (102)

Coordinates: 48°27'N - 46°11'E.

Date latest information: June 1948.

Location: 10-1/2 miles N of Vladimirovka; 7-1/2 miles NE of Pokrovka;
10-1/4 miles ESE of Pologoye.

Landing area:

Field:

Dimension and orientation: 5,609 x 3,969 feet.

Surface: No information.

Runway: No information.

Extensibility: No information.

Taxiways: No information.

Parking: No information.

Obstructions: No information.
Facilities: No information.
Hangars: No information.
Misc. buildings: No information.
Access: No information.
Users and operators: No information.
Photo coverage: Figure 43.

(10) Zhitkur (102)

Coordinates: 48°57'N - 46°17'E.
Date latest information: June 1944.
Location: 1 mile W of Zhitkur; 14-1/2 miles E of Novyy Byt.
Landing area:
Field:
Dimension and orientation: 5,000 x 4,300 feet E/W.
Surface: Sod.
Runway:
Dimension and orientation: 3,110 x 240 feet (NW/SE).
Surface: Probably graded earth.
Extensibility: Runway 3,500 feet to SE, 2,200 feet to NW.
Taxiways: Graded earth taxiway connecting runway ends.
Parking: 23 revetments around N and E sides.
Obstructions: None.
Facilities: No information.
Hangars: None.
Misc. buildings: Barracks.
Access:
Road: Secondary road to El'ton.
Railroad: Rail station at El'ton, on Pushkino-Astrakhan' Railroad,
27 miles ENE.
Users and operators: No information.
Photo coverage: Figure 44.

(11) Zhitkur-South (Alternate name: Repeva) (102)

Coordinates: 48°53'N - 46°14'E.

Date latest information: June 1943.

Location: 4-1/2 miles S of Zhitkur; 30-1/2 miles NE of Kapustin Yar.

Landing area:

Field:

Dimension and orientation: 4,265 x 4,265 feet.

Runway: No information.

Extensibility: No information.

Taxiways: No information.

Parking: No information.

Obstructions: No information.

Facilities: No information.

Hangars: No information.

Misc. buildings: No information.

Access: No information.

Users and operators: No information.

Photo coverage: Figure 45.

APPENDIX V: 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.

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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	
Ak-Shkol	49 15 N 47 07 E	less than 100	
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	

a/ Population undeterminable, probably less than 500.

