BEST COPY Available THROUGHOUT FOLDER

6/24/98

Approved For Release 2001/08/08 : CIA-RDP79T01018A000200020001-0

Copy No. 143

ONE

G-13

GEOGRAPHIC INTELLIGENCE REPORT

A GEOGRAPHIC APPRAISAL OF THE USSR NEW LANDS PROGRAM

CIA/RR–G–13
February 1956

CENTRAL INTELLIGENCE AGENCY

OFFICE OF RESEARCH AND REPORTS

WARNING

This material contains information affecting the National Defense of the United States within the meaning of the espionage laws, Title 18, USC, Secs. 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

Approved For Release 2001/08/08 : CIA-RDP79T01018A000200020001-0

GEOGRAPHIC INTELLIGENCE REPORT

A GEOGRAPHIC APPRAISAL OF THE USSR NEW LANDS PROGRAM

CIA/RR-G-13

CENTRAL INTELLIGENCE AGENCY

Office of Research and Reports

CONTENTS

Appendixes

Photographs

Maps

CONFIDENTIAL

A GEOGRAPHIC APPRAISAL OF THE USSR NEW LANDS PROGRAM

Summary

The New Lands program formally launched in March 1954 is the most recent Soviet attempt to increase grain production. Its immediate goal is the sowing of grain on 30 million hectares of virgin or idle land by 1956 -- chiefly spring wheat but also some millet and corn. The bulk of the land being brought under cultivation lies in the semiarid-steppe and wooded-steppe regions of the southern Urals, Western Siberia, and northern Kazakhstan.

Relief is an obstacle to agricultural expansion only in isolated local areas. The New Lands region consists of an unbroken expanse of plain in the north and a series of rolling or dissected plateaus and hills in the south. About 65 percent of the land is level enough to be suitable for tillage, 20 percent is rolling land that could be used for meadow and pasture, and only 15 percent consists of slopes too steep for agricultural use.

Soils in the New Lands can be divided into three major belts. The northern belt consists of a complex mosaic of soils that vary considerably in their suitability for small-grain cultivation. The middle belt is a broad expanse of chernozem soils of moderate to high productivity. The southern belt consists of dark chestnut soils whose naturally high productivity is limited by low rainfall. Throughout the region, occurrences of saline and alkali soils drastically reduce the apparently great reserves of agricultural land.

Climatic factors will exercise a decisive influence on the success or failure of the New Lands program. The region has a low annual precipitation and wide annual and diurnal ranges in temperature. Winters are long and cold, summers are hot and windy, and the transitional spring and fall seasons are short and marked by rapid changes. The length of the frost-free season sets definite limits to agricultural expansion in the north, where late spring and early fall frosts are a constant threat. Summer temperatures are usually sufficient for spring wheat and millet, but not for corn. To the south the critical factor in agricultural expansion is moisture availability, particularly during the growing season, and the southern boundary of New Lands activity roughly follows the 75-millimeter isohyet for the period May through July. Droughts are a major hazard in the New Lands, as evidenced by the reduced yields of 1955. Droughts have occurred on an average of 2 out of 5 years and will probably occur with the same frequency in the future.

Although the New Lands have actually been settled for many years and contain a number of large cities, extensive areas are still sparsely settled. The New Lands program initiates a new era of settlement and development that will increase the population, stimulate the growth of existing villages and towns, introduce new sovkhoz settlements, and change the ethnic composition of the area. Newly established sovkhozes, manned by migrants from all parts of European USSR, will carry the main burden of new cultivation. The provision of adequate housing and other facilities for them has been one of the major problems of the New Lands program. The standard pattern of establishing new sovkhoz settlements is indicative of the strong state control over the whole program.

The movement of construction materials, agricultural equipment, and general supplies into the New Lands, as well as the timely transport of grain, requires an efficient transportation system. In 1954, only a few key railroads served the New Lands region, and improved roads were almost totally lacking. With the initiation of the agricultural program, construction has begun on some 2,132 kilometers of new railroad lines, about two-thirds of which are narrow-gauge. The two most important rail lines under construction are the Kustanay-Kokchetav-Kaymanachikha and the Kurgan-Peski-Sovkhoz Krasnoznamenskiy lines. New roads are also being built, and many of the existing dirt roads have been improved to accommodate year-round traffic. The Ob' and Irtysh Rivers offer good opportunities for the shipment of grain and other bulk products, and a combined program has been initiated for the regulation of the river flow and the development of hydroelectric power.

I. Introduction

The Current New Lands program is the most recent manifestation of the Soviet struggle for increased grain production -- a problem that is at the very root of the Government's conflict with the peasantry and one that has precipitated many changes in economic policy ever since the Communists assumed power. Soviet strong men have proposed many panaceas for this Soviet Achilles heel, and political fortunes have fluctuated with the temporary success or failure of the measures adopted. When Malenkov resigned, he gave as the reason the failure of the agricultural program. Khrushchev's rising star was connected with the successful New Lands harvests in 1954, and his political future could conceivably be affected by results of the current program.

Soviet five-year plans in the past have included many schemes for land reclamation and development and acclimatization of crops. In the early 1930's, the emphasis was on acreage increases; in the later 1930's, it was on improved yields. In the two postwar five-year plans (1946-50 and 1951-55), improvement of yields was the announced goal, and the Government leaned heavily on the pseudo-scientific theories of Lysenko. Production figures published during these years seemed to indicate success, but these figures were based on "biological" or preharvest estimates rather than actual barn yields after normal harvest losses. Malenkov, in a report to the 19th Communist Party Congress in the fall of 1952, even went so far as to state that "the grain problem ... is successfully solved, definitely and irrevocably." 124,p.195/* But after the death of Stalin in March 1953, indications pointed to a disenchantment with Lysenko's theories and to the need for a new approach to the grain situation.

The New Lands program as a solution to the problem was formally launched on 2 March 1954 by decree of the Plenary Session of the Central Committee of the Communist Party. The area involved included Western Siberia, northern Kazakhstan, and the southern Urals (see Map 25081, following p. 4). The plan called for the sowing of grain on 13 million hectares** of virgin and idle lands*** in this region by 1955 -- 2.3 million hectares in 1954 and the remaining 10.7 million in 1955. 31/ In the spring of 1954 the goal was exceeded when 3.6 million hectares were planted. In August 1954 the target was

*For numbered source references, see Appendix C.

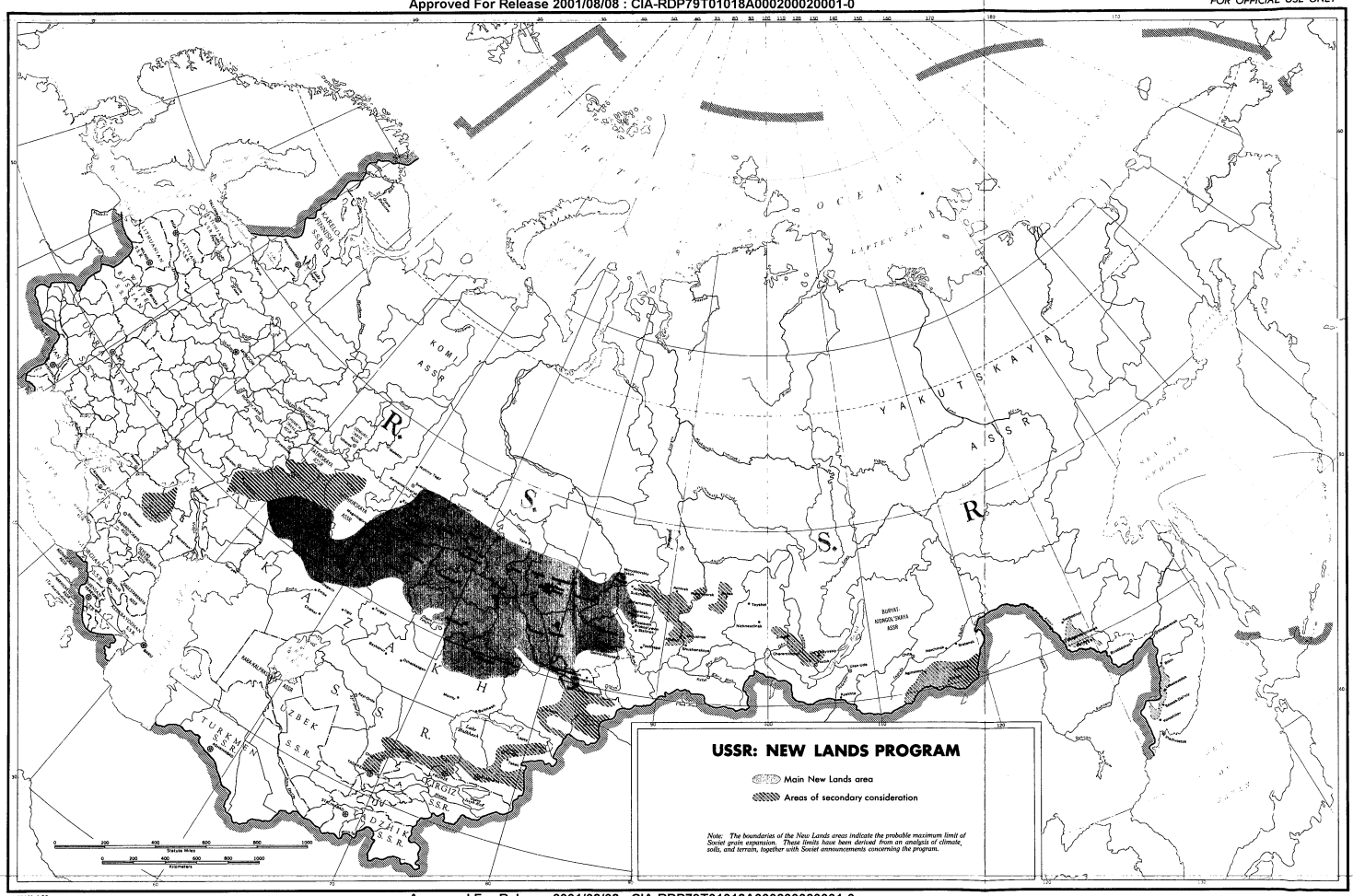
**1 hectare = 2.47 acres.

***Virgin lands imply those lands not previously cultivated, and idle lands imply those cultivated at some time in the past.

increased to 15 million hectares by 1955 and 30 million by 1956. Spring planting in 1955 exceeded the goal when 20 million hectares were sown. 108/ Reports on 1955 fall plowing indicate that the 1956 goal of 30 million hectares will probably be reached, if not exceeded. This will mean about a 20-percent expansion of the total Soviet sown area, which is estimated at 155 million hectares in 1953. The immense areal scale of the New Lands operation can be appreciated by a comparison with United States wheat acreage, which totaled 21.6 million hectares in 1954.

Khrushchev set forth five reasons for the need of increased grain production: (1) to meet the grain requirements of the ever-increasing population; (2) to provide adequate feed for livestock needs; (3) to build up reserves "for all kinds of eventualities"; (4) to facilitate the specialized production of crops other than grain in certain regions; and (5) to increase the amount of grain available for export. 124,p.197/ The launching of the campaign may well have had accompanying political motivations. In 1955 the emphasis was on new sovkhozes. By obtaining a higher proportion of its grain from state farms, the Government is lessening its dependence on the kolkhozes (collective farms) and thereby strengthening itself in its conflict with the peasantry. At the same time, however, increased production would serve to reduce the pressure on the kolkhozes to deliver grain. Perhaps strategic factors, also, were taken into consideration in the development of an agricultural base in the interior of the country, as was the case with industrial development.

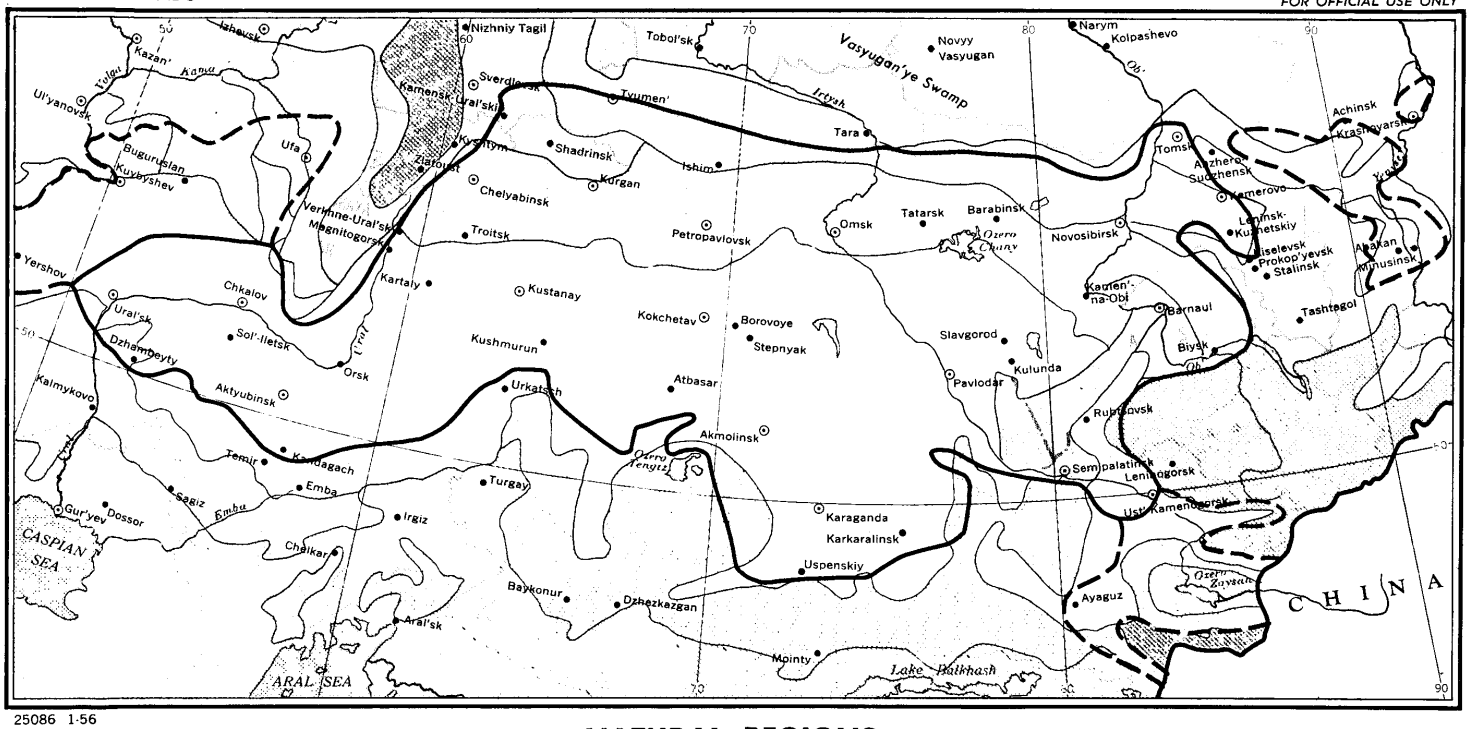
Many problems face the Soviets in their new, gigantic undertaking. One of the main physical limitations is the climate -- the uncertainty of precipitation, the drought hazard, and the short growing season. There are also doubts about the amount of land with soils suitable for cultivation, the extent of salinity conditions, the erosion hazard, and the efficiency of measures used to prevent soil depletion. A shortage of surface and ground water for the needs of men and livestock may develop. Livestock formerly dependent on grazing will have to be fed. Adequate manpower, both in terms of quantity and quality, must be maintained, particularly during the seeding and harvesting periods. Technical personnel and workers have been motilized from all over the country, induced by financial incentives and patriotic motivation. The needs of workers settling on new lands -- for housing, consumer goods, personal services, medical facilities, and schools -- must be met. The transportation system must be expanded in view of the vast distances involved and the strain that would be imposed on the few existing railroads. Equipment such as tractors and trucks are needed in great numbers, putting a strain on the whole



25081 1-56

USSR: NEW LANDS

FOR OFFICIAL USE ONLY



25086 1-56

NATURAL REGIONS

based on climate and natural vegetation

Union Republic boundary (SSR)

Oblast, Kray or Autonomous Republic (ASSR) boundary

Administrative center (Oblast, Kray or ASSR)

Taiga

Deciduous forest

Wooded steppe

Steppe

Dry steppe and semi-desert

Desert

Mountain-vegetation

Limit of main New Lands area

General limit of secondary areas

SOURCE: *PRIRODNYYE ZONY SSSR (Natural Zones of the USSR) 1:5,000,000, GUGK, Moscow; 1953.*

0 100 200 300 Miles

0 100 200 300 Kilometers

Soviet industrial economy. In 1954 alone, some 50,000 tractors, in terms of 15 horsepower units, were reportedly sent to the New Lands.

In analyzing the probable degree of success or failure of the program from a geographic point of view, the physical elements of climate and soils are given particular attention. Such factors as precipitation, growing season, and soil type place almost definitive limits on the extension of grain production. Further, if wheat is sown in an area where the average available moisture barely meets crop needs, crop failures can almost assuredly be expected in years when available moisture is below normal. Similarly, where crops are sown on soils of marginal salinity, poor yields and soil-management problems are sure to be the rule. The Soviets frequently claim that they have developed improved varieties of crops and methods of cultivation specially designed to cope with problems in dry regions, but these claims may well prove to be either false or merely over-optimistic. In the drier portions of the Ukraine, a long-established agricultural area, evidence that natural restrictions have been appreciably overcome is very slight.

The main body of New Lands activity encompasses an area of about 1,300,000 square kilometers within the steppe and wooded-steppe regions of Western Siberia, northern Kazakhstan, and the southern Urals (see Map 25086, following p. 4). The areas of most intense activity are Zapadno-Kazakhstanskaya, Aktyubinskaya, Chkalovskaya, Chelyabinskaya, Kurganskaya, Kustanayskaya, Severo-Kazakhstansyaya, Kokchetavskaya, Akmolinskaya, Karagandinskaya, Pavlodarskaya, Omskaya, and Novosibirskaya Oblast's, and Altayskiy Kray. Also included within the main New Lands area are smaller portions of Sverdlovskaya, Tyumenskaya, Tomskaya, Kemerovskaya, Semipalatinskaya, and Vostochno-Kazakhstanskaya Oblast's.

In addition to the main area of concentration, there are a number of areas of secondary consideration, such as the region just east of the Volga, including portions of Saratovskaya, Kuybyshevskaya, and Chkalovskaya Oblast's, and Bashkirskaya ASSR. There intensive agriculture has long been established, and the amount of virgin and idle land available is limited. New sowings have also been reported in eastern Rostovskaya and southern Stalingradskaya Oblast's, but the paucity of publicity suggests small-scale activity only. Some agricultural expansion is taking place on the piedmonts at the foot of the high mountain ranges along the eastern and southeastern borders of Kazakhstan. East of the main area of activity are several smaller steppe and wooded-steppe regions where virgin and idle lands are being cultivated. The most important of these are in southern Krasnoyarskiy Kray and northeastern Kemerovskaya Oblast' -- particularly around the

towns of Krasnoyarsk and Abakan. Some grain has also been sown in southern Irkutskaya Oblast' along the Trans-Siberian Railroad between Irkutsk and Tulun. Of only minor significance are new grain sowings in Chitinskaya and Amurskaya Oblast's and Primorskiy Kray.

II. Physical Capabilities

A. Land Potential in Relation to Agricultural Expansion Possibilities

The New Lands program has been based upon two dominant characteristics of the land which, at first glance, appear to indicate a great potential for agricultural expansion. These factors are the extensive areas of seemingly productive soils, and the vast stretches of plains that are well adapted to mechanized agriculture. Any evaluation, however, that is based solely upon these two factors is necessarily deceptive, for it completely ignores the third critical factor -- the severe climatic handicaps.

1. Relief

In the New Lands region, relief is not an obstacle to agricultural expansion except in a few isolated areas. Although detailed statistics are not available, a rough estimate based on study of terrain descriptions and analysis of medium-scale maps indicates that approximately 65 percent of the region is level or gently rolling country; about 20 percent is rolling land that could be utilized for pasture and meadow; and only the remaining 15 percent is in slopes that are definitely too steep for any type of agricultural use. (See Map 25082, following p. 92).

These figures appear to substantiate in part the Soviet claims to great reserves of land for agricultural development. Climate and soil, however, drastically reduce this apparent reserve, and these factors must be taken into consideration. For example, marsh covers much of the level Barabinsk Plain north of the Omsk-Novosibirsk Railroad (Map 25083, at end of report). Before any of this marshy land could be brought under cultivation, extensive drainage would be necessary, involving considerable outlays for labor, materials, and equipment. It should also be pointed out that the best land has already been under cultivation for some time. Even before World War II, the ratio of the wheat acreage to the total land area was higher in the Western Siberian portion of the New Lands region than in most of Central European USSR.

On the basis of relief features, the New Lands region can be divided into two distinct zones. In the north is the unbroken expanse

of plain extending from the Urals to the Altay and Sayany Mountains (Figure 1); in the south the land consists of a series of rolling or dissected plateaus and rugged hills (Figure 2).

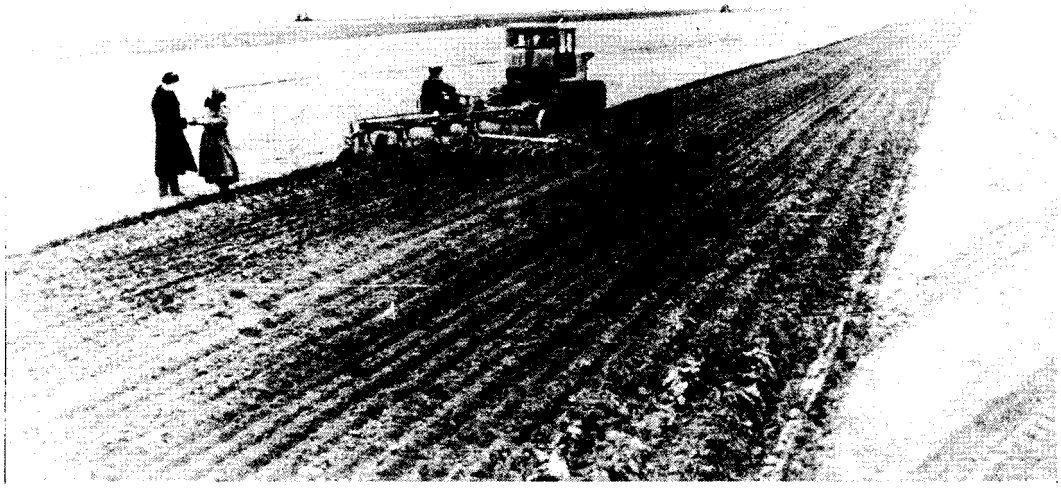


Figure 1. Flat terrain on the Kulunda Plain.