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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/	
Avdeyenko	48 47 N 46 18 E	less than 100	
Aymeken	48 37 N 47 40 E	a/	
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	
Baga-Bukhus	48 01 N 45 01 E	a/	
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	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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	
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/	
Bikin	48 49 N 46 12 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/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
Bobrovskiy	47 31 N 46 57 E	732	
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/	
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/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
Breyusova	48 39 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/	
Bugur	47 34 N 46 55 E	a/	
Bukash	47 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/	
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/	
Chapchachi	47 31 N 47 09 E	579	
Chapurniki	48 27 N 44 31 E	184	Small shipyard for river craft
Chechin	49 14 N 46 44 E	less than 500	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
Chekay	48 23 N 46 41 E	a/	
Chelyuskin	49 03 N 44 39 E	233	
Chenin Pervyv	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	
Chernoyarskaya	47 50 N 45 52 E	a/	
Chernyshev	48 16 N 46 29 E	a/	
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/	
Chutkin	47 50 N 45 45 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/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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/	
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 sub-ordination; rayon center; sawmilling; food processing
Dubovyy Ovrag	48 20 N 44 37 E	2,841	Sel'sovet center
Dulin	49 11 N 45 30 E	a/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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	
Dzhandou Kstau	47 55 N 47 58 E	a/	
Dzhan ^o -Gendyr	48 01 N 47 11 E	a/	
Dzhanybek	48 55 N 45 58 E	less than 100	
Dzhanzapsn	48 07 N 47 22 E	a/	
Dzhasankol ^o	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/	
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 ^o ton	49 08 N 46 51 E	1,524	Sel ^o soviet center; bromine plant; health resort
Enbek	48 38 N 46 54 E	a/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
Falseyev	49 11 N 46 08 E	a/	
Fastov	49 04 N 44 13 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	
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/	
Gashun Domba	47 59 N 45 41 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/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
Gnutenkov	48 50 N 46 03 E	a/	
Godunov	48 12 N 45 06 E	a/	
Golya	47 36 N 46 43 E	a/	
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-Vadyanoye	49 15 N 44 57 E	1,438	Sel'sovet center; grain milling
Gorodishehe	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	
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/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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	
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'chenkov	48 26 N 46 08 E	a/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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/	
Imeni Lenina	48 57 N 46 52 E	a/	
Imeni Stalina	49 00 N 46 58 E	a/	
Imeni Veroshilova	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	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
Kalkhan-Kul ^o	48 54 N 46 51 E	a/	
Kalman	47 54 N 47 43 E	a/	
Kal'novka	48 19 N 45 38 E	421	
Kamenny Buyarak	48 48 N 44 23 E	118	
Kamenny 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/	
Karakuduk	49 10 N 47 24 E	less than 100	
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/	
Karpov	48 07 N 45 40 E	a/	
Karpov	49 13 N 46 53 E	187	
Karpov	49 00 N 46 40 E	a/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
Kasin	48 29 N 46 35 E	a/	
Kasyntay	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/	
Kazachek	47 31 N 46 57 E	a/	
Kazachkov	48 34 N 46 23 E	a/	
Kazanchenkov	48 04 N 46 56 E	a/	
Kazenny	48 19 N 45 29 E	a/	
Kense-Basy	49 17 N 47 25 E	less than 100	
Kenzhegora	48 16 N 47 30 E	a/	
Khakshakhta	47 37 N 46 43 E	a/	
Khara	49 14 N 46 39 E	89	
Khara-Usuk	48 25 N 44 19 E	a/	
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 08 N 44 07 E	a/	
Khokhlatskiy	48 28 N 45 34 E	146	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
Khomichev	48 11 N 45 01 E	a/	
Khonul	48 06 N 45 16 E	a/	
Khrenovoy	48 55 N 46 22 E	22	
Khurul Khuracha	47 56 N 45 37 E	a/	
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/	
Kletskiy	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/	
Kochkovatka	47 33 N 47 03 E	2,063	Sel'sovet center

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
Kochkutov	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 Part's'yezda	49 00 N 45 55 E	a/	
Kolkhoz Imeni Voroshilova	48 48 N 45 31 E	30	
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/	
Kol'kta	47 31 N 46 44 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/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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	
Korshavityy	48 28 N 45 16 E	a/	
Korzhev	48 19 N 46 29 E	a/	
Koshara Khaptaga	47 32 N 46 09 E	a/	
Koshara Sem' Bugrov	47 56 N 45 46 E	a/	
Koshary	48 22 N 44 16 E	156	
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	
Kosunov	48 54 N 46 16 E	a/	

~~TOP SECRET~~
SECURITY INFORMATION

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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/	
Kovzalo	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 shipbuilding
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	
Krestovy	48 34 N 44 30 E	a/	

~~TOP SECRET~~

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
Krivusha	48 32 N 44 45 E	117	
Kruten'kiy	48 41 N 44 29 E	a/	
Kryachkov	49 03 N 46 39 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	
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/	
Kuygen Kul'	49 18 N 47 59 E	a/	
Kuzhnoy	49 16 N 45 15 E	a/	
Kuz'michevskiye	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/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
Kylykov Sad	49 17 N 45 47 E	a/	
Kyporoshoye	48 40 N 44 29 E	a/	
Kyzyl dzhar	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/	
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/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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
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 Ivanovka	49 23 N 44 31 E	1,513	Sel'sovet center; grain milling; agricultural machinery repairing
Malaya Kazinka	47 45 N 46 34 E	a/	
Malaya Sol'yanka	48 30 N 45 54 E	a/	
Malaya Sol'yanka	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'sovot center

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
Malyy Karakul'	48 26 N 46 32 E	a/	
Malyy Lemeshkin	48 43 N 46 04 E	a/	
Malye Chapurniki	48 20 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/	
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
Milayev	48 57 N 46 23 E	less than 100	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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/	
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/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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	48 29 N 44 13 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	
Nezhintev	49 01 N 46 19 E	a/	
Nicol'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 49 N 44 47 E	a/	
Nizhneye-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/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
Novaya Nadezhda	48 50 N 44 18 E	250	
Noven'kiy	48 06 N 45 28 E	a/	
Noven'kiy	48 37 N 46 15 E	a/	
Noven'kiy	48 12 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/	
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 12 N 46 32 E	a/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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 42 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	
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 23 E	a/	
Peschanyy	48 40 N 44 35 E	89	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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
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/	
Pitomnik	48 44 N 44 13 E	a/	
Plaksina	48 34 N 45 59 E	a/	
Plodovitoye	48 08 N 44 22 E	a/	
Pochta	49 30 N 44 4° 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	

1/ Petropavlovskiy on most recent Soviet maps.