The plains area is the southern part of the vast West Siberian lowland, which continues northward to the shores of the Kara Sea, far beyond the limits of the New Lands. The 300-meter contour is the dividing line between the plain and the adjacent uplands to the south, east, and west. The plain slopes gradually toward the north, and at Tara on the northern margin of the New Lands, it reaches its lowest elevation of 61 meters.

Although there are no major variations in relief on the northern plain, a number of distinctive names are applied to specific localities. Thus the Soviets customarily refer to the Ishim, the Barabinsk, the Kulunda, and Kustanay Plains and the Pri-Obskoye and Predural'skoye Plateaus. The combined area of these plains and plateaus covers all of the northern plain except for a narrow strip along its eastern margin, for which the term "Eastern Intermontane Valleys" has been coined.

The southern subregion consists of a series of plateau and foothill areas with elevations considerably higher than those of the northern plain. The southern upland, which begins near the point

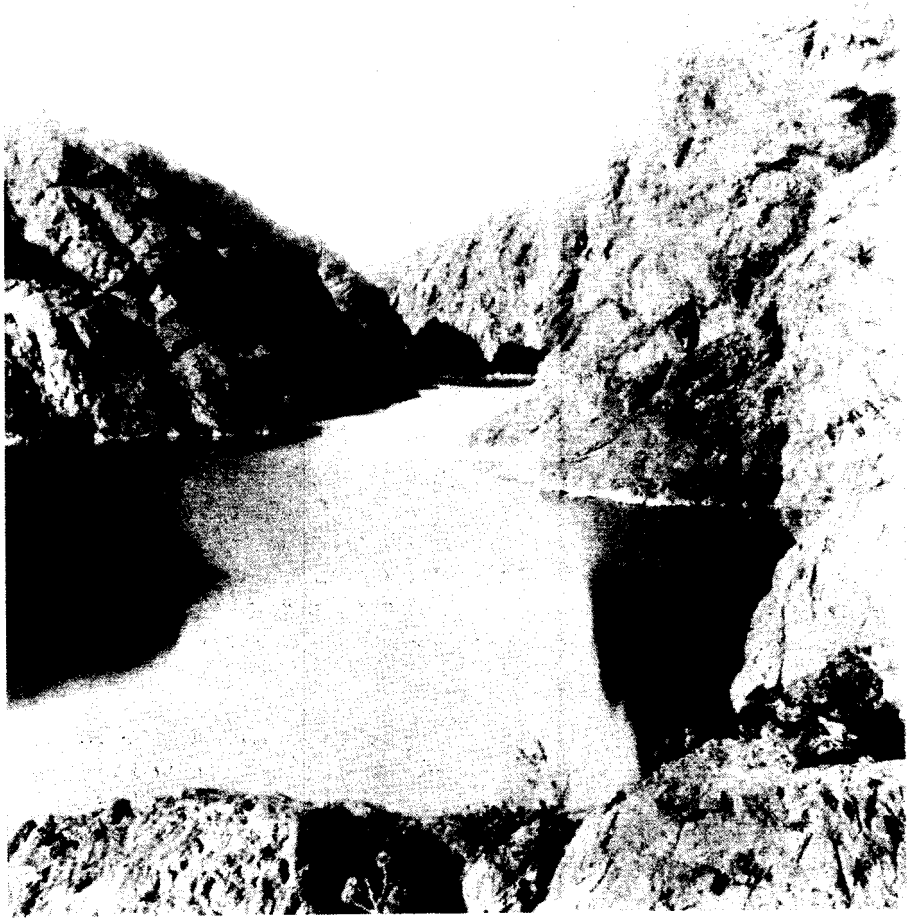


Figure 2. Selety River (Akmolinskaya Oblast')
in the Kazakh Folded Upland.

where the Irtysh River crosses the southern limit of the New Lands region, extends westward to the vicinity of Ural'sk, and includes parts of the Kazakh Folded Upland, the Turgay Tableland, and the Podural'skoye Plateau. This series of uplands is interrupted only to the west of Ural'sk and near the center of the New Lands where the valleys of the Ubagan and Turgay Rivers merge.

A detailed description of the relief of the various sections of the New Lands region is given in Appendix A.

2. Soils

The extensive belts of moderately and highly productive soils within the New Lands region give an impression of a vast untapped potential for agriculture. The best lands, however, are already under cultivation, and much of the so-called idle land was at one time cultivated and then abandoned for economic reasons. Furthermore, widely distributed areas of poorly drained, saline, and alkali soils drastically limit the real soil potential of the New Lands region.

a. Agricultural Potential

From the viewpoint of area and productivity, chernozems are the most important type of soil, covering about one-third of the New Lands region (Map 25085, following p. 14). Chernozems develop in areas where restricted moisture supply makes natural forest growth impossible. They are covered by a thick grass sod (Figure 3), below which is a layer of black soil 50 or 60 centimeters deep with an extremely high humus content (6 to 10 percent or higher). Another characteristic of these soils is the accumulation of lime in the lower horizons. Because of their adequate supply of plant nutrients and their good structure, such soils are moderately to highly productive for small grains -- wheat, oats, barley, and rye -- and, where moisture is sufficient, for corn also.

The dark chestnut soils rank second in productivity and areal extent, covering about 29-31 percent of the New Lands region. Since the dark chestnut soil has developed on the arid margin of the chernozem belt, its profile is generally similar to that of chernozem, but the humus content is only 3 to 4.5 percent. The lower organic content is reflected in a lighter color -- chestnut or dark brown instead of the black of the chernozem. The upper soil horizons are invariably less than 60 centimeters in thickness. Chestnut soils characteristically have a small cloddy structure. Although the chestnut soils are unleached and possess good proportions of all the constituents necessary for high productivity, the low rainfall associated with their development restricts their agricultural potential. In other parts

Figure 3. A grass-covered chernozem area with patches of solonetz in the foreground.

Figure 4. Cattle grazing on mixed tall and short grasses of the dark chestnut belt.

of the world the cultivation of dark chestnut soils is commonly practiced only with the aid of specialized moisture-conservation practices, such as dry-farming, or through the use of drought-resistant crops like sorghums and kaffir. Even so, drought is an ever-present hazard. Where irrigation is possible, however, crop yields are high. Without irrigation the natural vegetation cover is mixed tall and short grasses that furnish good pasturage (Figure 4).

Although the southern boundary of the dark chestnut soils seems to be the effective southern limit of successful grain cultivation, the Soviet press occasionally refers to New Lands activity in areas that appear to lie beyond this boundary and within the belt of light chestnut soils, which are characteristic of semidesert areas. The light chestnut soils occupy only about 2 percent of the New Lands region. Although similar to the dark chestnut soils, they contain somewhat less organic matter (1 to 3 percent), which results in their lighter color. The humus horizon is only 30 to 40 centimeters thick. Below the humus layer is a thick layer of carbonates, usually underlain by gypsum. When irrigated, the light chestnut soils are productive. Without irrigation, farming on such soils is virtually impossible. The sparse growth of grasses that develops naturally on such soils is suitable only for extensive livestock grazing.

Degraded chernozem soils, intermediate between the true chernozem or steppe soils and podzolic or forest types, comprise about 10-11 percent of the soil cover. They provide evidence that the climate in Western Siberia is gradually becoming more humid.* The soils were developed originally under a vegetation cover of grass. In recent geologic eras, however, forest vegetation from the north and the west has encroached upon the steppe vegetation and has begun to transform the chernozems into podzolic soils. When carried to its ultimate conclusion, this degrading process results in the disappearance of the granular structure characteristic of chernozems, a reduction in the humus content, the leaching out of carbonates, and the deposition of oxides in the underlying soil horizon. A strongly degraded chernozem is low in productivity. In most cases, however, podzolization has not reached this extreme stage. The transitional types, which are generally characterized by a nearly black upper horizon and vestiges of lime accumulation in the deep layers, are of moderate to high productivity. Although not identical, these degraded soils are in many ways like the productive prairie soils of the United States Corn Belt, where the soils retain the fertility of chernozems but the rainfall is somewhat greater than on the semiarid steppes.

*This process must be measured against a time scale of hundreds or thousands of years. It therefore has no practical bearing on the immediate course of the New Lands program.

Meadow chernozems cover 6 or 7 percent of the total area in the New Lands region. These soils are chernozems that have been subjected to poor drainage. The humus content of the upper horizon of such soils depends on the soil moisture and is frequently higher than for the ordinary chernozems, ranging from 7 to 17 percent. The humus content, however, decreases rapidly with depth, and at 30 to 50 centimeters amounts to only 1 or 2 percent. Microrelief factors drastically affect the characteristics of the meadow chernozems. On the flat divides the solonetz type of meadow chernozems predominates. In the lower, poorly drained places, the meadow chernozems are chiefly of the solonchak type, which has been modified by the process of salinization.

Meadow chernozems are apparently cultivated to a considerable extent, but in small scattered parcels because of the effect of drainage on soil distribution. The meadow chernozems are clayey and in wet years often drop out of cultivation. In one extensive area of meadow chernozems on the Barabinsk Plain, such wet periods reportedly may last 3 to 5 years. Consequently, meadow chernozems must be classified as marginal in productivity.

Gray-brown podzolic soils account for approximately 2.5 percent of the soil cover in the New Lands region. These slightly acid soils develop under a natural vegetation cover of deciduous forest, usually under good drainage conditions. The soil structure is generally good, and the leaching out of essential mineral elements has not progressed as far as in the true podzol soil of the coniferous forest to the north. Consequently, the gray-brown soils are moderately productive when the land is first cleared. With proper fertilization and management, they may become highly productive for diversified crop and dairy farming. Soils of a similar type cover the greater part of northeastern United States and northwestern Europe, and a high proportion of these areas is under cultivation.

Concerning alluvial soils, which comprise about 3 percent of the area, generalizations are diffficult. The soils are commonly in an early stage of development and have only a small organic content. Drainage conditions and yields vary greatly from place to place.

Podzol and bog soils, which occur almost exclusively along the northern edge of the New Lands, occupy about 5 percent of the total area. The podzols are leached of many of the important plant nutrients and are acid in reaction, deficient in organic matter, generally poor in structure, and of low fertility. With exceptionally good farm practices, they may be capable of supporting a subsistence-type agriculture. Since pasture is generally one of the highest uses of such soils, the dairy industry is likely to become established in

podzol areas. Bog soils are water-saturated most of the time. The thick peat layers that accumulate are low in productivity, but with drainage these soils may become moderately or even highly productive for special crops.

Particular attention must be given to the saline and alkali soils in the New Lands region. Although planimetric measurements indicate that solonetz soils cover only 7 percent of the total surface, this percentage grossly underrates the seriousness of soil salinization and alkalization. The percentage includes only continuous areas of solonetz soils extensive enough to be shown on small-scale maps, but not the innumerable patches of solonetz and solonchak soils that are scattered throughout the wooded-steppe and steppe regions of Western Siberia and Kazakhstan.

Salinization, or the accumulation of various salts of sodium and calcium or sometimes of potassium and magnesium, can occur in practically any type of soil, but the process is most active in poorly drained areas under semiarid and arid conditions. Even a slight degree of salinization reduces the fertility of any soil markedly, but saline soils that have reached the solonchak stage have absolutely no economic value and cannot be used for crops unless they are washed free of salts. Under irrigation or with slightly heavier than average precipitation, the salts may gradually be dissolved, and the solonchaks may be transformed into alkali claypans to which the name "solonetz" is given (Figure 5). Although slightly better than the solonchaks, the solonetz soils are also of low productivity.

Although salinization and alkalization tend to become subordinated in general discussions of the major soil types, they must be considered in evaluating the soil potential of the New Lands region. In view of recommendations by Soviet agricultural scientists that land should be plowed only where saline and alkali soils comprise no more than 10 to 20 percent of the total area, it is clear that saline and alkali soils drastically reduce the otherwise apparently great reserves of agricultural land. Such recommendations may have restricted too greatly the progress of the New Lands program, since in October 1955 the Communist Party organ Pravda noted and officially rejected one of the recommendations. 97/ Western experience, however, seems to corroborate the views of the Soviet agricultural scientists concerning the cultivation of land if saline or alkali soils comprise more than 20 percent of the total.

b. Distribution

Although the soils vary considerably within the New Lands region, the distribution pattern is fairly simple. It consists of three

Figure 5. An extensive area of solonetz soil.

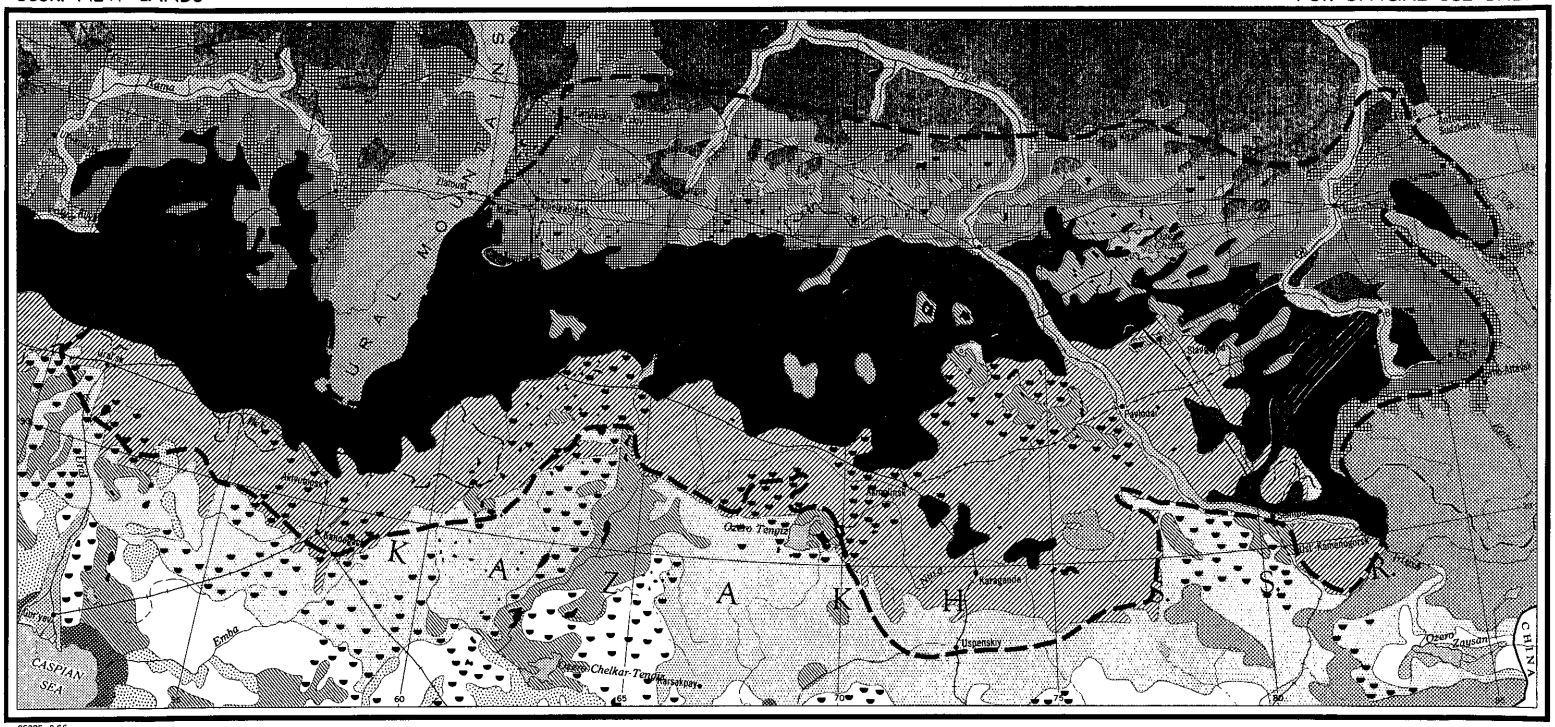
latitudinal belts that stretch west-east across the entire breadth of the region. The northern belt, which lies south of the great belt of podzol and bog soils of the Siberian taiga, has a complex intermixture of soils. In contrast, each of the two southern belts is dominated by a single soil type -- chernozem in the middle belt and dark chestnut in the southern. The boundary between the dark chestnut and the light chestnut soils coincides closely with the southern margin of the New Lands region.

(1) The Northern Belt

The northern belt, which includes all of the New Lands region east of the Ob' River and north of the Troitsk-Omsk-Barnaul line, is a complex mixture of degraded and meadow chernozem, gray-brown podzolic, and solonetz soils. Characteristically, narrow strips of alluvial soils border major rivers such as the Tobol, Ishim, Irtysh, and Ob'. Beyond these alluvial floodplain soils are considerably wider bands, measuring anywhere from 10 to 50 kilometers, that generally consist of degraded chernozem soils. Along the northern margin of the New Lands region, in areas that are or have been forested, the degraded chernozems may be replaced by gray-brown podzolic soils. The meadow chernozems are distributed extensively on the divides between the streams and are likely to be intermixed with alkali or saline soils. The intermixture varies from occasional small patches of solonetz and solonchak soils among the meadow chernozems to

USSR: NEW LANDS

FOR OFFICIAL USE ONLY



25085 2-56

SOIL TYPES

- General limit of the main New Lands area
- Northern boundary of Kazakh SSR
- Principal railroad

- Podzol and bog soils
- Gray-brown podzolic soil
- Alluvial flood-plain soil
- Chernozem
- Degraded chernozem
- Meadow-chernozem
- Dark chestnut soil
- Light chestnut soil
- Desert soils
- Sands
- Mountain or highland soil
- Solonchak (saline soil)
- Solonetz (alkali soil)
- Extensive areas
- Scattered patches

Sources: POCHVENNAYA KARTA SSSR (Soil Map of the USSR) 1:5,000,000, GUGK, [1946];
POCHVENNAYA KARTA SSSR (Soil Map of the USSR) 1:4,000,000, GUGK, 1954.

0 100 200 300 Miles
0 100 200 300 Kilometers

continuous stretches of solonetz soils that extend for distances of 100 or 200 kilometers.

Except in the area east of the Ob', the basic pattern of soil distribution predominates throughout the northern soil belt, with only minor variations in the relative proportions of the various soil types. On the Predural'skoye Plateau, for example, the ratio of gray-brown podzolic to degraded chernozem is slightly higher than in other parts of the belt, and on the Barabinsk Plain the areas of continuous solonetz soils are especially large. Other distinctive features of the Barabinsk Plain include occurrences of true chernozem along the ridges in the central part of the plain and of extensive areas of bog soils in the valleys.

East of the Ob' River the distribution of soils appears to be more strongly influenced by elevation. Along the eastern bank of the Ob' River, strips of sandy podzol soils flank the alluvial soils. At intermediate elevations, extensive areas of degraded chernozem are encountered in the wooded-steppe zone. Finally, under deciduous forest at higher elevations, the gray-brown podzolic soils appear.

(2) The Middle Chernozem Belt

The broad middle soil belt begins at the western boundary of the New Lands region, skirts the Urals, then extends eastward to Kamen'-na-Obi, where it turns southeastward along the western bank of the Ob', and terminates at the eastern margin of the New Lands region. A southward prolongation of the chernozem belt extends to the vicinity of Ust'-Kamenogorsk.

The middle belt is made up almost entirely of chernozem soils. The only major breaks in the continuity of the chernozem belt occur in two patches of mountain-steppe soils near Kokchetav and in several narrow strips of sandy podzol soils in the forested valleys of the Pri-Obskoye Plateau southwest of Barnaul. The chernozem belt of the New Lands region differs from the Ukrainian chernozem regions in possessing a high proportion of alkali soils. Patches of solonetz soils are widely distributed, becoming especially prominent on the Predural'skoye Plateau, on the Barabinsk and Kulunda Plains, and in the area east of Kokchetav. For the most part, these alkali soils occur in shallow depressions without external drainage.

(3) The Southern Dark Chestnut Belt

The belt of dark chestnut soils stretches uninterruptedly across the entire southern part of the New Lands. West of Akmolinsk it averages about 150 kilometers in width. In the vicinity of Akmolinsk the width increases to between 300 and 400 kilometers.

Occurrences of alkali soils are even more widespread in the southern belt than in the chernozem belt. Throughout the belt, patches of solonetz soils are scattered among the dark chestnut soils, principally in poorly drained areas. South of Ozero Selety-Tengiz, especially extensive areas are covered by solonetz soils. Two other soil types are represented to a smaller extent in this belt. The chernozem soil belt penetrates into the higher elevations of the Akmolinsk-Karaganda area, where chernozems occur as three small islands; and mountain soils have developed in an area on the Kyzyl-Tau and Bayanaul'skiye Gory north of Ozero Kara-Sor. In texture the soils of the southern belt are almost invariably clays or clay loams, but sandy soils predominate in the areas south of Kustanay and east of the Irtysh River.

3. Water Resources

In extending agriculture into the New Lands region of Western Siberia and northern Kazakhstan the Soviets are confronted by the serious obstacle of inadequate water supply. In most of the region, the deficiency of water has a direct influence not only on agricultural yields but also on the establishment of the necessary new settlements. Large quantities of water must be provided for the thousands of new settlers and large numbers of horses, as well as for heavy machinery. A Soviet source estimates that the water requirements are 30 to 40 liters (7.9 to 10.6 gallons) a day per capita and 45 to 50 liters for each horse. 45,p.72/ Although Soviet water requirements are considerably lower than the American, the provision of even these modest amounts is generally acknowledged to be a serious problem.

A Soviet study published prior to the initiation of the New Lands program indicated that only 20 percent of the wooded-steppe and steppe regions in Western Siberia and northern Kazakhstan obtains water from surface sources. 75,p.22/ The remaining 80 percent of the area depends almost exclusively on ground water.

Surface sources of supply are adequate in only small areas along the northern and eastern fringes of the New Lands region. Along the northern border, an abundance of potable water can be obtained from the many fresh-water lakes and swamps. In the east, streams descending from the Altay and Sayany Mountains make water available to the adjacent areas. Elsewhere the poorly developed hydrographic net provides only limited quantities of water. Throughout much of the wooded steppe, only the largest streams provide potable water the year round; other streams are inadequate except during the spring high-water period. Many of the lakes are saline. In the southern portion of the New Lands region, surface-water resources are

definitely inadequate. Most of the streams are intermittent, and potable water is generally available only during the spring. At other seasons the water available is generally mineralized. Most of the lakes are saline.

Ground-water resources decrease in both quantity and quality towards the south. For example, the northern or wooded-steppe part of the region has an abundance of ground water at shallow depths. In the northern part of the Barabinsk Plain the water table is only 1 or 2 meters below the surface. Farther south, in the portion of the Barabinsk Plain along the Trans-Siberian Railroad, the water table is at depths of 2 to 3 meters. On the Kulunda Plain near Pavlodar the average depth is 6 to 10 meters.

Mineralization of ground water also increases from north to south. Along the northern margin of the New Lands, fresh or slightly alkaline waters predominate. The moderately mineralized ground waters of the central part contain both sulfates and chlorides. In the south, mineralization is very high, with chloride salts predominating. The principal exceptions to this overall pattern are occasional sandy patches, where the degree of mineralization is considerably less, and the valleys of the major rivers and the shores of many lakes, where the water is relatively fresh.

Figure 6. Boring a well in the steppe region.

To summarize, much of the wooded-steppe region is well supplied with surface water and also has a fair to abundant quantity of ground water, which is generally fresh and occurs relatively close to the surface. In the steppe regions, on the other hand, surface water is insufficient, and new settlements would have to rely almost exclusively on the limited ground-water resources (Figure 6), most of which are mineralized to some degree. This dependence upon the ground-water supply has been recognized by the Soviets, and at least three industrial plants -- the Mytishchi Instrument Building Plant, the Andizhan Strommashina Plant, and the Bakinskiy Rabochiy Plant -- have been assigned the task of producing water pumps for the New Lands program. 42/ Hundreds of these water pumps, one model reportedly capable of lifting water 100 meters, are being shipped to the New Lands. However, since the water-bearing strata in the steppe areas are generally thin, wells frequently dry up during the dry periods. As a result, protracted droughts will not only drastically reduce crop yields but also create water-supply problems affecting the very existence of the new settlements, particularly along the southern margin of the New Lands region.

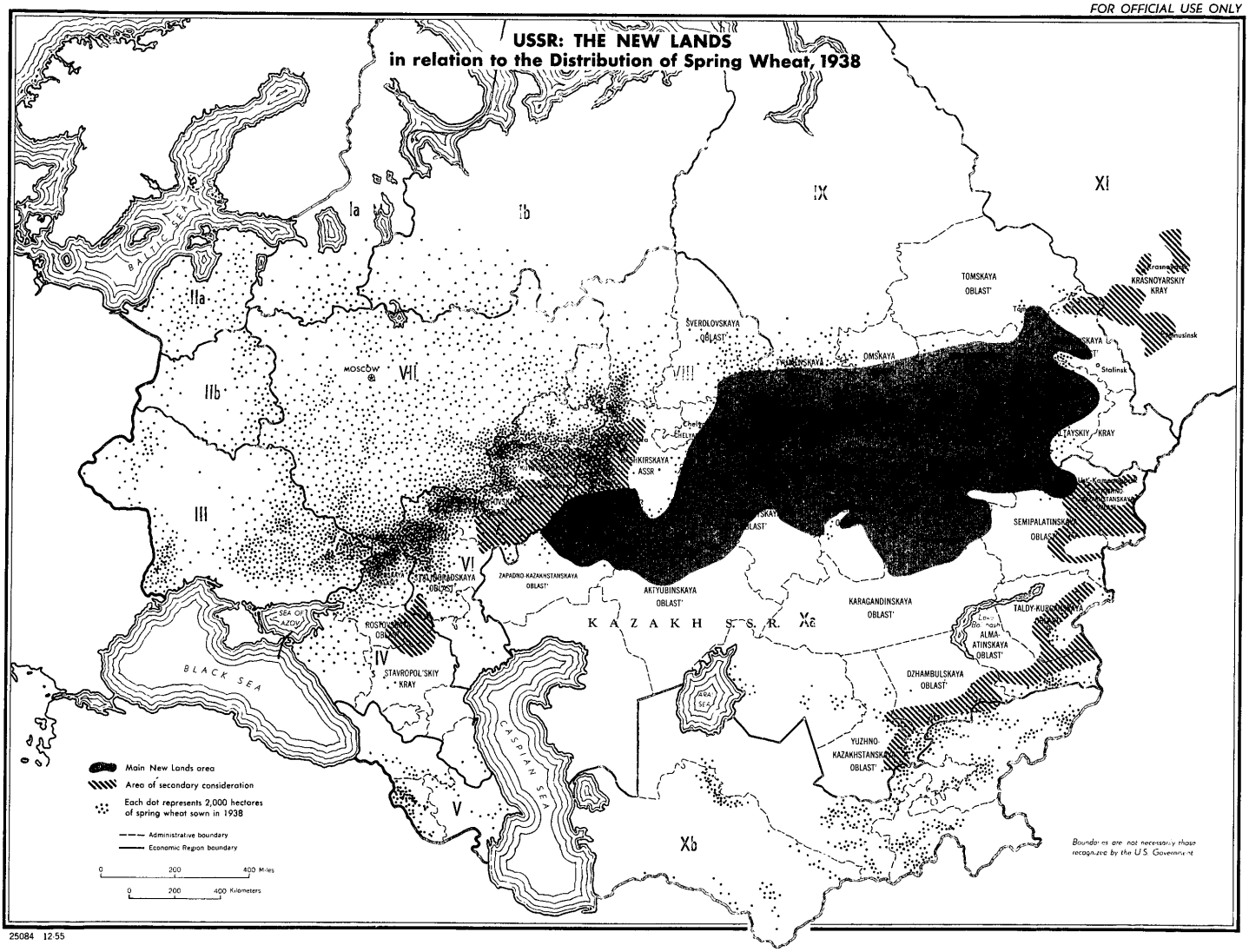
B. Climate as a Controlling Factor in Agricultural Expansion

Climate plays a dominant role in limiting the extension of cultivation and will have a decisive effect on the success or failure of the current agricultural expansion project. Climate is especially important in assessing the agricultural potentialities of the New Lands region, since conditions are not the most favorable.

The best lands in Western Siberia and northern Kazakhstan are already cultivated. An established belt of grain cultivation extends approximately eastward from the central Volga to the Altay foothills, roughly along the route of the Trans-Siberian Railroad, and is interrupted only by the southern Urals (Map 25084, following p. 18). Within this belt the traditional areas of concentrated grain production have long since become established through trial and error. Some agricultural expansion is still taking place within the areas of established farming, largely on marginal lands whose use has been restricted by soil factors. The New Lands activity, however, involves agricultural expansion southward from the established belt into the more arid wooded-steppe and steppe regions.

The present program calls for the cultivation by 1956 of 30 million hectares, principally in the semiarid wooded-steppe and steppe regions of Western Siberia and northern Kazakhstan. It is estimated that 75 percent of the New Lands have been cultivated at some time in the past; the remaining 25 percent are truly "virgin." 65,p.5/ It is

USSR: THE NEW LANDS
in relation to the Distribution of Spring Wheat, 1938



25084 12-55

no accident that these lands have been cultivated only intermittently. Colonists of prerevolutionary times settled here, but generally moved on to more stable areas after their agricultural attempts proved unprofitable. During the early 1930's, a great expansion of grain sovkhozes took place, but adverse natural factors -- especially climate -- brought about their failure, and much of the land reverted to pasture or was abandoned.

The new program is thus extending grain production into a zone of hazard, where yields are variable and frequent crop failures may be expected. The Russians are apparently willing to gamble, hoping that with favorable weather, as in 1954, good crops may be grown on the marginal land. Perhaps the Russians of today feel that with modern agricultural technology they can succeed where their predecessors failed. On the other hand the rapidly increasing population of the USSR may have caused the Soviet leaders to embark on the New Lands program without due regard for the problems involved and the possible consequences.

1. Climatic Influences

Most of the virgin and idle lands being brought under cultivation lie within the steppe and wooded-steppe zones, transitional between the desert to the south and the taiga forests to the north (see Map 25086, following p. 4). This transitional zone extends from the Volga region to the Altay Mountains, interrupted only by the southern Urals. East of the Altay Mountains, the terrain is almost completely mountainous, with occasional isolated "islands" of steppe and wooded-steppe vegetation. Within these isolated "islands," only limited New Lands activity is taking place.

The climate of the New Lands region is influenced by both the Atlantic Ocean and the vast interior of the continent of Asia. The effect of the Atlantic Ocean is greater in the west and north and is strongest during the winter. The effect of the continent increases toward the east and south, and in these areas is pronounced during both winter and summer.

The temperature contrast and the pressure gradient between the Atlantic Ocean and the continental interior are particularly pronounced in winter. Because of the nature of the air currents and the location of areas of high and low pressure, the air from the Atlantic moves over the New Lands from the southwest. The migration of this air takes place predominantly in Arctic-front cyclones, in which the Atlantic air is frequently forced upward and has little effect on the temperature at the surface. These cyclones abate as they approach

the area of high pressure that occupies all of Central Asia almost continuously during the winter. In the wake of the cyclones the Arctic air moves southward and remains stationary over southwestern Siberia and northern Kazakhstan until another cyclone from the southwest forces this air to retreat northward. Continental conditions cool the Atlantic air that flows over the continent and slowly warm the Arctic air.

In summer the basic process is the formation of continental air masses. As air from the north moves southward toward the low-pressure area over the Central Asiatic deserts it becomes drier as it is warmed. The inflow of Atlantic air is considerably reduced during summer. Although it sometimes moves as far east as Western Siberia, the Atlantic air frequently assumes a continental character while it is still over the European part of the USSR.

2. Seasonal Characteristics

The New Lands region has a marked continental climate with wide annual and diurnal ranges in temperature. Annual precipitation is low, ranging roughly from 250 to 400 mm,* with a maximum in summer. Winters are long and cold; summers are hot and windy; and the transitional seasons are short but marked by rapid change.

a. Winter

Winter generally begins early in November, when the mean daily high temperature drops below freezing and a snow cover is established. The season lasts almost 5 months, until late March or early April, when average afternoon temperatures frequently rise above the freezing point.

Below-freezing temperatures prevail throughout the winter. Isotherms trend generally east-west except where higher terrain interrupts the pattern. The mean daily maximum and minimum temperatures** at five key points during the winter are as follows:

---

*25 mm = approximately 1 inch (0.98 inches)

**Climatic statistics given throughout this section were obtained from a variety of sources, mainly Soviet scientific text, which were compared with one another for consistency of data. As a further check, isoline maps were prepared. The result of this careful evaluation was a composite set of statistics that do not necessarily correspond with the figures given in any one source.

Station	Mean Daily Max. (°C)					Mean Daily Min. (°C)					Absolute Winter Min. (°C)
	N	D	J	F	M	N	D	J	F	M	
Chkalov	-2	-10	-14	-11	-4	-8	-16	-21	-18	-12	-41
Kustanay	-4	-10	-14	-12	-8	-12	-17	-24	-24	-17	-45
Akmolinsk	-5	-12	-16	-13	-7	-12	-19	-22	-22	-17	-49
Omsk	-7	-15	-19	-14	-7	-13	-22	-26	-23	-17	-49
Barnaul	-6	-12	-16	-12	-6	-12	-20	-24	-23	-17	-52

Surface waters are usually frozen throughout the winter. The Ishim is normally frozen over from 27 November to 26 April at Akmolinsk; the Ob' from 8 November to 24 April at Barnaul; and the Irtysh from 8 November to 30 April at Omsk.

Winter precipitation is almost entirely in the form of snow and is very light. Totals for the five winter months are 157 mm at Chkalov, 48 mm at Kustanay, 119 mm at Akmolinsk, 71 mm at Omsk, and 178 mm at Barnaul. Somewhat more than half of this precipitation falls in November and December. March is the driest winter month; Kustanay averages only 3 mm during this month. In winter, precipitation can be expected on one-third to one-half of the days.

Throughout the New Lands region, a snow cover is usually established by the beginning of the winter season, but in the north around Kurgan and Omsk the cover may become established by late October. An almost uninterrupted snow cover persists for about 140 days in the west and south, and the period increases to 180 days in the north and east. The snow cover disappears in early or middle April except around Barnaul in the east, where it may last until late April. The depth of the snow cover generally increases from south to north. The maximum depth usually occurs in January and February, when the average ranges from 25 cm in the south to 50 cm in the north. Thaws are rare, but strong winter winds often blow the snow into drifts, leaving extensive areas of bare ground.

Relative humidity is high throughout the winter, averaging between 80 and 90 percent in the early mornings and afternoons.

Prevailing winds are from the southwest. Winds of gale force (winds in excess of 12.5 m. per sec. or 32 m.p.h.) are frequent, particularly in January. The effect of the strong winter winds is increased by cutting cold and quantities of fine blowing snow. Snow driven along the ground may be enough to reduce visibility seriously.

b. Spring

Spring starts in late March or early April, when temperatures begin to rise rapidly, the snow cover melts, and streams become swollen. After 4 or 5 weeks, ending in early May, summer weather sets in.

Early morning frosts still prevail in early April, but by the end of the month they are uncommon. The average daily maximum and minimum temperatures during April are 7°C and -2°C at Chkalov, 6°C and -4°C at Kustanay, 4°C and -5°C at Barnaul and Akmolinsk, and 3°C and -6°C at Omsk. The ice on the rivers and other bodies of water gradually melts, breaking up during the latter part of the season and soon disappearing.

Spring precipitation is light, with totals for April ranging from 10 mm to 25 mm. Much of it is in the form of snow during the early part of the month, but snows are uncommon during the latter part. When the snow melts and the ground thaws the plains become muddy, the streams become turbulent, and trafficability is generally poor.

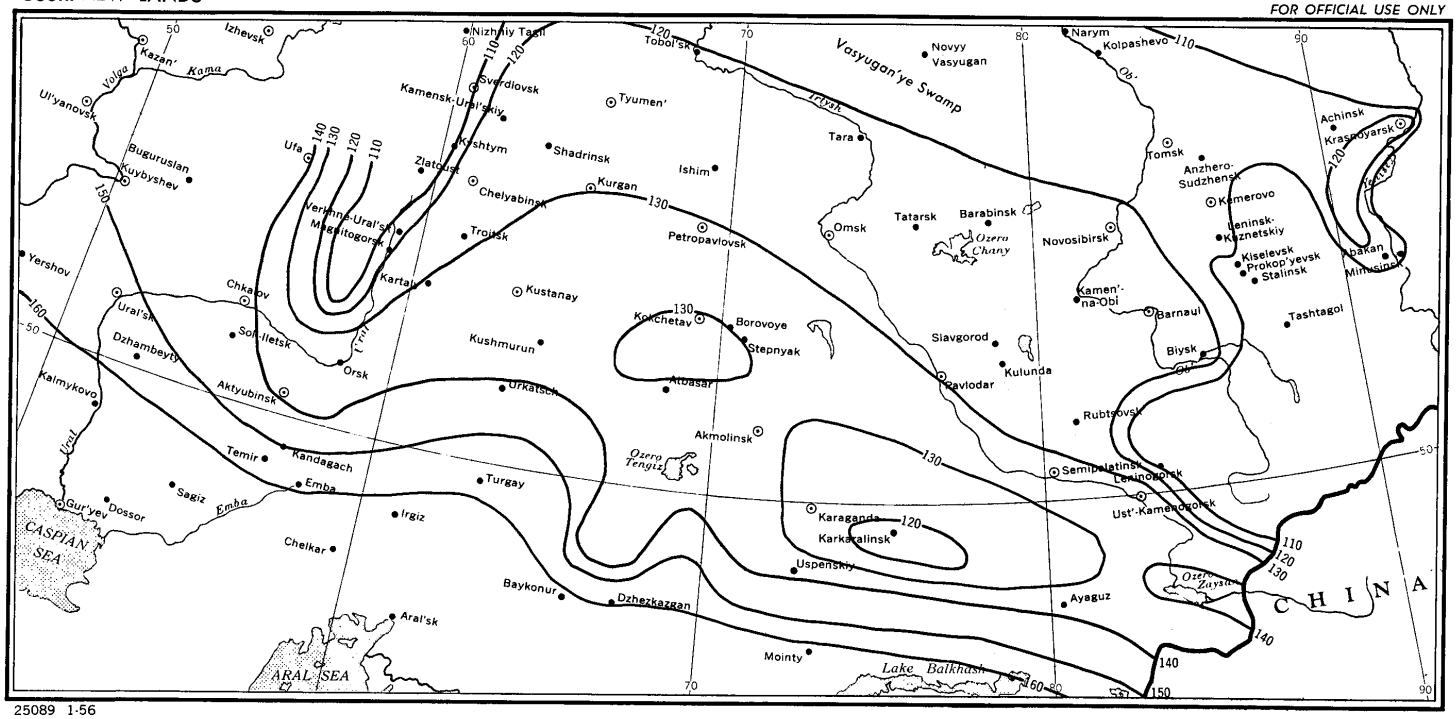
c. Summer

The hot, windy summer begins in early May after the rapidly rising temperatures have melted the winter snow and ice and frosts have ended. The season is about 4-1/2 months long, lasting until late September, when occasional early morning temperatures approach the freezing point.

The length of the frost-free period decreases toward the east and north (Map 25089, following p. 22). The average length is 146 days (5 May-29 Sep) at Chkalov, 131 days (10 May-19 Sep) at Akmolinsk, 125 days (16 May-19 Sep) at Omsk, and 122 days (17 May-17 Sep) at Barnaul. The length of the frost-free season, however, varies considerably from year to year. The mean daily maximum and minimum and extreme maximum temperatures at five key points during the summer are as follows:

USSR: NEW LANDS

FOR OFFICIAL USE ONLY



25089 1-56

AVERAGE DURATION OF THE FROST-FREE SEASON

(number of days)

Union Republic boundary (SSR)

Oblast, Kray or Autonomous Republic (ASSR) boundary

⊙ Administrative center (Oblast, Kray or ASSR)

Main railroads

Compiled from a variety of sources.

0 100 200 300 Miles

0 100 200 300 Kilometers

Station	Mean Daily Max. (°C)					Mean Daily Min. (°C)					Extreme Summer Max. (°C)
	M	J	J	A	S	M	J	J	A	S	
Chkalov	20	24	26	25	18	8	13	15	13	7	37
Kustanay	17	22	25	23	17	4	10	12	11	5	37
Akmolinsk	18	23	26	23	17	6	11	13	11	5	37
Omsk	16	21	23	21	16	4	11	13	11	6	39
Barnaul	16	21	24	22	17	4	11	13	11	5	36

Summer is the season of maximum precipitation, which usually occurs in the form of brief thunderstorms. Between storms, the summer can be classified as dry. Summer skies are generally clear, sunshine is intense, evaporation rates are high, and relative humidity is low (40-70 percent). Throughout much of the New Lands region the precipitation averages 25 mm to 40 mm in May; 30 mm to 50 mm in June, July, and August; and 25 mm to 40 mm in September.

Prevailing winds are from the north and northwest. Desiccating winds up to 17.8 m. per second (40 m.p.h.) occur from mid-April to September, particularly in the western parts of the New Lands.

d. Fall

Fall arrives suddenly in late September, when temperatures begin to drop rapidly and early morning frosts appear. The season is 5 or 6 weeks long, lasting until early November, when the winter snow cover becomes established.

Temperatures are highly variable during the fall. Morning frosts become progressively more frequent. The average daily maximum and minimum temperatures in October are 8°C and 0°C at Chkalov, 7°C and -3°C at Kustanay, 6°C and -3°C at Akmolinsk, 4°C and -3°C at Omsk, and 6°C and -2°C at Barnaul.

Fall precipitation is rather light, averaging about 25 mm in October throughout most of the New Lands region. Snow becomes

more frequent toward the latter part of the season, but intermittent thaws occur until early or middle November, when the snow cover is firmly established.

3. Agroclimatic Analysis of the Production Potential

Of all the physical factors that hamper and limit expansion in New Lands region, none is more serious than climate. The two major limits to the expansion of grain production are (1) the length of the growing (frost-free) season in the north and (2) the amount of effective precipitation in the south. Since it is easier to combat the lack of water in the south than the lack of heat in the north, the Soviets are emphasizing particularly the intensification and expansion of agriculture in the marginal-precipitation areas of the steppes and wooded steppes. It is noteworthy that on 7 January 1955, at a meeting of Komsomol "volunteers," Khrushchev stated:

> The lands in Kazakhstan and Altay are considerably more fertile than in the Ukraine. It is said that there is little rain there. But in the southern Ukraine there is no more rain; therefore such an argument does not stand examination! 35,p.2/

Along the Azoz and Black Sea coasts, the portion of the Ukraine that Khrushchev speaks of, average precipitation totals are similar to those in the New Lands area, but temperatures permit the cultivation of winter varieties of wheat. Only a year later, Khrushchev referred to the New Lands as "a zone of drought." 38,p.14/

The greater part of the New Lands activity is being devoted to increasing the area in spring wheat (Figures 7 through 9). Press and radio reports on sown acreages in the region indicate that spring wheat occupies between 75 and 80 percent of the total cultivated area. In 1955, this amounted to 15 to 16 million hectares, or about three-fourths of the total wheat acreage in the United States. Most of the spring wheat is of the hard variety, although some soft wheats are grown.* Since wheat is the basis of the New Lands program, the agroclimatic analysis of the production potential of the region will be directed primarily to that crop.

*For a detailed description of the various varieties of spring wheat and millet being grown in the New Lands, see Appendix C, Item 45. See also Figures 11-16.

Areas in millet are also being increased and probably amounted to 8 to 10 percent of the total sown area of the New Lands in 1955, or between 1.6 and 2 million hectares (Figure 10). Millet is grown both as a fodder crop and a cereal. It is drought resistant, likes warm weather, requires little seed, and is a good insurance crop during droughts when other crops may fail. A serious disadvantage of millet is the large amount of weeding required, which makes heavy demands on labor. The new millet acreages are located primarily in the Volga-Urals region, particularly in Chkalovskaya, Saratovskaya, and Kuybyshevskaya Oblast's and Bashkirskaya ASSR. In 1955, millet accounted for 35 percent of the total sown acreage in Chkalovskaya Oblast'. 41/ Considerable areas are also planted to millet in northern Kazakhstan, particularly in Pavlodarskaya Oblast', where millet accounted for about one-fifth of the total sown acreage in 1955. In Western Siberia, some millet is grown in Altayskiy Kray, but seldom elsewhere.