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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
Probuzhdeniye	49 05 N 46 00 E	less than 500	
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/	
Pshenichnyy	48 21 N 46 20 E	a/	
Pshenichnyy	48 14 N 46 08 E	less than 100	
Puposkov	47 57 N 46 15 E	a/	
Pushnin	48 11 N 45 12 E	a/	
Put' Il'icha	48 56 N 45 50 E	less than 500	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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/	
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
Rudnikov	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/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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/	
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	
Samafalovka	48 56 N 44 14 E	623	Sel'sovet center
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/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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/	
Sarvastyskiy 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/	
Sasykoli	47 34 N 47 01 E	4,423	Rayon center; sel' sovet center
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	
Shaposhnikov	47 40 N 46 07 E	a/	
Sharapka	48 58 N 46 13 E	a/	
Sharon	48 01 N 44 46 E	a/	
Shehalkunov	43 19 N 46 37 E	less than 100	
Shehepkin	48 09 N 45 17 E	a/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
Sheherbakov	48 59 N 46 32 E	a/	
Shcherbakov	49 00 N 46 10 E	a/	
Shchuch'e	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/	
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/	
Shivanov	48 28 N 46 21 E	a/	
Shivanov	48 39 N 46 28 E	a/	
Shivanov	48 34 N 46 44 E	less than 500	
Shivanov	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/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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/	
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 Zaymishehe	47 56 N 46 07 E	3,526	Sel'sovet center
Solenyy	48 37 N 44 55 E	424	
Solodniki	48 25 N 45 17 E	3,924	Sel'sovet center; sawmilling

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
Solodovka	48 40 N 45 23 E	470	Sel'sovet center
Solokhin	49 01 N 46 15 E	a/	
Solonchack	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/	
Sovkhoz Prigroyednoye	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

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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/	
Stalingradskiy	48 46 N 44 26 E	a/	
Stamgazi	47 54 N 47 45 E	a/	
Starodubovka	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/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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/	
Syrovatskiy	48 54 N 46 11 E	less than 100	
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/	
Tazikov	48 37 N 46 06 E	a/	
Terekhov Pervyi	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/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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/	
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
Tsagan-Aman	47 34 N 46 43 E	a/	
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/	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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	
Turgay	48 19 N 46 56 E	a/	
Tutovyy	48 44 N 44 44 E	158	
Tveritin	48 48 N 45 54 E	a/	
Tyulyngen	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/	
Urazali	49 17 N 46 48 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/	

TOP SECRET
SECURITY INFORMATION

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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/	
Vandelovskiy	49 17 N 46 49 E	a/	
Verblyuzh'ya	47 43 N 46 53 E	a/	
Verkhneye-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/	
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	

TOP SECRET

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
Vostok Pervyi	49 03 N 46 29 E	less than 100	
Vostok Vtoroi	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/	
Vyreznoi	48 15 N 46 38 E	25	
Yalkhi	48 34 N 44 17 E	68	
Yagodnyy	48 34 N 44 15 E	201	
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/	
Yegrashkin	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	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
Yerzovka	48 57 N 44 38 E	12,557	Sel'sovet center; brick making; quarrying
Yevdokimov	49 03 N 46 53 E	a/	
Yezhovka	48 43 N 44 22 E	a/	
Yl'inba	49 14 N 44 44 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	
Zavarykin	49 14 N 44 14 E	a/	
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 10 N 46 54 E	a/	
Zhas-Khayrat	49 19 N 47 40 E	a/	
Zheltukhin	49 01 N 44 38 E	75	
Zheltyy	48 23 N 46 13 E	a/	
Zhidkov	49 19 N 46 48 E	a/	
Zhigalkin	48 15 N 46 36 E	less than 100	

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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/	
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	
Zubarevka	48 30 N 45 17 E	91	

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SECURITY INFORMATION

<u>Name</u>	<u>Coordinates</u>	<u>Population</u>	<u>Remarks</u>
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	

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