The recent Soviet program for expanding corn (maize) acreages has extended even to the New Lands. This is surprising because the precipitation is low and the growing season is too short to permit the ears to mature. As a result, corn can be raised only for silage in most years (Figure 17). Another problem is the lack of sufficient hybrid seed, as evidenced by Soviet eagerness to purchase hybrid seed from a United States firm. Statistics on corn acreages in the New Lands are particularly vague. They vary from 5 to 10 percent of the total sown area in different oblasts, and probably average about 6 to 8 percent for the area as a whole. In 1955, apparently about 1.2 to 1.6 million hectares were involved, or almost 10 percent of the total Soviet corn acreage.

Other crops often mentioned in connection with the program include potatoes, sunflowers, and seed flax. Potatoes are probably important only as a local source of food, and their total acreage is probably very small. Sunflower and seed-flax acreages are being expanded to increase the production of vegetable oil (Figure 18). For these crops, the goal set is 500,000 to 600,000 hectares, but the progress toward this goal as of 1955 is not known. 40,p.7/ According to the best estimate that can be made, sunflowers and seed flax will occupy between 1 and 2 percent of the total New Lands crop acreage. The tall sunflowers, and even corn, are often planted in strips and serve as windbreaks and snow fences.

The Soviets have commented very little on the problem of crop rotation. It would seem to be illogical to sow grain crops on the same land for many consecutive years in such a dry region. Dry-farming

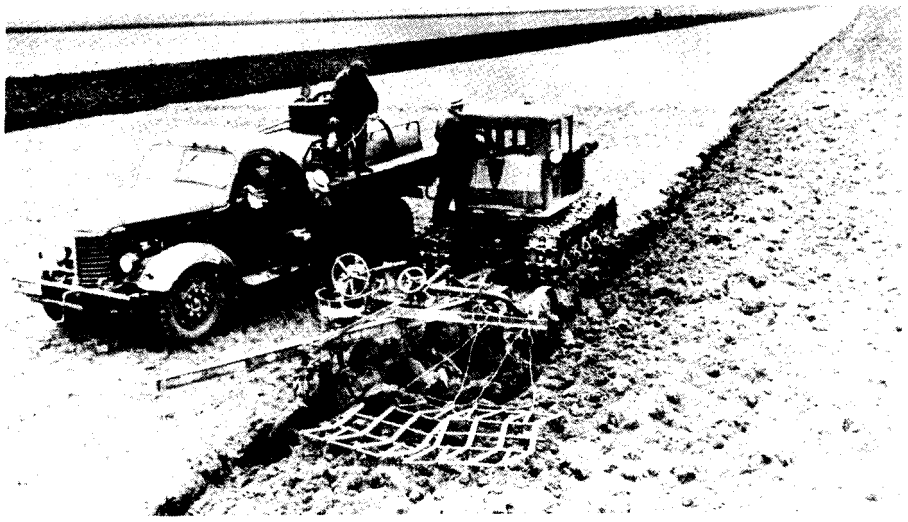


Figure 7. Plowing and harrowing in the New Lands, May 1955.

Figure 8. Sowing spring wheat in the Kulunda Plain, Altayskiy Kray, June 1954.

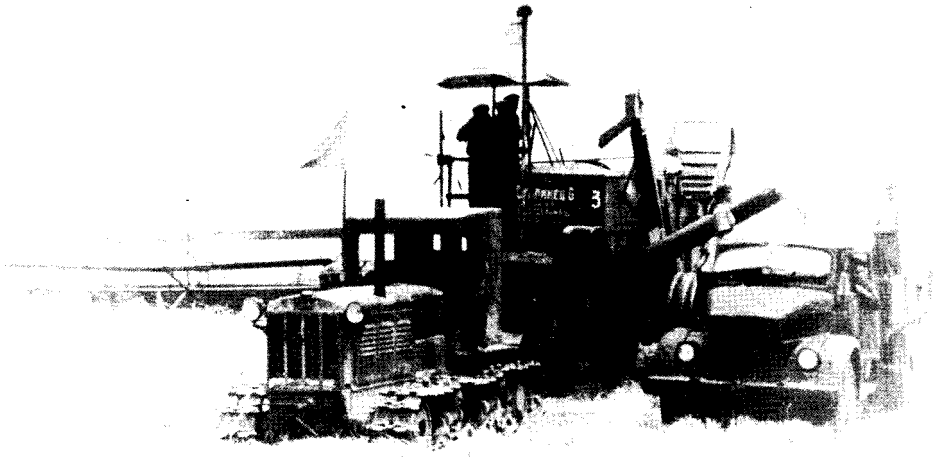


Figure 9. Harvesting spring wheat in northern Zapadno-Kazakhstanskaya Oblast', August 1952. Combine is a "Stalinets-6" model.

Figure 10. Kazakh farmers cutting millet in Aktyubinskaya Oblast', 1947.

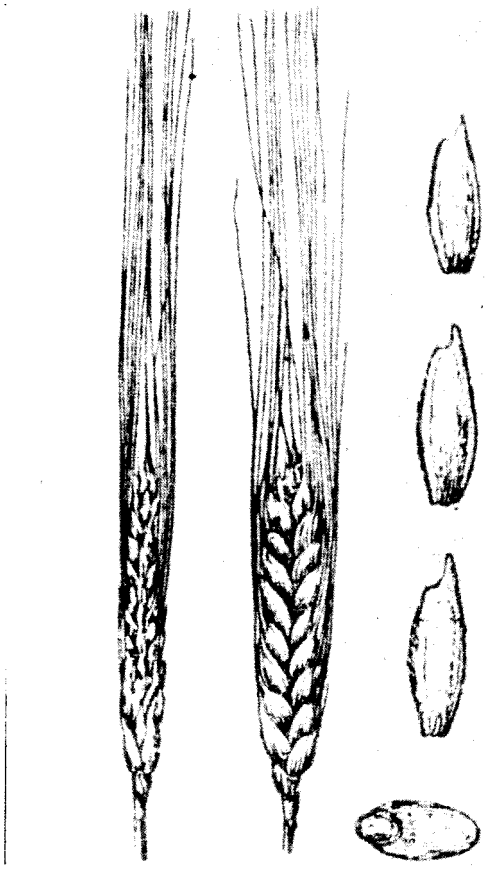


Figure 11. Melyanopus 69 hard spring wheat. The most extensively distributed and most drought resistant of hard spring wheats. Yields are average, milling and baking qualities average..

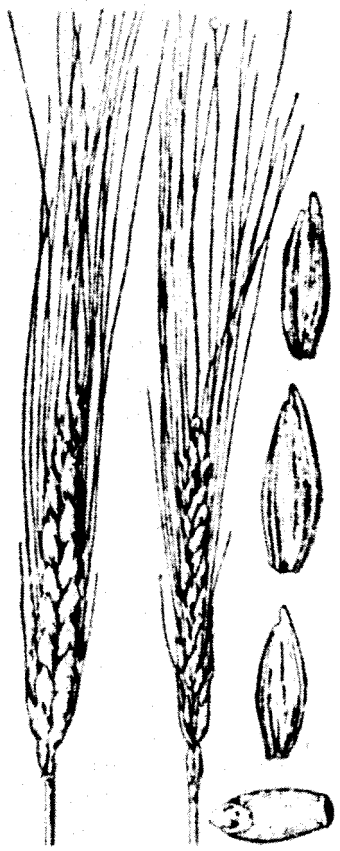


Figure 12. Gordeyforme 10 hard spring wheat. A late-maturing variety of only average drought resistance. Susceptible to blight. Yields are above average, milling and baking qualities average.

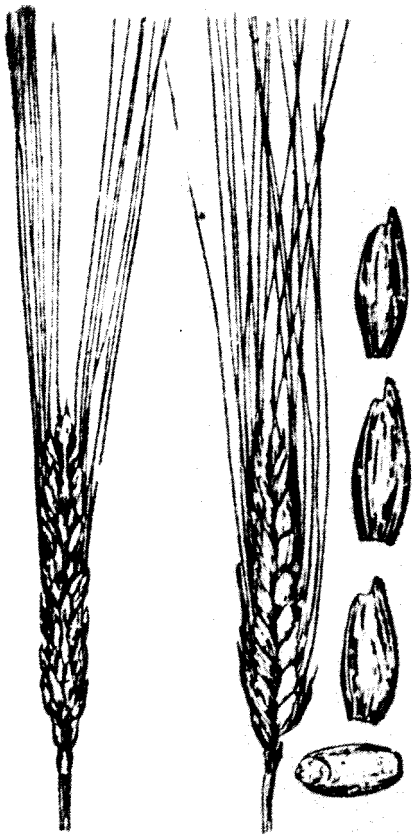


Figure 13. Gordeyforme 189 hard spring wheat. Drought resistance is above average, milling and baking qualities average.

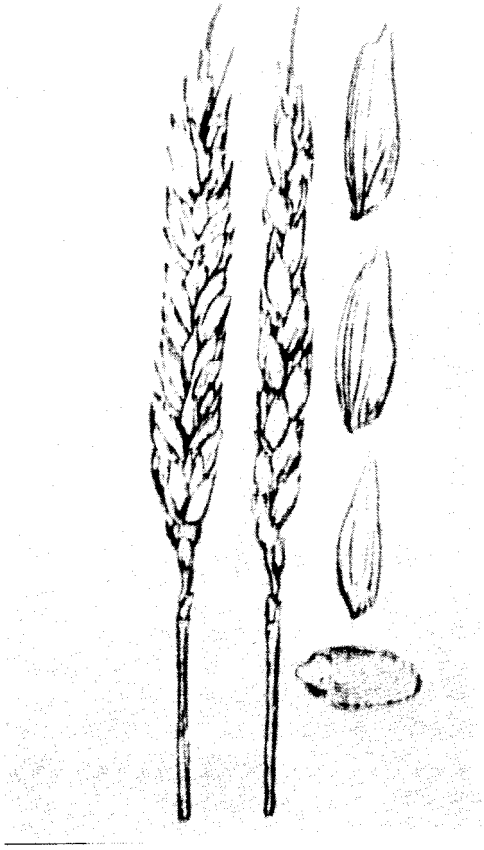


Figure 14. Mil'turum 553 soft spring wheat. Drought resistance is above average during first half of summer. Milling and baking qualities are good.

Figure 15. Saratovskoye 853 millet. The most widely distributed variety of millet. Noted for its high yields, resistance to drought, and resistance to lodging.

Figure 16. Dolinskoye 86 millet. Quality and yields are high, but its drought resistance is only average. Because of a tendency toward brittleness, it must be harvested at just the right time.

Figure 17. Mechanized harvesting of corn for ensilage.

Figure 18. Harvesting sunflowers in the New Lands, October 1954. Combine is a "SK-2.60" model.

practices, also, generally include frequent fallowing to allow moisture to accumulate in the soil. Occasionally, sources mention 4 to 5 years of grain followed by one year of fallow, or refer vaguely to 2 to 5 years of grain, depending on local soil conditions, followed by fallow.

a. Temperature

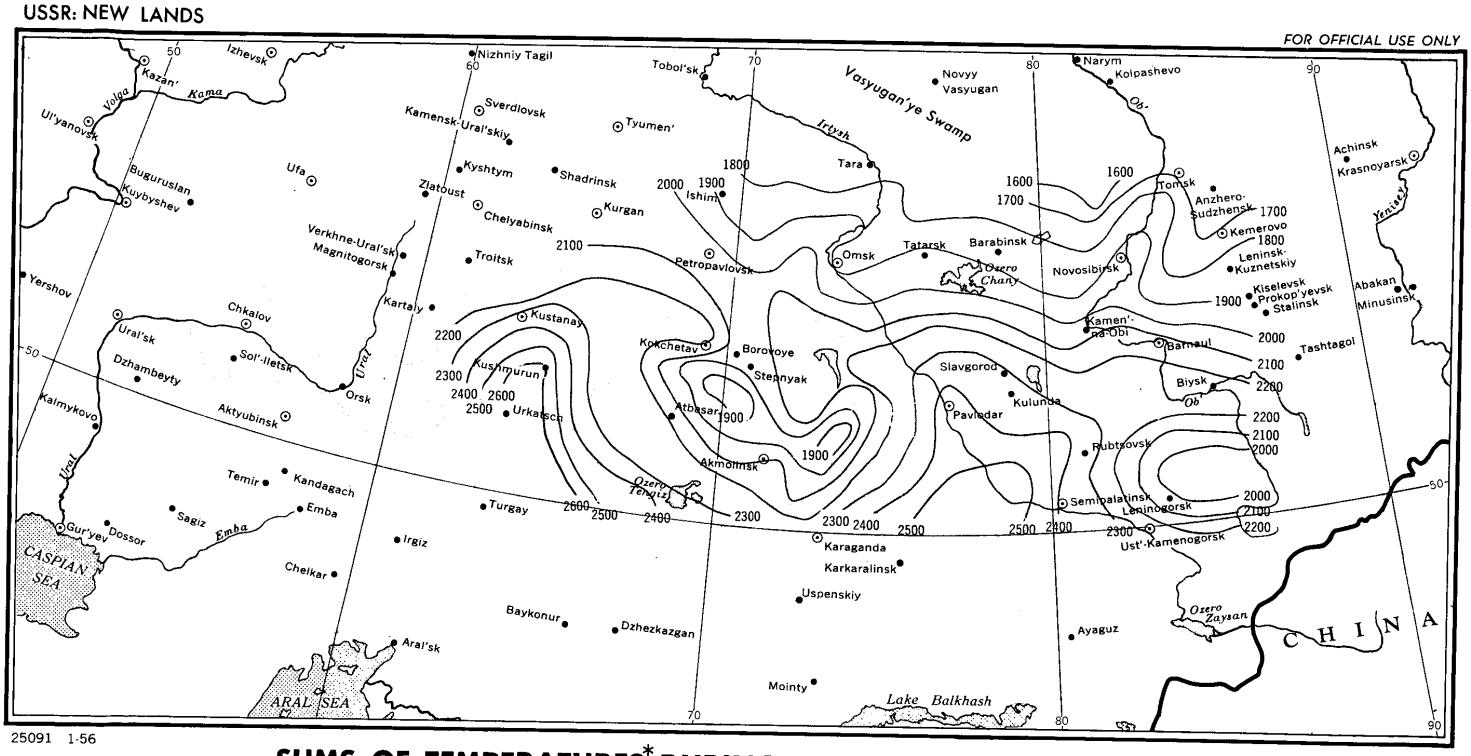
The wooded-steppe and steppe regions, where the land is being brought under cultivation, generally meet the thermal requirements of spring wheat and millet. Temperature, however, plays a dominant role in limiting the northward expansion of grain cultivation and, together with soil factors, fixes a rather definite northern limit. Temperature is progressively less significant toward the south, where precipitation becomes the dominant factor.

The predominance of spring wheat over winter wheat is largely attributable to temperature factors. If possible, winter wheat would be grown by preference because of its higher yields, but the short growing season and low winter temperatures permit only spring-sown grains throughout the New Lands area. In the USSR, mean October temperature appears significant as an index of the dividing line between areas of spring and winter wheat. Winter wheat gives way to spring wheat where the October mean is less than 8°C. The October means at five key places are 4°C (Chkalov), 2°C (Kustanay), 2°C (Akmolinsk), and 1°C (Omsk, Barnaul). Another index is the mean January-February temperature. Spring grains begin to appear in areas where the January-February mean is lower than -6°C. At the five key places mentioned the January-February mean temperatures are considerably below -6°C, ranging from -14°C to -19°C. In the Great Plains region of the United States the -6°C January isotherm cuts across central Nebraska and marks approximately the northern limit of winter wheat. Winter temperatures in the New Lands area correspond closely with those of northern North Dakota and southern Saskatchewan, which are in the heart of the North American spring-wheat belt. Temperature factors, however, are not the sole criterion for determining areal limits of spring and winter grains. For example, ground with an adequate snow cover will retain more soil heat than bare ground, and consequently a snow cover favors the growing of winter grains.

Sums of temperatures for the growing season often set the northern limit of feasible cultivation for a particular crop. 73,p.98-134/ A temperature sum is the total of the average daily temperatures of those days within the growing season that have an average temperature of 10°C or more and may be represented by an isoline (Map 25091, following p. 32). A considerably higher temperature sum is needed for millet and corn than for spring wheat. The northern limit of feasible

USSR: NEW LANDS

FOR OFFICIAL USE ONLY



25091 1-56

SUMS OF TEMPERATURES* DURING THE GROWING SEASON

(degrees centigrade)

Union Republic boundary (SSR)

Oblast, Kray or Autonomous Republic (ASSR) boundary

⊙ Administrative center (Oblast, Kray or ASSR)

Main New Lands area

* Total sum of the average daily temperatures of days having an average temperature of 10°C. or more.

SOURCE: Izvestiya Akademii Nauk SSSR. Seriya Geograficheskaya Mar.-Apr. 1955.

0 100 200 300 Miles

0 100 200 300 Kilometers

wheat cultivation is indicated by the 1600°C isoline. Wheat cultivation, however, does not often extend so far north in the USSR because of the cold boggy soil along the southern margin of West Siberia's great Vasyugan'ye Swamp. Millet varieties grown by the Russians require a minimum temperature sum of 2050°C, according to Soviet agronomists. This would preclude millet cultivation north of a line running roughly from Kurgan to Barnaul. The only millet acreages in Siberia are in Altayskiy Kray, south of this line. The temperature sum for average-maturing varieties of corn is 3000° to 3500°C, and even quick-maturing varieties need from 2500° to 3000°C. Temperature sums in excess of 2500°C are only rarely encountered in the New Lands region, which explains in part why the corn here is being grown for green fodder only. The Soviets claim to be developing a variety of corn that requires temperature sums of 2000°C to 2500°C, but even if a strain that would mature fully in the New Lands were developed, the yield would probably be low.

Below certain minimum temperatures, grain cannot be planted and be expected to germinate successfully. It is generally accepted that spring wheat should not be planted until average daily temperatures exceed 5°C. This minimum sometimes becomes a significant factor in the northern part of the New Lands where the frost-free season is barely long enough for the growth requirements of spring wheat. Average temperature is the determining factor; early morning temperatures may fall below 5°C and often do well into May. Average daily temperatures usually reach the 5°C mark by late April or early May throughout most of the New Lands region, except in the west, where the 5°C mark is commonly reached by mid-April. The May mean daily high and low temperatures at four northern stations are 16°C and 5°C at Tyumen', 15°C and 3°C at Tara, 13°C and 3°C at Tomsk, and 14°C and 3°C at Krasnoyarsk. Carl L. Alsberg sets the optimum temperature for wheat germination at 20° to 25°C. 12,p.14/ Mid-afternoon temperatures in the northern portion of the New Lands area average 16° to 18°C during the last week of May. Although these temperatures do not reach the optimum of 20° to 25°C, they approach it rather closely, and all northern stations have afternoon readings well in excess of 5°C even in early May. Normally temperature at the time of sowing is not a restrictive factor, but it would become highly significant if winter temperatures persisted abnormally late in the year, since the short frost-free period does not permit much delay.

Minimum permissible temperatures are higher for planting millet and corn than for spring wheat. For millet these temperatures range from 8°C to 10°C; the best time to plant millet is when the average daily temperature reaches 10°C. Millet sprouts are very sensitive to frost and begin to show signs of frost nipping at temperatures of 2 or 3°C. The average daily temperature usually reaches 10°C by about

1 May in the millet-growing areas. Although early morning readings down to 2°C are not uncommon in May in northerly areas and near Akmolinsk and Barnaul, they are rare in the millet-producing regions near Chkalov, Ufa, Ural'sk, and Pavlodar. For corn the minimum planting temperature is about the same as for millet -- 8° to 10°C. Corn sprouts are nipped at about 1°C, but new growth usually appears after several days. The optimum time for planting corn is when the average daily temperature has reached about 13°C, or in mid-May, throughout all but the northern part of the New Lands area, where very little corn production is being attempted.

The length of the frost-free season is highly significant in determining the type of grain planted, the sowing and harvesting dates, and the limits of expansion to the north (Map 25089, following p. 22). Since the short growing season and low winter temperatures preclude fall sowing, spring-sown grains prevail throughout the New Lands area. The varieties of hard spring wheat grown in the region require 100 to 110 frost-free days to mature. The less important soft varieties require 95 to 105 days. The growing period of millet is somewhat shorter -- 70 to 80 frost-free days for the rapid-ripening varieties and 90 to 110 days for the slower ripening types. The growing period for New Lands varieties of corn varies considerably. About 120 to 125 frost-free days are required for the early-maturing varieties, 130-140 days for the average varieties, and 150 or more days for the slower maturing varieties. The table on the opposite page gives the dates and lengths of both the average and shortest frostless period at various key points (west to east).

From these figures, it would appear that an average year would present no major problem to raising mature crops of spring wheat and millet. The problem arises when the frost-free period drops appreciably below average. The column on the right indicates the shortest frostless season that is likely to be encountered over a long period of years. The number of frost-free days that might be expected during below-average years is somewhere between the average and extreme. The expectancy of below-average years is difficult to forecast because temperature records do not cover a sufficient number of years, but it would be safe to assume that one or two years out of every ten will probably have a frost-free period significantly shorter than average. At Omsk, for example, where the average length is 125 days and the observed minimum length is 90 days, a frost-free period of 105-110 days would not be unusual. Since delays in sowing and harvesting are likely to recur, Soviet socialized agriculture will probably continue to suffer periodically from serious crop losses. The United States farm delegation that recently visited the USSR encountered a light frost at Rubtsovsk in Altayskiy Kray on 15 August 1955 -- about 5 weeks earlier than normal.

Station	Average Frostless Season: First Date	Average Frostless Season: Last Date	Average Frostless Season: Length (days)	Latest Recorded Spring Frost	Earliest Recorded Fall Frost	Shortest Season Recorded (days) a/
Ural'sk	26 Apr	28 Sep	154	16 May	14 Sep	129
Chkalov	5 May	29 Sep	146	4 Jun	13 Sep	114
Ufa	5 May	27 Sep	144	2 Jun	10 Sep	n.a. b/
Troitsk	14 May	18 Sep	126	6 Jun	3 Sep	n.a.
Tyumen'	20 May	23 Sep	125	3 Jun	13 Sep	107
Kokchetav	22 May	22 Sep	122	18 Jun	4 Sep	78
Akmolinsk	10 May	19 Sep	131	3 Jun	26 Aug	87
Omsk	16 May	19 Sep	125	9 Jun	28 Aug	90
Karkaralinsk	24 May	12 Sep	110	27 Jun	12 Aug	65
Novosibirsk	20 May	19 Sep	121	13 Jun	3 Sep	91
Barnaul	17 May	17 Sep	122	19 Jun	3 Sep	77
Tomsk	17 May	12 Sep	117	n.a.	n.a.	n.a.
Krasnoyarsk	20 May	22 Sep	124	n.a.	n.a.	n.a.

a. This figure does not necessarily agree with the time lapse between the latest spring and earliest fall frosts, since the dates given are the absolute extremes and probably occurred in different years.

b. Data not available.

To achieve any degree of success the Soviets must seed the grains as early in the spring as possible. Soviet agronomists have stated that spring wheat sowed later than 20-25 May probably will not ripen fully before the fall frost, with a consequent sharp reduction in the harvest. One source reported that at Kustanay the yield of wheat sowed after 20 May was 24 percent lower than that sowed by 4 May. 45,p.48/

In both 1954 and 1955, seeding was not completed until early June, with most of it taking place in May. Spring arrived early in 1955 and it would seem that the seeding should have been completed earlier, but the very size of the gigantic New Lands program probably caused inevitable delays. There is no reason to assume that similar delays will not occur in the future. In the United States and Canada, spring wheat is usually sown several weeks before the last killing frost. The young plants emerge before the last frost, but they are not seriously injured. Permissible temperatures for germination of wheat may occur prior to the last frost; if the young plants are able to survive a mild frost (not below -2°C), early planting would seem to be a good way of avoiding the more dangerous fall frosts.

A heavy frost in the late summer or early fall may kill the plants before the grain has matured. Wheat that freezes before reaching maturity is likely to be unsuitable for milling. Even a light frost may cause the bran to wrinkle, resulting in low-quality grain. During ripening, the plant translocates its nutrients to the developing kernel, and the longer the plant can live before the arrival of frost, the bigger and heavier will be the kernels and heads. The fact that 1955 sowing was not completed until 10 June gives rise to speculation regarding the extent of possible frost damage before the fall harvest. Assuming it takes 100 to 110 days to mature, hard spring wheat planted 1 June will presumably not mature until 8 to 18 September. During an average year (see tabulation on p. 35 and Map 25089), frosts would cause no problem. Should they occur appreciably earlier than normal, the wheat might well be subjected to frost damage.

If corn is planted by mid-May, early-maturing varieties would ripen about 13 to 18 September and average-maturing varieties 23 September to 3 October. In so far as the frost-free season is concerned, mature crops of early-maturing types of corn could therefore be grown in the New Lands area, but the corn would have to be planted as soon as temperatures permit successful germination if the damaging effects of frosts earlier than about 20 September are to be avoided. Corn is highly sensitive to frost damage, particularly if temperatures fall as low as -3°C. This may explain in part why the Soviets are planting their corn closely, as if only a fodder harvest were anticipated. Millet has a shorter growing period than wheat and corn, and consequently is less subject to frost damage.

Temperature is an important factor throughout the life history of the wheat plant. Heat requirements for germination have been discussed on page 33. During the flowering period, wheat needs fairly cool weather. If the weather is too hot, the pollen grains will be killed; if it is too cool, the flower will not open. Flowering lasts

from 6 to 14 days, depending on the weather. Fertilization of the flowers takes place within rather narrow climatic limits. The best temperatures appear to be from 13° to 26°C. Fertilization takes place chiefly in the morning, but low temperatures may delay the process until later in the day. The actual opening of the flower and discharge of pollen takes less than an hour. Depending on its size, an entire field of wheat takes 1 or 2 days for fertilization. Optimum climatic conditions must prevail if the whole field is to flower at the same time and if all of the grain is to ripen at the same time.

During ripening, the temperature should be cool and the air should contain sufficient moisture to allow wheat to continue to grow and develop its kernels until they are mature. When the plant dies naturally, it is ready for harvesting. The ripening process requires 5 to 6 weeks after the emergence of the ear from the leaf sheath. At any time during the growth cycle, very high temperatures create the hazard of excessive evaporation, which might reduce the plant to the wilting point. Temperatures are particularly significant in July, since the critical period of heading and flowering of wheat occurs at that time. According to a Soviet agronomist, 23°C appears to be critical in July; higher temperatures are likely to damage the grain. 114,p.263/ The July 23°C isotherm corresponds roughly with the southern boundary of the New Lands region. Average July temperatures at five key southern points are 24°C at Ural'sk, 22°C at Aktyubinsk, 22°C at Urkatsch, 19°C at Karkaralinsk, and 22°C at Semipalatinsk.

Corn is a warm-weather plant that requires high temperatures both day and night during the growing season. In the United States, practically no corn is grown where the average summer temperatures are lower than 19°C. Temperatures suitable for corn production prevail in the southern and western parts of the New Lands, but not along or north of the Trans-Siberian Railroad. Warm weather after planting hastens germination and growth. Corn flowers and ripens much sooner when grown at 27° to 32°C than at 21°C. At temperatures as low as 16°C the flowering and maturing are considerably retarded. During the months of June, July, and August the average afternoon high temperatures range from 21°C to 27°C at most stations in the New Lands. The failure of afternoon temperatures to rise consistently above 27°C is a significant handicap to the successful production of a crop of mature corn.

Millet also thrives on high temperatures, particularly those between 22° and 32°C. Millet does not grow well at temperatures above 35°C, but such high temperatures are rare. Because millet has a shorter growing period than any other major grain crops, its production is less restricted by temperature factors.

Throughout much of the New Lands area the ground freezes to a depth of 1-1/2 to 2 meters in winter as a result of the long and severe cold and scant snow cover. At Kursk, in the European part of the USSR, temperatures are equally low, but the soil usually freezes to a depth of only one-half meter because of the protection provided by a heavier snow cover. In the New Lands, unlike European USSR, the soil dries out more rapidly than it warms up, and the top layer of the soil is ready for working while the lower layers are still frozen. For example, by about May 1 the average daily air temperatures at Omsk begin to reach the 5°C mark necessary for germination, but at a depth of 1 meter the temperature is still around 0°C, and at a depth of 1-1/2 meters it remains below freezing until mid-May. As a result, plant growth and the renewal of bacterial activity are retarded, and water runs off the land instead of being absorbed into the soil.

b. Precipitation

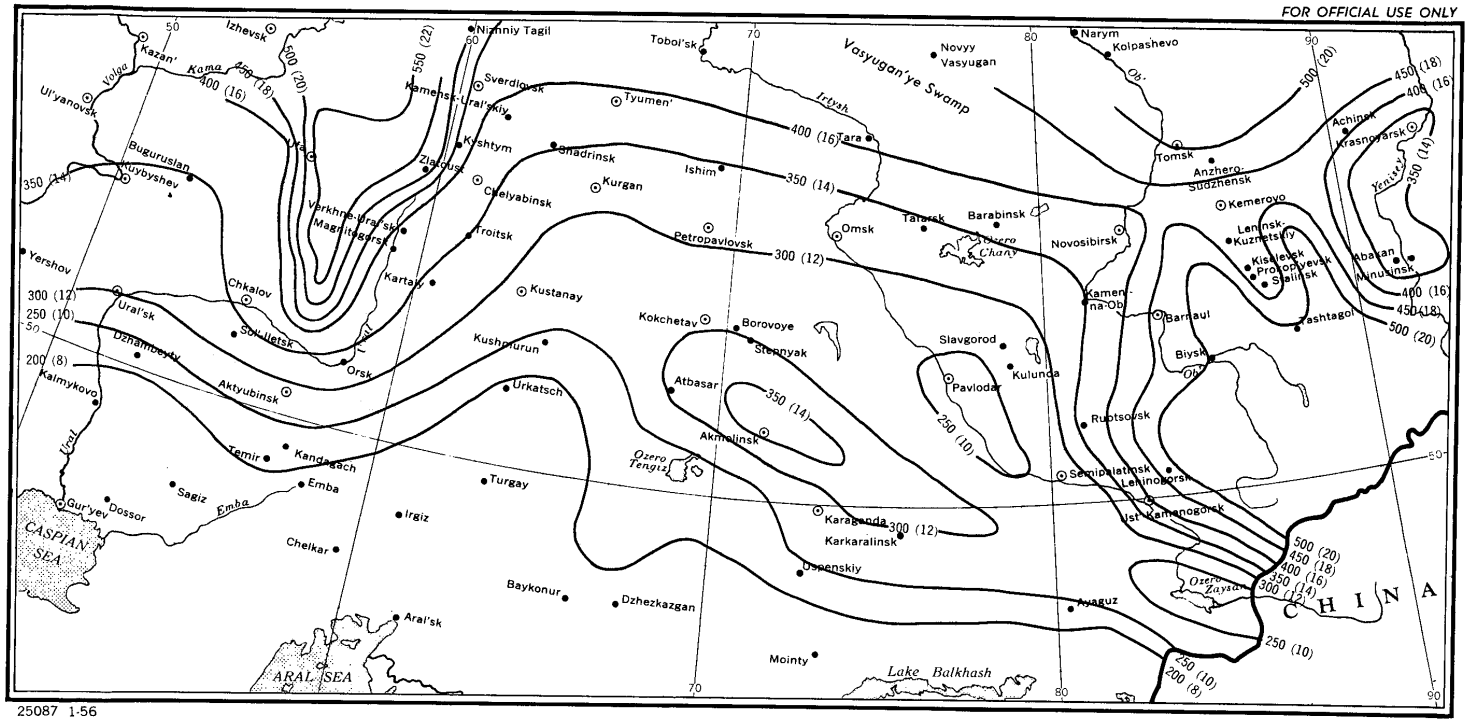
Throughout much of the New Lands region, especially in the central and southern parts where agricultural expansion is most active, the critical factor is moisture supply. Only in the wooded steppes to the north, where effective precipitation is greater and evaporation lower, is sufficient moisture for grain culture generally assured.

Annual precipitation totals are small throughout the New Lands area, ranging from about 250 mm in the south to 400 mm in the north (Map 25087, following p. 38). Precipitation exceeds 400 mm only in the extreme north and east. Isohyets trend east-west except where the plains are interrupted by the southern Urals, the Kazakh Folded Upland, and the Altay Mountains. In the southern Urals rainfall becomes heavier as altitude increases, and the isohyets bend sharply southward. Precipitation also increases on the northern slopes of the Kazakh Folded Upland, and Akmolinsk has a higher annual total than Omsk, about 430 kilometers to the north. On the east, precipitation becomes heavier near the base of the Altay Mountains, which mark the eastern limit of the main body of New Lands activity.

The seasonal distribution of the precipitation is an important factor in evaluating the agricultural possibilities of an area. In the western part of the New Lands, maximum precipitation falls in late spring and early summer (May-early June), whereas east of the Urals the maximum usually falls in July. Throughout the area precipitation is heaviest during the warm season when evaporation rates are highest. In addition, summer rains are usually in the form of brief thundershowers, with long dry periods between. Precipitation decreases in the fall, and winter is the driest season of the year. Fall rains are important, and the land is often plowed in the

USSR: NEW LANDS

FOR OFFICIAL USE ONLY



25087 1-56

AVERAGE ANNUAL PRECIPITATION

(in millimeters)

(approximate inch equivalents are shown in parentheses)

Compiled from a variety of sources.

Union Republic boundary (SSR)

Oblast, Kray or Autonomous Republic (ASSR) boundary

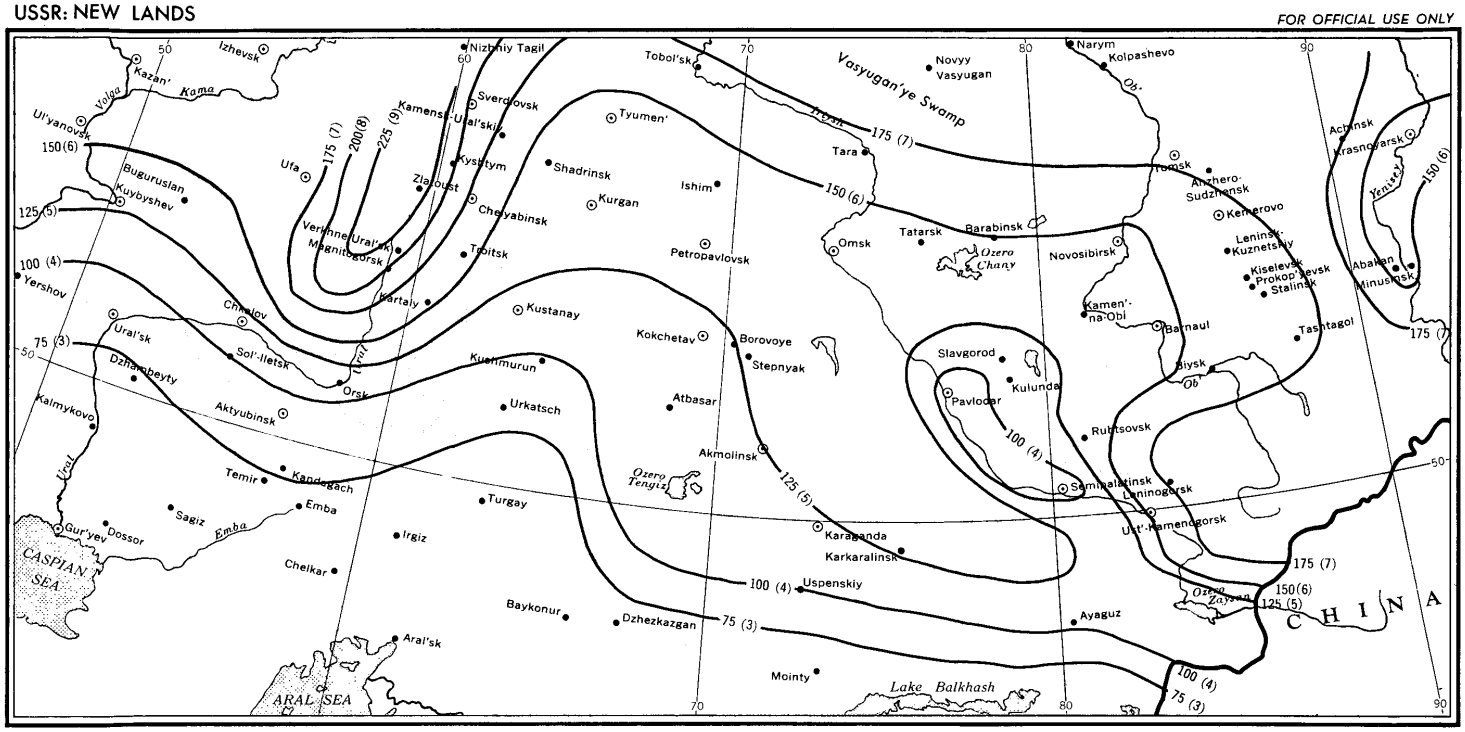
⊙ Administrative center (Oblast, Kray or ASSR)

0 100 200 300 Miles

0 100 200 300 Kilometers

USSR: NEW LANDS

FOR OFFICIAL USE ONLY



25088 1-56

AVERAGE TOTAL PRECIPITATION FOR MAY-JUNE-JULY

(in millimeters)

(approximate inch equivalents are shown in parentheses)

Compiled from a variety of sources.

Union Republic boundary (SSR)

Oblast, Kray or Autonomous Republic (ASSR) boundary

⊙ Administrative center (Oblast, Kray or ASSR)

Main New Lands area

0 100 200 300 Miles

0 100 200 300 Kilometers

fall to assist in building up moisture reserves for the following crop year. In winter the ground freezes, and a light snow cover blankets the landscape. In spring, when the ground thaws and the snow cover melts, runoff-retention measures are of paramount importance if the winter precipitation is to be conserved for agricultural use.

Moisture availability determines largely the southern limit of agricultural expansion in the New Lands. The average annual precipitation gives only an approximate indication of this limit, since the moisture may not be available when it is most needed. The 250 mm isohyet corresponds fairly closely with the southern limit of wheat cultivation, but in some places the Soviets are sowing wheat where the average annual rainfall is even more precarious. For example, at Kandagach (south of Aktyubinsk), Uspenskiy (south of Karaganda), Pavlodar, and in the area between Kustanay and Atbasar the annual totals are between 200 and 250 mm.

The amount of precipitation during May, June, and July (Map 25088, following p. 38) is important for maintaining soil moisture from the time of sowing through the critical stages of heading and flowering (53-60 days). If rainfall is below normal, the plant must rely on moisture stored in the soil, which may soon be depleted. In established wheat areas in other parts of the world the 75 mm isohyet for these three months often corresponds with the extreme limit of sparse acreage. Three-month totals (May through July) for six stations along the southern limit of wheat production in the New Lands are 89 mm at Ural'sk, 89 mm at Aktyubinsk, 90 mm at Urkatsch, 125 mm at Karkaralinsk, 79 mm at Pavlodar, and 96 mm at Semipalatinsk.

From about mid-July to early September (44-50 days) the grain is filling out and maturing, and the precipitation during this time often determines the size of the heads and the general quality of the grain. Precipitation during July and August is greater than during May and June through most of the New Lands area, the chief exception being in the west (Ural'sk-Chkalov), where the peak precipitation comes in the earlier part of the summer. In general, however, precipitation is less of a problem during the filling out and maturing stage of wheat than in the period from sowing to flowering and heading.

Millet is one of the most drought-resistant grains and has long been an established crop in the Volga-Urals area and northern Kazakhstan. Millet is very economical in its consumption of moisture, having a lower transpiration coefficient than other grains. The seeds require only a little soil moisture for growth and absorb very little water. During past droughts, wheat yields dropped 70 percent while millet yields dropped only 25 percent.

Corn needs plenty of moisture. Requirements are high throughout the growing season, particularly during silking and tasseling. According to Soviet agronomists, precipitation is most critical during the second and third months following planting, or roughly from late June to late August. During this 2-month period 100 mm or more of precipitation per month are needed for a good mature crop, 75 to 100 mm per month for a satisfactory crop, and 50 to 75 mm for a poor crop. If the precipitation is less than 50 mm per month, a good crop cannot be expected. The average July and August precipitation (in millimeters) for a number of key stations is as follows:

Station	July	August
Ural'sk	25	26
Chkalov	31	35
Aktyubinsk	25	58
Kustanay	37	46
Kokchetav	37	47
Omsk	52	46
Akmolinsk	45	40
Karkaralinsk	43	40
Pavlodar	21	46
Semipalatinsk	34	26
Barnaul	63	53

Almost everywhere in the New Lands the rainfall for July and August is less than 50 mm. Altayskiy Kray (Barnaul) seems to be the most promising area. The deficiency in precipitation during each of these two months is one more indication that a mature corn crop cannot be expected unless hybrid varieties adapted to the short growing season and low precipitation totals are developed and widely used.

A Russian geographer, N.N. Ivanov, has divided the New Lands area into three moisture zones (Map 25090, following p. 40). 58,p.48-50/ For the four months of May, June, July, and August, he has computed the relation of precipitation to maximum evaporation and calls the

resulting values "coefficients of moisture."* For example, if the precipitation total were only half the maximum possible evaporation total, the coefficient of moisture would be 0.50, as indicated below:

$$\text{Coefficient of moisture} = \frac{\text{Precipitation total}}{\text{Maximum possible evaporation}}$$

Moisture zones are classified as having sufficient moisture (0.50 and above), deficient moisture (0.20-0.50), and "meagre" moisture (less than 0.20). For the period May through August, most of the New Lands fall within the "deficient" zone. Only in the general area north of the Trans-Siberian Railroad and in portions of Novosibirskaya Oblast' and Altayskiy Kray is the moisture "sufficient". According to Ivanov's moisture classification, the zone of deficient moisture includes most of the New Lands. However, the area between Karaganda and Semipalatinsk, where numerous state farms were established in 1955, falls in the zone of meagre moisture supply.

c. Winds

Winds are a significant climatic factor with which the Soviets must contend in developing the New Lands. Summer winds blowing across the plowed surface cause dust storms. Hot, dry spring and summer winds may dessicate crops and dry out the soil, and winter winds may remove the valuable snow cover. The Soviets realize the importance of the problem and are extensively applying measures to reduce the damaging effects of wind.

The New Lands can be described as a "windy" region. Southwesterly winds prevail in winter and northerlies and northwesterlies in summer. No major physical barriers prevent winds from blowing into the New Lands from the north and south. Winds of gale force (over 51 km per hour) are common throughout the year. In the region of Aktyubinsk, Kustanay, and Kokchetav, gales blow an average of 40 to 45 times a year. Farther to the east -- around Omsk, Novosibirsk, Karkaralinsk, and Barnaul -- gales are experienced 20 to 25 times a year. The frequency of gales decreases to the north (Kurgan, 9; Tomsk, 3) and the far west (Chkalov, 7; Ural'sk, 9). 47/

Of particular importance are the hot, dry winds of late spring and summer (sometimes referred to as "sukhovey) that blow up to 64 kilometers per hour. These winds are associated with descending masses of air and usually occur along the southern margin of an anticyclone. By lowering the relative humidity during both day and night, these winds greatly increase the rate of transpiration and soil evaporation. If the soil moisture is sufficient to balance transpiration, the damage to plants is slight, but if the soil moisture is low when

*See also discussion of evapotranspiration by Thornthwaite. 115/

the wind occurs the plant may wilt and be permanently damaged. In this way, high winds may seriously aggravate existing drought conditions. Sukhovey winds have reportedly caused temperatures to rise to 40°C and relative humidity to drop to 15 percent.

Wind is also an important erosion agent. In northern Kazakhstan and western Siberia, clouds of blowing topsoil have always been a common occurrence. This situation has been aggravated by the current extensive plowing program. Members of the visiting farm delegation in the summer of 1955 describe large quantities of dust on the ground and in the air. In winter, high winds often blow snow from the fields into the ditches or nearby woods. Since the snow cover is thin, it is essential that as much as possible be retained on the fields to provide moisture for spring crops.

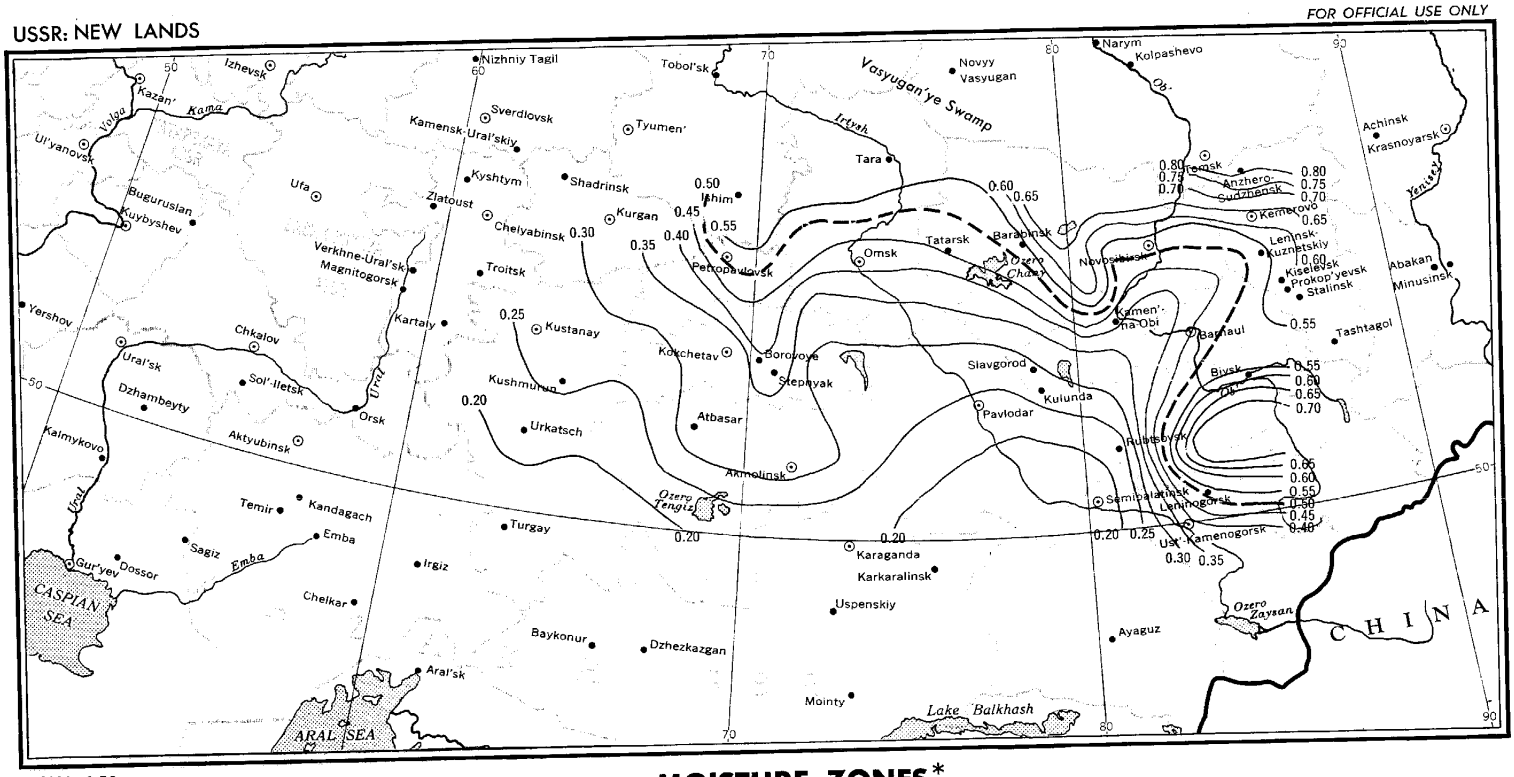
The Soviets have adopted a number of measures to protect soils from wind erosion and preserve the winter snow cover. Many reports mention the planting of trees and shrubs in protective shelterbelts across open country and along the borders of the fields (Figure 19). The United States farm delegation that visited the USSR in the summer of 1955 noticed great numbers of these newly planted trees and shrubs. 48/ In many places, high-stalked vegetation -- particularly corn and sunflowers -- is planted along the edges of the fields (Figure 20). Soviet agronomists have recommended that the fringes of fields be plowed and planted first, but this seems rather impractical. Also recommended is the establishment of a cloddy soil structure with soil particles too heavy to be carried away by the wind. The erection of snow fences has also been mentioned frequently. One of the visiting American farmers reported that "the Soviets are making the great mistake of taking off all the stubble, which in itself is a good snow retainer." 49/

d. Drought Hazards

Droughts are a major hazard to the New Lands program. In the discussion of the southern limit of agricultural expansion, it was noted that the Soviets are extending cultivation as far south as average precipitation totals will permit. Even during an "average" year, agriculture would be in a precarious position in some of the newly cultivated areas. Soviet statistics for one station in the New Lands area over a period of 70 years show that 46 percent of the years had precipitation 10 percent or more lower than average and 26 percent had totals 20 percent or more lower than average. 63/ In areas where agriculture is precarious in an "average year," even a 10 percent reduction of precipitation would be hazardous. Therefore, the critical factor for agriculture is not so much average precipitation as the irregularity and undependability of the precipitation within any one year and from year to year.

FOR OFFICIAL USE ONLY

USSR: NEW LANDS



25090 1-56

MOISTURE ZONES*

0.5 and above ..... Sufficient moisture
0.2 — 0.5 ..... Deficient moisture
Less than 0.2 ..... Meager moisture

* *by coefficients of moisture based on relation of precipitation to maximum potential evaporation. (according to Soviet Geographer N. N. Ivanov).*

Union Republic boundary (SSR)
Oblast, Kray or Autonomous Republic (ASSR) boundary
Administrative center (Oblast, Kray or ASSR)
Main New Lands area

SOURCE: Izvestiya Akademii Nauk SSSR. Seriya Geograficheskaya Mar.-Apr. 1955.

0 100 200 300 Miles
0 100 200 300 Kilometers

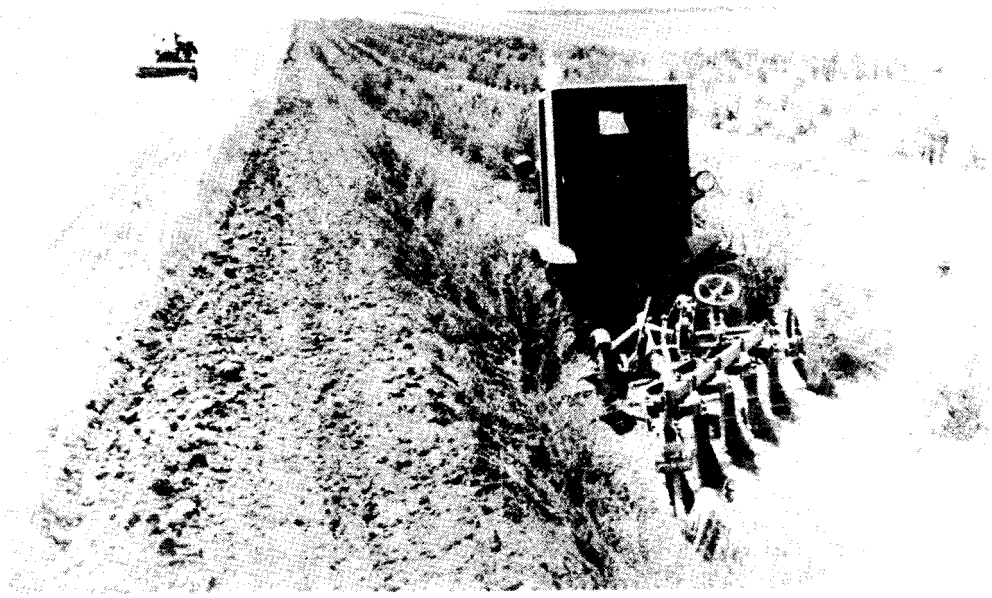


Figure 19. Cultivating newly planted shelterbelt in western Kazakhstan, 1951.

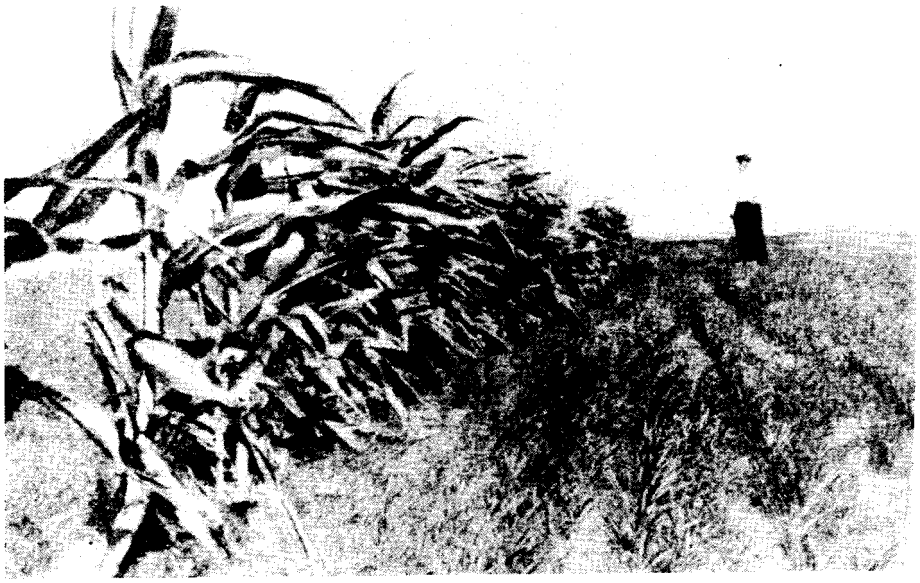


Figure 20. Corn row planted in wheatfield to catch blowing winter snows.

Normally, precipitation increases during the spring months, reaches a maximum in the summer, and then declines through autumn to a minimum in the winter. Nevertheless, dry spells may occur in May and June. In this critical period of crop growth, the moisture supply accumulated during the autumn and winter is quickly used up by the growing plants and evaporation and transpiration increase because of rapidly rising temperatures. It was one of these early summer dry spells that seriously reduced the harvest in 1955. After the spring wheat germinates, continued dry weather dries out the upper layers of the soil, and the small wheat plant cannot develop an adequate root system. Without proper rooting, a crop cannot be assured. Even with proper rooting, drought causes the wheat plant to speed up its growth processes in an effort to complete the ripening of the grain before the water supply is exhausted. The result is shriveled, prematurely formed heads that give low yields or poor quality grain. The heat and dryness of the atmosphere also cause more rapid transpiration by plants and a proportionally heavier drain on soil moisture.

The effect of drought on wheat yields is shown by a comparison of 1954 and 1955 yields in the New Lands region. According to a member of the visiting U.S. farm delegation, spring wheat at Rubtsovsk, Altayskiy Kray, yielded 21 centners per hectare* (barn yield) in 1954. In 1955, a drought year, the same area yielded 8 to 10 centners per hectare. Yields at Rubtsovsk are considerably higher than on most of the New Lands. At Atbasar 1954 yields averaged 11.5 centners per hectare and 1955 yields 3.5 to 4 centners per hectare. 107/

Hot, dry winds are sometimes associated with droughts, particularly in the western part of the New Lands area. Such winds increase evaporation and transpiration rates and have a desiccating effect on crops. Winds are discussed in greater detail in section II-B-3-c, pp. 41-42.

The late spring and summer droughts may be broken by rains, which improve the condition of the crops, or the drought may continue through a large part of the summer. The dry spells that occur frequently in autumn are sometimes followed by winters with particularly light snow cover. Maximum winter snow depths range from 25 cm in the south to 50 cm in the north. Should the snow cover be appreciably below normal, the soil-moisture reserves would be reduced, and a dry spell the following spring would be especially serious.

*1 centner per hectare = 1.49 bushels per acre.

Drought expectancy is particularly important in analyzing the probable degree of success or failure of the New Lands program in coming years. There are no definite climatic criteria for defining a drought. Drought is relative, depending on the extent of departure from normal moisture conditions in any specific locality. Records kept at Barnaul from 1857 to 1930 give some indication of the variability of precipitation from year to year. During this long period, 26 percent of the years had precipitation 10 percent or more above normal, 8 percent had precipitation 20 percent or more above normal, 46 percent had precipitation 10 percent or more below normal, and 26 percent had precipitation 20 percent or more below normal. 63/ Below-normal annual precipitation does not necessarily indicate drought, since favorable distribution might compensate for low rainfall in any specific year. According to A.A. Kaminskiy, a Soviet climatologist, drought conditions occur when there is a continuous period without rain, afternoon temperatures increase day by day, there is little cloudiness, and the absolute humidity is constantly low. 44,p.166/

The records for Barnaul indicate that a serious drought occurred on an average of once in every 5 to 8 years and usually lasted 2 years. One especially serious drought lasted 15 years -- from 1857 to 1872. In 1939, Lazar Volin of the U.S. Department of Agriculture stated during a period of nearly half a century following the catastrophic crop failure of 1891 in the lower Volga and Asiatic wheat regions only 11 years had a good moisture supply; 22 years experienced potential droughts during the growing season; and 15 years had full-fledged droughts. 123,p.179/ These 15 droughts occurred on an average of once in 2 to 4 years, but they varied from 2 years in succession to 1 in 7 years. According to other estimates, droughts may be expected in 2 out of 5 years. It can be assumed that the frequency of drought in the future will be about the same as in the past.

In 1954, moisture conditions were good in the New Lands and poor in the Ukraine, whereas in 1955 the situation was reversed. This has led to the development of the so-called "balancing out" theory, which some believe to be one of the motives behind agricultural expansion in the New Lands. Since droughts are usually confined to particular regions in any specific year, the production of wheat in several regions rather than in only one would reduce the hazard of a major Soviet grain shortage in any one year.

III. Settlement Structure in the Development of the New Lands

The New Lands area is by no means new as an agricultural region, although it includes large reserves of virgin and idle land. The main

area of expansion -- the southern part of Western Siberia, northern Kazakhstan, and Altayskiy Kray -- was colonized by agricultural settlers in Tsarist days, and agriculture and animal husbandry have long been important features of the economy.

The larger cities of the area, which originally served as market towns, key points in the transportation network, and distribution and supply centers, later developed diversified manufacturing. The New Lands area is well situated for importing basic industrial goods, since the major part of it lies between two great industrial complexes, the Urals and the Kuzbas, with a third growing industrial and mining center at Karaganda, to the south (Map 25083, at end of report).

Despite the established agricultural and industrial development, the distribution of population in the New Lands is irregular, and large areas are sparsely populated. The current Soviet agricultural program ushers in a new era of settlement and development. Many observers have noted similarities between conditions in the New Lands and along the frontier in the early days of the American West. Emphasis on permanent settlement in the New Lands continued to increase as the program moved into its second year. If successful, the program will introduce a new type of agricultural town into the steppes, stimulate the growth of established settlements, and increase population throughout the area.

A. Present Settlement Pattern

1. Origins of Settlement

The process of peopling the area now included in the New Lands project has been in progress since the colonial days of Tsarist Russia, when the Empire was being expanded to the east and south. Most of the large cities in the main New Lands area originated as fortresses at strategic points on overland routes, some of them early in the eighteenth century. Even the present-day major centers of northern Kazakhstan -- Petropavlovsk, Kokchetav, Akmolinsk, and Aktyubinsk -- were established as Russian outposts, not Kazakh settlements.

Although situated far to the east, the Altay region was the objective of Russian colonization as early as the end of the seventeenth and the beginning of the eighteenth century. Later, in the nineteenth and twentieth centuries, it received many immigrants from the Ukraine. The best agricultural lands of northern Kazakhstan were colonized by settlers from the Ukraine and the central chernozem region during the nineteenth century.

Settlement in these areas, however, received its greatest impetus from the building of railroads. The Trans-Siberian main line, particularly, was a major influence in bringing permanent agricultural settlement to Western Siberia. Construction was begun in the early 1890's and continued for about 13 years. The completion of the railroad opened up the adjacent lands to intensive agricultural settlement.

2. Population Density and Distribution

The present distribution of population in the New Lands is influenced not only by availability of agricultural land, as determined chiefly by climate and soils, but by transportation facilities, particularly railroads. In this area the majority of the population is concentrated along the widely separated rail lines.

The area from the Volga eastward to Chkalov and Orsk is shown on Russian maps as having a population density of 10-25 per square kilometer (26-65 per square mile). Densities are about the same in the vicinity of Chelyabinsk and Kurgan, around Omsk, in a narrow band along the main Trans-Siberian line eastward beyond Novosibirsk, southward from Novosibirsk into Altayskiy Kray and the Kuznetsk Basin. The rest of the main New Lands area falls within the category of 1-10 persons per square kilometer (2.6-26 per square mile). To the north and south the New Lands area is bordered by nonagricultural, sparsely populated areas with densities of less than 1 person per square kilometer (2.6 per square mile).

Within these general population categories densities vary locally. The northern and central portion of Kustanayskaya Oblast', according to best recent Soviet sources 26/, has an average rural density of 7 persons per square kilometer (18 per square mile). The part of Akmolinskaya Oblast' within the New Lands area (the north and central part) has an average density of 9 per square kilometer (23 per square mile). Population density falls to about 4 per square kilometer (10 per square mile) in the adjacent northern part of Karagandinskaya Oblast'. Along the northern section of the right bank of the Irtysh River in Pavlodarskaya Oblast', in easternmost Kazakhstan, highest densities are from 3 to 5 per square kilometer (8-13 per square mile). In the dry southwestern part of the oblast, densities drop to less than 1 per square kilometer.

In the oblasts in Western Siberia along the main Trans-Siberian line, densities are higher than in northern Kazakhstan. The densest population in Omskaya Oblast' is in the central part along the railroad, where densities rise to 15 persons per kilometer (39 per square

mile). Novosibirskaya Oblast' has its heaviest population concentrations, up to 16-23 per square kilometer (42-60 per square mile), in the eastern Trans-Ob' rayons, which are well served by rail transportation and are near the industrial Kuznetsk Basin. Densities are lower in the western part of the oblast, which is most emphasized in the New Lands program, and lowest -- 4 per square kilometer (10 per square mile) -- in the northern rayons of the Barabinsk Plain.

Altayskiy Kray has an average population density of 9 per square kilometer (23 per square mile), but the density rises to 20 (52 per square mile) on some of the better agricultural lands in the wooded-steppe and steppe zones.

3. Ethnic Composition

Great Russians are the dominant ethnic group throughout the New Lands, but many Ukrainians and Kazakhs, as well as representatives of various smaller nationality groups, live within the area.

The Volga area has significant Ukrainian and Bashkir minorities, and a few Tatars. In the Urals the proportion of Bashkirs increases. Ukrainians are also present, and Kazakhs appear as a minority group in the south near the borders of the Kazakh SSR, especially in Chkalovskaya Oblast'.

Ukrainians are relatively numerous among the farming population of Western Siberia, particularly in southern Omskaya Oblast' and in the Barabinsk Plain of Novosibirskaya Oblast'. Some Tatars are found in Kurganskaya Oblast' and another group of them near Lake Chany in the Barabinsk Plain, but they comprise an insignificant proportion of the population. Many other nationality groups of the Soviet Union are represented in the area, especially in the large cities. Like any frontier area, Western Siberia has been a melting pot for many nationalities.

In Altayskiy Kray the Ukrainian population ranks second only to the Great Russian, and Ukrainians are particularly numerous in the Kulunda Steppe. Chuvash and Kazakhs form small minority groups. Most of the native Altaic tribes live chiefly in the mountains in the southern part of the kray rather than on the agricultural lands.

Even in Kazakhstan, Great Russians appear to outnumber the native Kazakhs, with Ukrainians occupying third place. Soviet sources stress the fact that Kazakhs comprise the basic mass of the population throughout the republic, but this does not seem to be true for individual oblasts. In Akmolinskaya Oblast', for example, the census of 1939 indicated that about 30 percent of the population was Kazakh,

40 percent Great Russian, and 20 percent Ukrainian. 26/ The percentage of Great Russians in the total population of Kazakhstan has undoubtedly increased since 1939. In general, the Great Russians are concentrated in the larger towns and cities, especially in industrial and mining centers, and the Ukrainians are found chiefly in the rural villages of the better agricultural areas.

4. Rural Settlements

Rural settlement prior to the New Lands program consisted chiefly of compact agricultural villages. By that time, the dispersed farmsteads of the earlier settlers had gradually disappeared and been replaced by the nucleated settlements of kolkhozes, sovkhozes, and machine-tractor stations.

In the wooded-steppe area along the Trans-Siberian Railroad in Western Siberia, farm villages are usually small, with a population of about 500 or less. In the Barabinsk Plain of Novosibirskaya Oblast', the average number of households per kolkhoz ranges from 92 to 255. Within the boundaries of a single kolkhoz, there are usually several populated points, or small villages. The extensive type of cultivation in less humid areas of this type, plus the consolidation of kolkhozes in recent years, has contributed to this situation. Villages in the Kulunda Steppe of Altayskiy Kray are generally larger than those of the wooded steppe, with settlement concentrated near good water sources. Most of the numerous rural settlements in Altayskiy Kray are shown on a recent Soviet map as having a population of less than 2,000. 140/

Villages are most closely spaced near transportation routes. The larger settlements, which are often rayon centers, are generally located on a railroad line or a major stream. Village streets are generally unpaved. Wooden construction predominates in the villages of the wooded steppe, and log houses and wooden fences around individual homes are common. An occasional village made up entirely of whitewashed adobe huts reveals the Ukrainian origin of its inhabitants. A fairly dense net of local dirt roads connects the agricultural villages.

In the true steppe in Kazakhstan, south of the wooded steppe, the villages are more widely spaced and usually smaller. In Akmolinskaya Oblast', which will be a major center in New Lands development, populated places are spaced 30 to 40 kilometers apart. For the most part, they are located along rivers or on fresh-water lakes and have populations of 300 to 500, with an occasional larger village of 1,000 or more. Houses in the timberless steppe area are predominantly of adobe (Figure 21).

Figure 21. Adobe hut on a Kazakhstan kolkhoz.

5. Urban Settlement

There are a number of cities with populations of over 100,000 in the main New Lands area, as well as many smaller cities. The cities, however, are more widely spaced here than in European USSR. Novosibirsk, with a population estimated at 800,000,* is the largest city in the area. Other large cities in the RSFSR sections of the New Lands are Chelyabinsk (700,000), Omsk (600,000), Chkalov (225,000), Kemerovo (325,000), Barnaul (250,000), Tomsk (225,000), Tyumen' (130,000), and Kurgan (100,000).** These cities all have administrative functions, being oblast centers or the equivalent. Two of the large cities are not administrative centers. Orsk, a center of oil refining and heavy industry in Chkalovskaya Oblast', has a population of about 155,000; and Biysk, a city of 125,000, is located in a rich agricultural region in Altayskiy Kray.

*All population figures in this section are estimates, based on source 2 in Appendix C. In some cases these estimates seem too high.

**The industrial cities of the Kuznetsk Basin other than Kemerovo are not included here, since they have little connection with the New Lands program.

The large cities include the usual range of urban activities. Most of them are transportation centers and have varied industrial enterprises. Novosibirsk, usually described by observers as a booming frontier-type town despite its large size, is the most important industrial and transportation center east of the Urals. The products of its industries include electronic equipment, assembled airframes, optical instruments, steel products, arms and ammunition, and farm machinery.

In northern Kazakhstan the chief cities, which are also oblast centers, are generally smaller, and their industries are less varied. The outstanding exception is Karaganda, a huge coal-mining and metallurgical center in the southern part of the New Lands. The most recent estimates place the population of the Karaganda metropolitan area at around half a million. Both Petropavlovsk and Semipalatinsk are in the 150,000-population category, and Akmolinsk, Aktyubinsk, Ural'sk, Kustanay, Kokchetav, Pavlodar, and Ust'-Kamenogorsk are cities of 75,000 to 125,000 population. In all these cities mentioned except Karaganda, the processing of agricultural products occupies a prominent place among the industrial activities.

The impact of the New Lands program is likely to be more strongly felt in the many smaller cities in the area than in the large cities with diversified industries. The chief industries of the typical small steppe city are concerned with processing agricultural products and include flour mills, meat-packing plants, tanneries, and in some places woolen mills. Most of the oblast centers of Kazakhstan are of this type, with industries dependent on the products of their hinterlands. Kustanay and Akmolinsk, particularly, are frequently mentioned in the press as being centers for the development of new lands (Figure 22). Among the other small steppe cities are Shadrinsk in Kurganskaya Oblast', Ishim in Tyumenskaya Oblast', Troitsk in Chelyabinskaya Oblast', Atbasar in Akmolinskaya Oblast', and Kamen'-na-Obi and Slavgorod in Altayskiy Kray. Most of them fall within the 25,000-50,000 population range and will serve as local supply and market centers in the New Lands program.

Rubtsovsk in southern Altayskiy Kray, unlike many other small cities, is already a large center for the manufacture of tractors and agricultural machinery (Figure 23). Since the founding of these industries during and after World War II, Rubtsovsk has grown rapidly, and its position in the midst of a greatly expanded market area should be an added impetus to growth. In 1955 the population of Rubtsovsk was estimated at 70,000.

Figure 22. Scene in Akmolinsk, 1955. Most of the streets in this sizable city are unpaved.

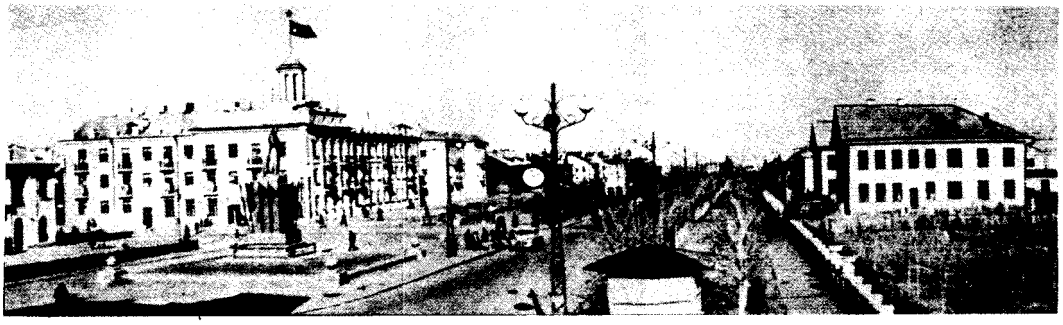


Figure 23. Rubtsovsk, probably one of the fastest-growing cities in the New Lands, 1952.

B. Impact of the New Lands Program

1. Official Policy Regarding Settlement and Construction

A period of several years with good harvests will be required before permanent settlements can become firmly established in the New Lands. No plans were made for building settlements in advance of immigration to the New Lands. Rather, the settlers themselves, mostly young agricultural workers, after being transported to the New Lands apparently were expected to do a large part of the actual building.

Khrushchev touched on the problem of living conditions in a January 1955 speech, months after the first settlers had gone to the New Lands area. He commented on the gradual improvement in housing, such as, progression from earthen floors to wooden, and urged settlers to use local building materials, such as the reeds of Kazakhstan. Since most of the New Lands are in a timber-deficient area, houses of clay and straw were recommended. Khrushchev emphasized the importance of carrying "town culture" to the steppes and urged the settlers to build schools, children's homes, and kindergartens. 35/

One of the early Party and Government decrees on virgin and idle lands clearly indicated the temporary character of initial settlement facilities. 94/ According to the decree the Ministry of Consumer's Goods was required to deliver large numbers of 25-man and 10-man tents to the Ministry of Agriculture and the Ministry of State Farms. Some provision for permanent housing was made in the decree, which stipulated that prefabricated housing units also were to be delivered to the Ministries of Agriculture and State Farms.

Housing and water supplies have presented major problems throughout the New Lands area. Primitive living conditions, with workers housed in tents and field wagons, apparently prevailed in many areas throughout 1954 and in some cases persisted into the second year of the program (Figures 24 and 25). Prefabricated houses and building materials, however, soon were moving into the area from woodworking enterprises in the northern parts of the USSR, along with such facilities as portable bathhouses. In spite of continuous press reports about the tardiness and inefficiency of the responsible construction trusts, houses and other buildings have apparently been springing up in the new settlements at a relatively rapid rate, possibly because of the initiative of the settlers in building their own homes.

Various types of prefabricated houses are being shipped in, ranging from single homes to multiple-flat buildings (Figure 26). One dormitory-type unit is described as consisting of 14 individual rooms and a common kitchen, dining room, drying room, and storage room.

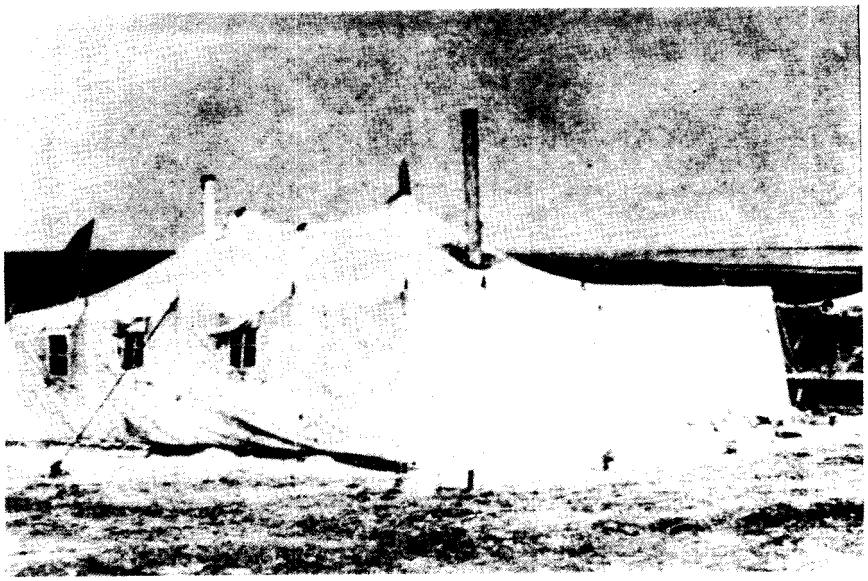


Figure 24. Tents used as temporary housing for settlers on new state grain farms.

Figure 25. Portable temporary housing on a sovkhoz in Chkalovskaya Oblast', June 1954.

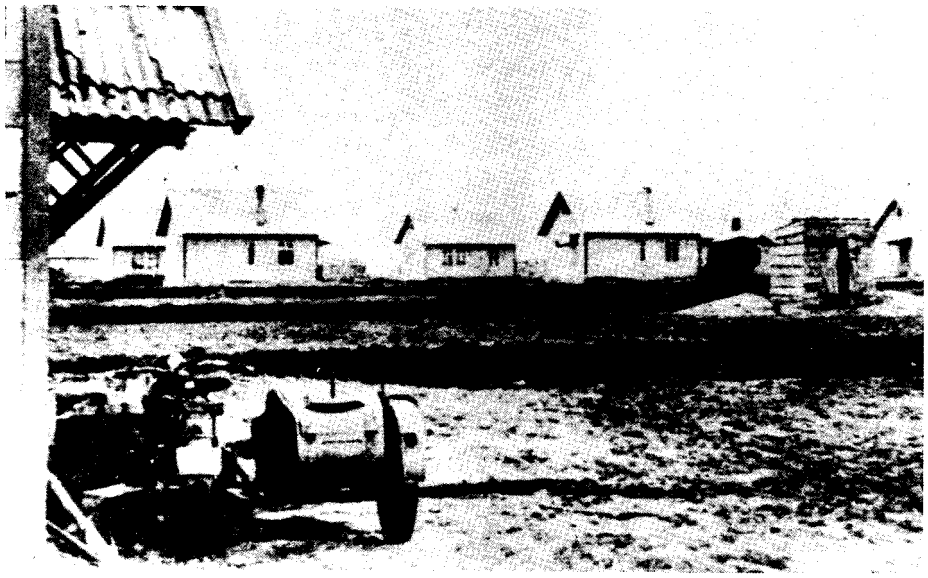


Figure 26. Prefabricated houses on a new sovkhoz in Altayskiy Kray.

Many of the settlers, however, are building their own homes with the aid of government loans. Such individual houses are generally made of mud brick because wood is scarce (Figure 27).

The use of local building materials has been facilitated by various local surveys. Stone, concrete, bricks, and other local materials have been widely used in the construction of grain storehouses. Even the Kazakhstan reeds have been used to a considerable extent in the manufacture of pressboard. Houses made of blocks and slabs of this material instead of clay bricks can be built very rapidly.

2. New Sovkhoz Settlements

In 1954, the first year of the New Lands activities, the burden of bringing new ground under cultivation fell chiefly on the kolkhozes already existing in the region. This work is being transferred to large new sovkhozes (state farms), 124 of which were established in the New Lands area in 1954 and 300 more in 1955 (Figures 28 and 29). Of this total, 337 state farms with a total of about 12.5 million hectares are in Kazakhstan. 85/ The large percentage of new state farms points up the importance of northern Kazakhstan in the New Lands project, but in actual acreage planted to grain, Kazakhstan does not

Figure 27. New settlers mixing brick for a house on a sovkhoz in Altayskiy Kray.

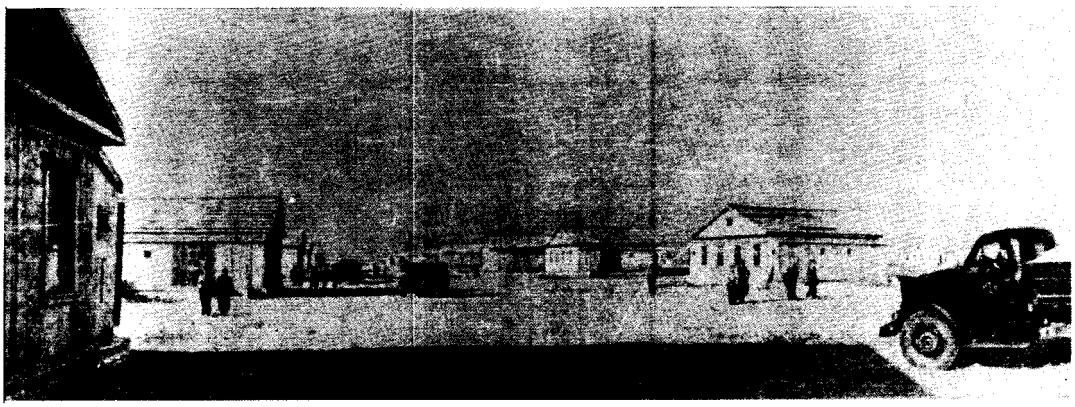


Figure 28. A new sovkhoz town in Kazakhstan, 1954.

Figure 29. Another sovkhoz settlement in Kazakhstan, 1955. Houses are almost identical to those in Figure 28.

rank quite so high. Apparently, in established farming areas that are already fairly well settled, such as Altayskiy Kray, southern Omskaya Oblast', and even Severo-Kazakhstanskaya Oblast', large acreages are to be brought under cultivation by extending the sown areas of existing kolkhozes and sovkhozes, and the new sovkhozes are being built chiefly in areas where few had existed before. Akmolinskaya Oblast', for example, has 77 new grain sovkhozes 34/ and Kustanayskaya Oblast' even more, while Altayskiy Kray has only 20 or so. 121/

The best estimate of the average size of the new state farms is in excess of 25,000 hectares. Estimates, however, vary from 20,000 to 50,000 hectares. Minister of State Farms Benediktov stated on one occasion that each farm has an average of 25,000 hectares of arable land, not including land of other types. 36/ According to a July 1955 report from Kazakhstan, the land area at the disposal of each sovkhoz varies from 20,000 to 40,000 hectares. Planning teams are working on land-utilization programs for the new sovkhozes, using aerial photographs to identify areas suitable for grain, hay, and pasture. The teams are also working on plans for internal transport, organization of settlements, and the layout of irrigation networks. 32/

In contrast to the frequent mention in the Soviet press of new sovkhozes, no mention has been made of new kolkhozes. Some new MTS's (machine-tractor stations), however, are being built to meet the needs of expanding agriculture on existing kolkhozes. This has been interpreted as evidence of a desire for direct state control over new lands, which is most easily accomplished if the sovkhoz is the dominant type of agricultural organization. The creation of new sovkhozes with larger, functionally planned settlements manned chiefly by young people is also a quicker and more efficient means of getting productive workers onto the land than is resettling whole peasant families on new kolkhozes. The personnel of established kolkhozes, however, is being increased by the immigration of whole families. For example, more than 4,000 families reportedly migrated to kolkhozes in Altayskiy Kray in 1954.

The most striking changes in settlement pattern apparently will take place in sparsely inhabited areas where new sovkhozes are being organized, notably in northern Kazakhstan. In areas already settled the chief effect will be an increase in total population and in the size of kolkhoz settlements, even though a few new sovkhozes will be established. On the new sovkhozes, however, new settlements are being created around the central farmsteads, and considerable centralized control will be exerted over the building of the new towns.

The Ministry of Urban and Rural Construction of the USSR is sending groups of architects, engineers, and other technicians to the

New Lands to select sites for the towns on new state farms. Each of the planned settlements was assigned an area of 60 to 100 hectares, allowing room for several streets. A central square, a park, a garden, and public buildings are planned for each settlement, with electric stations, workshops, and grain-storage facilities on the outskirts. The figure of 500-600 inhabitants is suggested for these "townlets," but population figures quoted for several individual sovkhozes are 1,000 or more.

The building of settlements on the large new sovkhozes affords an excellent opportunity for realizing Khrushchev's aim of carrying "town culture" to the steppes. The new settlements, with rows of apartment houses and cultural buildings, will be in striking contrast to the older kolkhoz villages. Although there has been no actual mention of agrogorods, much of the planning for sovkhoz settlements is reminiscent of Khrushchev's abortive 1950-51 scheme for resettling the agricultural population in rural cities. In September 1955, Pravda stated that "in the steppes, populated points of a new type are arising, with hospitals and maternity homes, libraries and reading rooms, baths and public dining rooms." 89/

According to the standard pattern, an ideal new settlement would apparently consist of dwelling houses (including apartment buildings), a school and nursery, public dining room, stores, bathhouse, "House of Culture," and other facilities (Figures 27, 28 and 29). Most of these buildings will be of the simplest construction. New houses have only two or three rooms, and the much-publicized Houses of Culture may be one-room structures. Some of the new settlements have been described in Soviet press and radio reports. At Kulundinskiy Sovkhoz in the Kulunda Steppe of Altayskiy Kray, for example, apparently a dormitory and store have been completed and houses, a school, a club, and a hospital are under construction. Plans also called for planting a "green ring" of trees around the sovkhoz town.

Many articles emphasize the quick change-over from the tents and field wagons of 1954 to permanent settlements. In regard to Izobil'nyy Sovkhoz of Akmolinskaya Oblast', Pravda said: "Last year on the farmstead of this sovkhoz there were scattered around only several komsomol tents, but now there stands here a comfortable small town with a population of 1,500 people. One hundred and fifty families of new settlers are being provided with private homes." 89/

Although primitive living conditions still prevail in many places, the provision of essential services to the new sovkhozes is being pressed forward. The most serious problem is the provision of a dependable water supply. The new farms must depend on wells, and so far the number of wells and the quality of the water do not seem to be

satisfactory. Commonly a single well supplies a whole village with water, and no plumbing or sewer facilities are available (Figure 30). However, the new sovkhozes are apparently being supplied with electricity, telephone, telegraph, and radio facilities at a fairly rapid rate.

Figure 30. A woman carrying water from a village well in Western Siberia. Scarcity of water is one of the chief problems of settlements in the New Lands.

3. Expansion of Existing Cities and Towns

The expansion of the sown acreage of the kolkhozes and the arrival of additional personnel will also increase the size of existing rural settlements. The growth of such centers has received some attention in the Soviet press, although the emphasis has been on the new settlements. Kolkhoz villages, as well as new sovkhoz settlements, report the construction of radio diffusion networks, electric power stations, schools, clubs, libraries, and medical centers as new families arrive from European USSR.

Many railway-station settlements and urban centers in areas of agricultural expansion will also tend to increase in size and function. A striking example of a growing railroad town is Karasuk in the southern part of Novosibirskaya Oblast'. Karasuk, located on the Tatarsk-Kulunda line, is also the center for the construction of the new Karasuk-Kamen' broad-gauge line. A new settlement for railroad workers is growing up and new grain elevators have been built on the outskirts of the town. A considerable number of apartment houses are under construction, as well as schools, warehouses, clubs, and other public and cultural buildings. The completion of the Karasuk-Kamen' line will also speed the development of its other terminus, Kamen'-na-Obi, which is now a river port with important food-processing industries.

Another settlement that is likely to develop rapidly because of the expanding rail net is Peski, located at the crossing of the Kustanay-Kokchetav-Kaymanachikha line and the Kurgan-Sovkhoz Krasnoznamenskiy line. Although it was formerly only a small village near the Ishim River in Kokchetavskaya Oblast', Peski is now scheduled to become an important rail center.

An example of the impetus to the growth of steppe cities is given by a press report from Kustanay in April 1955, which noted that that city had become the center of one of the largest areas of new-land development. 86/ The article further stated that many new enterprises are either planned or under construction, among them the largest grain elevator in Kazakhstan, a plant for making reinforced concrete, and a brickyard. Housing is being provided for construction workers, railway workers, geologists, and other workers brought in by the New Lands program.

Development of the iron ore deposits south of Kustanay, which are located near the confluence of the Tobol and Ayat Rivers will give new importance to Kustanay and Tobol. A new city is also planned for the actual site of the ore-extraction combine, which will be on the railroad now under construction between Kustanay and Tobol.

In cities such as Rubtsovsk, where agricultural-machinery plants are already in operation, the expansion of these and related industries is already in progress. In Pavlodar, a large new agricultural-machinery plant is under construction.

4. Changes in Ethnic Composition

The resettlement program in the New Lands area will have a marked effect on ethnic composition. Figures on the number of migrants or

their ethnic origin, however, are incomplete. Frequent fragmentary reports suggest a continuing flow from almost all parts of European USSR into the New Lands, chiefly Kazakhstan, Altayskiy Kray, and some oblasts of Western Siberia. For 1954, the first year of the program, a commonly quoted figure is 150,000 immigrants. In the fall of 1955, Benediktov announced that a total of 450,000 volunteers had gone to work on the collective and state farms of the New Lands. 36/ This figure apparently did not include demobilized soldiers, technical experts, or railroad construction workers, whose addition might bring the total up to more than half a million. Kazakhstan alone has received over 290,000 immigrants, according to late 1955 press and radio reports. 37/

In order to induce settlers to go to the New Lands, the state has made liberal financial allowances, including free transportation, long-term credits for construction of homes, loans for livestock purchases, increased wages, and subsidies of other types. Most of the settlers actually seem to be volunteers attracted by patriotism, the adventure of the new frontier, or the liberal government allowances. Nevertheless, many technically qualified cadres, such as machine operators, engineers, and agronomists, are undoubtedly being moved into the New Lands under Party or Government orders.

The majority of the new workers seem to be young people from the urban centers; the press frequently reports the departure of trainloads of volunteers from Moscow, Leningrad, and other cities. Settlers for the New Lands are also being recruited from the Ukraine, Belorussia, Moldavia, and the Baltic republics, as well as from the RSFSR. The central industrial region and the central chernozem oblasts of the RSFSR appear to be supplying considerable numbers of settlers. Ethnically the composition of the immigrants is probably in proportion to the size of the three major Slavic groups of the USSR -- chiefly Great Russians, next Ukrainians, and then Belorussians -- with smaller numbers from the other nationality groups. There are some indications that settlers are also being recruited in the Central Asian republics, but probably in small numbers. A group of settlers from one city or area usually moves as a unit into the New Lands, and some areas have provided the complete complement of cadres for a new state farm. Leningrad, for example, has manned 15 new grain sovkhozes in Pavlodarskaya Oblast'.

The greatest ethnic change will be in the Kazakh portion of the New Lands, where the inflow of Slavic settlers will accelerate Russification of the area and reduce still further the relative proportion of native Kazakhs in the population. This is a continuation of an already established trend that has strong political implications.

IV. Expansion of Transportation in the New Lands

The success or failure of the New Lands program will depend in part on the availability of an efficient transportation system capable of meeting the heavy traffic demands associated with the importation of construction materials and the movement of grain and other agricultural products. Adequate railroad, road, and inland-waterway facilities will speed up the settlement of millions of acres of uncultivated lands, as well as guarantee the timely transport of grain and other agricultural products to processing centers.

In 1954, during the initial stages of the New Lands program, transportation was very inadequate. The rail net consisted chiefly of the east-west Trans-Siberian and Turkestan-Siberian (Turksib) trunklines and a few key railroads that crossed the New Lands area roughly from north to south. The Akmolinsk railroad junction and classification yard, located at the intersection of the South Siberian and Petropavlovsk-Karaganda lines, handled much of the freight traffic destined for the virgin and idle lands of northern Kazakhstan. It was known as the gate to the New Lands.

Roads in the New Lands area left much to be desired. Except for a few improved roads* following major rivers and railroad lines, most of the roads were unimproved dirt lanes that became muddy and unfit for motor traffic during the rains of autumn and spring (Figure 31). Many roads were no more than cross-country tracks, inadequately distributed and lacking road signs or orientation markings of any kind. The only inland waterways in use were a few hazardous stretches of the Ob' and Irtysh Rivers, which at best permitted only light traffic.

The Soviet Government, fully aware of the need for improved transportation in the New Lands, has taken ambitious steps to construct new avenues for overland freight movement and to develop inland waterways for greater commercial use. To date the construction program has been focused mainly on railroads, which are expected to carry the bulk of freight traffic in the New Lands. Road and inland-waterway improvement has progressed at a much slower rate because of lower immediate priority.

*This category includes roads with a built-up travelway, with gravel surfaces that have been reinforced or rolled. Improved roads are generally provided with drainage ditches and can be used for normal traffic throughout the year.

Figure 31. Seasonal unimproved dirt road of the type commonly seen in the New Lands region.

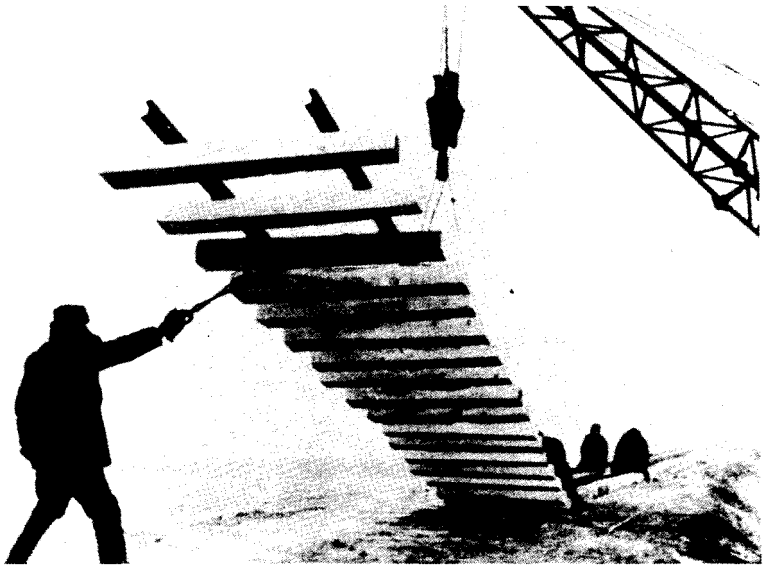


Figure 32. Laying narrow-gauge track on the newly constructed Kustanay-Uritskoye rail line.

A. New Railroads and Their Significance to the Overall Program*

With the initiation of the New Lands program, the construction of some 2,132 kilometers of new railroad lines was started in the vast expanse extending from the upper reaches of the Tobol River to the Irtysh and Ob' Rivers. The new lines, mainly of narrow gauge, will cut from west to east and from north to south across the main stretches of virgin and idle lands that are being brought under cultivation in northern Kazakhstan, the Altayskiy Kray, and the districts of Kurgan, Omsk, and Novosibirsk.

The predominance of narrow-gauge lines, approximately 1,390 kilometers of the total of 2,132, reflects the need for quick and cheap construction. Narrow-gauge lines can be laid quickly, with a minimum construction effort and a relatively small financial outlay (Figure 32). They are somewhat more expansive than hard-surfaced motor roads, but considerably cheaper than broad-gauge rail lines. Broad-gauge lines, however, are capable of handling heavier traffic and are therefore being constructed in areas where heavy traffic is anticipated. For this reason, some of the new lines originally planned as narrow-gauge are being changed to broad-gauge.

The network of narrow- and broad-gauge lines is intended to speed up the development of the New Lands and to guarantee transportation to processing points for grain and other agricultural produce, even from remote producing areas (Figure 33). In addition, the railroads will enable thousands of workers and settlers from the heavily populated areas of the European USSR to move to far-off districts in the New Lands (Figure 34). Essentially, the new lines will serve as feeder lines to the Trans-Siberian and South Siberian trunklines, which roughly bound the New Lands area on the north and south. Some of the new lines will branch off from one or the other of the two trunklines; others will connect with existing branches.

*Transportation data in this section were derived primarily from Soviet radio broadcasts and newspaper articles, which are exceptionally numerous because of the high propaganda value placed on transportation in the New Lands program. The information was spotty, incomplete, and in many cases inconsistent or contradictory. The material in this section is largely taken from such scattered accounts pieced together and evaluated against each other. Consequently the presentation as a whole is new, and no single source can be cited for many of the statements made. The section on railroads has been coordinated with S/Tr.

Figure 33. Types of broad-gauge locomotive and rolling stock to be used in transporting grains from the newly cultivated areas.

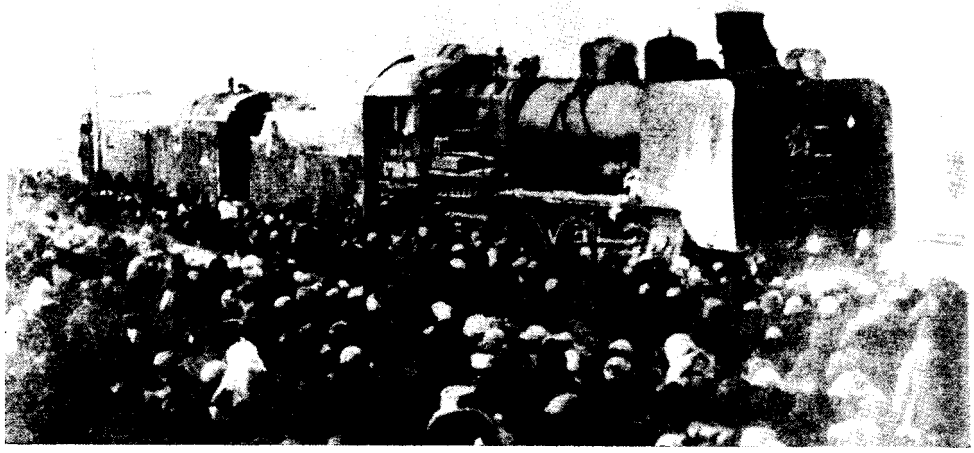


Figure 34. Train arriving at Kustanay with volunteer colonists from Moscow and the Ukraine.

Some of the new construction will serve those state farms that are being designed as show places of the huge agricultural program, such as Sovkhozes imeni Khrushcheva, im. Lomonosova, and Pobeda. According to present plans, other lines will terminate at large state farms, such as Sovkhozes Ozernyy, Krasnoznamenskiy, and im. Malenkova (see Map 25083, at end of report).

1. The Kustanay-Kokchetav-Kaymanachikha Line

This railroad is the longest of the lines planned for the New Lands in northern Soviet Central Asia. From Kustanay a rail terminus on the upper reaches of the Tobol River, it follows a roughly east-west course for approximately 820 kilometers to the settlement of Kaymanachikha on the Irtysh River.

The Kustanay-Kokchetav-Kaymanachikha line, when completed, will cut through the heart of the New Lands area in northern Kazakhstan about halfway between the Trans-Siberian Railroad on the north and the South Siberian Railroad on the south. At Kustanay, it will connect with a new industrial line currently under construction to Tobol, which will provide access to an area of huge, recently discovered iron-ore deposits in the vicinity of Lake Sarbay and near the village of Sokolovskiy. At the settlement of Kokchetav, the new railroad will intersect the Petropavlovsk-Karaganda-Balkhash line of the Karaganda railroad system.

Construction of the Kustanay-Kokchetav-Kaymanachikha line was progressing at a rapid pace to insure at least temporary service along sections of the line by the 1955 harvest season. According to the Soviet Ministry of Railroads the entire line was to be completed by August 1957. 50/ Original plans called for narrow-gauge construction throughout. Information as of April 1955, however, indicates that the 190-kilometer section from Kokchetav through Chkalovo to Kzyl-Tu was changed to broad gauge because of unexpected increases in traffic.

Construction is most advanced in the Kustanay-Peski-Kokchetav stretch. By October 1955, the Soviets had announced that two parts of this stretch had already been completed and commissioned for railroad traffic: (a) from Kustanay to the rayon center of Uritskoye, a distance of approximately 135 kilometers (Figure 32), and (b) from the village of Volodarskoye to Kokchetav, some 80 kilometers. Railroad surveying and construction work are also reportedly underway between Uritskoye and Volodarskoye (Figure 35). Between Kustanay and Kokchetav, according to Soviet sources, a number of railroad junctions, stations and sidings, water-supply points, temporary wooden

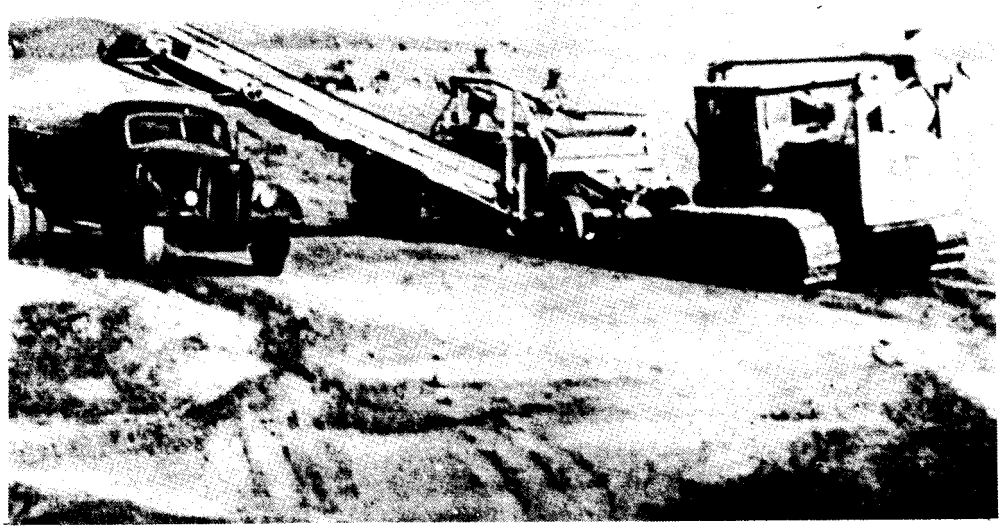


Figure 35. Initial phase in construction of narrow-gauge railroad in the area east of Kokchetav.

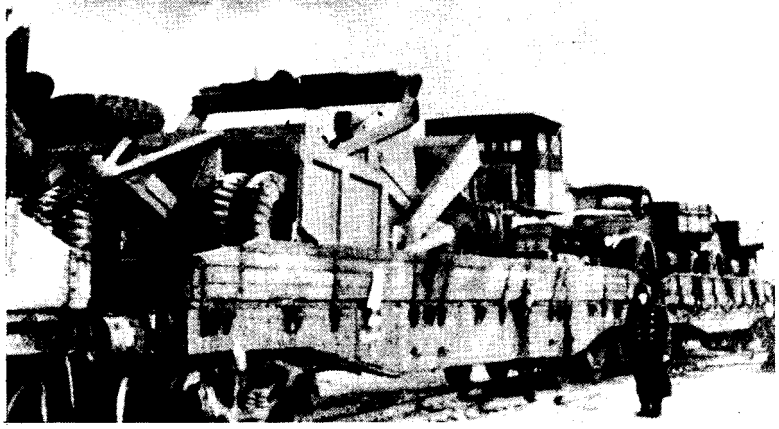


Figure 36. Trainload of farm machinery for new state farms arriving at Kustanay.

bridges, and communication lines are being constructed. A transloading station between narrow- and broad-gauge lines is being built at Kustanay to facilitate the transshipment of farm machinery and grains and other agricultural products (Figure 36). The small village of Peski, located on the left bank of the Ishim River approximately 220 kilometers east of Kustanay, is earmarked to become a significant railroad junction. Here, the east-west Kustanay-Kaymanachikha line will be intersected by another line leading northwestward to Kurgan and southeastward via Atbasar to Sovkhoz Krasnoznamenskiy (Red Banner State Farm). Heavy demands on railroad facilities at Peski are anticipated because of the nearby large Khrushchev state farm. The Tobol River at Kustanay and the Ubagan River some 100 kilometers to the east are reportedly crossed by temporary wooden bridges.

Construction appears to have been completed on a 80-kilometer section extending from Kokchetav eastward to Chkalovo. According to plans, this section was to be commissioned for temporary service by September 1955. To date, the opening of the line has not been confirmed. East of Chkalovo, railroad construction is less advanced. Indications suggest that a narrow-gauge track is still planned for the stretch eastward from Kzyl-Tu to Kaymanachikha on the Irtysh River. Although the route east of Kzyl-Tu may have been surveyed and the roadbed laid, it is doubtful whether construction has been completed.

2. The Kurgan-Peski-Sovkhoz Krasnoznamenskiy Line

The Kurgan-Peski-Sovkhoz Krasnoznamenskiy line is the second longest of the new lines under construction. As shown on a sketch map originally published in the Soviet newspaper Gudok, 28 October 1954 145/, the line branches off the Trans-Siberian trunkline at Kurgan and follows a southeasterly course for a distance of approximately 550 kilometers through the Severo-Kazakhstanskaya, Kustanayskaya, Kokchetavskaya, and Akmolinskaya Oblast's of the Kazakh SSR. At the settlement of Atbasar, located some 450 kilometers southeast of Kurgan, the railroad intersects the significant and recently completed South Siberian trunkline. According to current plans the line terminates at the large state farm Sovkhoz Krasnoznamenskiy, north of the Tengiz lakes.

Construction of the railroad is reportedly progressing along the entire route from Kurgan to Sovkhoz Krasnoznamenskiy. The route has been surveyed, and some sections of completed roadbed and track have been put into operation. Following a pattern of construction similar to that used on the Kustanay-Kokchetav-Kaymanachikha line, the railroad is being built in several sections. Although some

sections have been completed, others are still in various stages of construction. Efforts were made to have approximately half of the entire line completed by the end of the 1955 harvest season.

The northernmost railroad section under construction extends from Kurgan to Peski, a distance of about 268 kilometers. Although originally planned as a narrow-gauge line, broad gauge was later adopted. The change is attributed to growing transportation needs in the area. A 160-kilometer stretch of this railroad section, which connects Kurgan with the Sovkhoz im. Khrushcheva, was earmarked for completion by the end of August 1955. According to Sovetskaya Molodezh' 43/, it had been completed and opened for temporary traffic by August 1955. Four new stations between Kurgan and Sovkhoz im. Khrushcheva have been mentioned, but they cannot be located on available maps. The stations are Kairankul near Sovkhoz im. Khrushcheva, Utyak in Kurganskaya Oblast', Polovinnoye 67 kilometers south of Kurgan, and Troyebratnaya in Kustanayskaya Oblast'.

Construction is least advanced along the narrow-gauge section extending 125 kilometers southeastward from Peski to Sovkhoz Pobeda (Victory State Farm). Although this stretch has been surveyed, it apparently is not scheduled for completion until sometime in 1956. Preparations are being made for building a railroad bridge across the Ishim River near the southern outskirts of the Peski railroad junction. A large railroad station, Stantsiya Barakul, some 7 kilometers northwest of Sovkhoz Pobeda is reported as completed. It has been provided with grain-storage facilities, loading ramps, and administrative buildings and will probably serve the transportation needs of the sovkhoz.

Construction has been active for some time along the narrow-gauge section connecting Stantsiya Barakul and Sovkhoz Pobeda with Atbasar on the South Siberian trunkline. In August 1955, Pravda announced the opening of train traffic along this entire section. 130/ The construction of the line, which originally was started at Atbasar, was under the jurisdiction of the Baltic Transport Construction Trust (Balt-Trans-Stroy). The workers came mainly from Daugavpils, Limbazi, and other towns and rayons of the Latvian SSR. New railroad stations reportedly in operation along the completed railroad include Atbasar II, Kovyl'naya, Sovetskaya, Khlebnaya, Ovrazhnaya, and Kosogornaya. New railroad sidings are also reported at the settlements of Krutoy and Baygut.

Completion of the 100-kilometer narrow-gauge section between Atbasar and Sovkhoz Krasnoznamenskiy also appears to be imminent. In August 1955, Pravda reported that this section of line was about to be opened to traffic, and that narrow-gauge locomotives and coaches

were already available for scheduled runs. 130/ Completion was originally scheduled for the end of 1955 to insure the shipment of that year's grain harvest. In addition to servicing the huge Krasnoznamenskiy State Farm, the new line is to handle the transportation needs of other state farms in the area, such as Bauman, Astrakhan', and Kurzhunkul. The railroad junction of Atbasar is designed to become an important railroad center capable of handling the transloading and transshipment of large quantities of grain from the newly developed state farms. A new railroad station, Stantsiya Magdalinovka, has been reported between Atbasar and Sovkhoz Krasnoznamenskiy, but the exact location is not known.

3. The Karasuk--Kamen'-na-Obi Line

The Karasuk--Kamen'-na-Obi line is one of the relatively few broad-gauge lines under construction in the New Lands area. According to plans, the 250-kilometer line will be the main link of a proposed Central Siberian trunkline connecting Omsk with Barnaul. According to Gudok of 28 October 1954, 50/ the line is scheduled to be in full operation by August 1957. It may be opened for temporary traffic, however, as early as the summer of 1956.

When completed, the new line will contribute greatly to the economic development of the Kulunda plain by speeding up the shipment of workers, construction materials, and agricultural machinery to newly created state farms in the area, as well as by improving facilities for exporting grain, livestock, and other agricultural products. Currently the transportation of wheat and livestock from local state farms to processing centers at Karasuk or Kamen'-na-Obi is being handled by slow-moving truck convoys.

The rayon centers of Karasuk and Kamen'-na-Obi will also assume greater economic importance as a result of the new railroad. Karasuk is being developed into an important railroad junction and hub serving both the new line and the existing Tatarskaya-Kulunda-Semipalatinsk line. The ancient town of Kamen'-na-Obi is to be developed into a great urban and industrial center, which undoubtedly will affect the economy of adjacent rayons.

Construction of the Karasuk--Kamen'-na-Obi line is under the jurisdiction of Construction Trust No. 12 of the Ministry of Transport Construction, which has its headquarters in Karasuk. Mechanized operations are handled by two units of the Siberian Mechanized Construction Trust (Trest Sibstroymekhanizatsiya). One unit is based in the village of Zubkovo, located 43 kilometers east of Karasuk, and a second unit operates from the village of Khabary, approximately 100 kilometers east of Karasuk.

To date, construction has proceeded at only a moderate rate. As of May 1955 the entire line had been surveyed, but completed track and roadbed extended only a few kilometers eastward from Karasuk to sidings Karasuk II and Tselina. The embankment for the roadbed has been built for a distance of about 100 kilometers, to a point somewhere near the village of Khabary.

The Karasuk railroad station is the receiving center for construction materials, which include rails from Stalinsk, railroad spikes from Magnitogorsk, and lumber for ties from the Khakaskaya ASSR. New terminal and transloading facilities and a large railroad-workers settlement are reported under construction in the vicinity of Karasuk. Plans for the new line also call for the construction of 18 railroad stations and 3 sidings. Of these, only the stations of Mir, Zubkovo, and Khabary and the sidings at Karasuk II and Tselina are known to be under construction.

4. The Tuz-Kala--Uspenka Line

This line is a short extension of the broad-gauge Maraldy-Tavolzhan line, which branches off from the South Siberian Railroad. Tuz-Kala appears to be the name for the railroad station and terminal at Tavolzhan and probably for the recently constructed railroad-workers settlement near the station. The 32-kilometer extension is to be completed by August 1957. This rather remote completion date supports the theory that construction progress to date is negligible or non-existent. The line is probably designed to supply and service new state farms in the vicinity of Uspenka. The present Tuz-Kala--Maraldy line is used to transport salt extracted from the saline deposits of Maloye Tavolzhanskoye Ozero (Small Lake Tavolzhan).

5. The Bulayevo-Sovkhoz im. Malenkova Line

This narrow-gauge railroad was constructed to provide an outlet for grain produced at new state farms located in Bulayevskiy Rayon of Severo-Kazakhstanskaya Oblast' and in Chkalovskiy Rayon of Kokchetavskaya Oblast'. The new line branches off the Trans-Siberian trunkline at Bulayevo and terminates at the large Sovkhoz im. Malenkova. The completed line is approximately 100 kilometers long. Originally the line was scheduled to be completed and opened for temporary traffic by August 1955.* A new railroad station is known to have been built at Uspenka, a small village 20 kilometers south of Bukyevo.

*A Soviet broadcast from Alma-Ata, dated 22 July, reports that the line was commissioned 20 days ahead of schedule. 33/

6. The Yesil'-Sovkhoz im. Lomonosova-Uritskoye Line

This narrow-gauge railroad will link the settlement of Yesil' on the Karaganda railroad with the village Uritskoye some 200 kilometers to the north on the Kustanay-Kokchetav-Kaymanachikha line. The line is to facilitate grain shipment from newly cultivated lands in Ruzayevka Rayon of Kokchetavskaya Oblast' and in Uritskoye and Semiozerny Rayons of Kustanayskaya Oblast'.

Only a 90-kilometer section, running between Yesil' and the new Sovkhoz im. Lomonosova, was due to be completed by the end of 1955. As of September 1955, some of the completed track was ready for limited traffic and narrow-gauge locomotives and rolling stock were assembled at Yesil'. It is possible that the entire section is now completed and that limited railroad traffic may be operating.

7. The Shilda-Adamovka-Sovkhoz Ozernyy Line

This narrow-gauge line branches off the Chelyabinsk-Orsk railroad at Shilda and leads southeastward via Adamovka to Ozernyy, a new state farm near the Kazakh border. Covering a distance of approximately 170 kilometers, the line is to serve exclusively the transportation needs of Adamovskiy Rayon of Chkalovskaya Oblast'. Construction was started in 1954, and temporary traffic started by the end of August 1955 along the 75-kilometer stretch between Shilda and Adamovka. Nine stopping points have been opened on this line, including Shilda-Novaya, Anichovka, and Adamovka. The entire line to Sovkhoz Ozernyy is to be completed by 1957.

B. Improvement and Expansion of the Road Network

During the construction of railroads, the New Lands must depend mainly on motor and wagon transport (Figure 37). To date, however, only a few roads are capable of meeting the increasing freight traffic requirements of state and collective farms in the area. Most of the existing roads are seasonal dirt roads or cross-country steppe tracks on which motor traffic is extremely slow and inefficient (Figure 38). It is not uncommon for trucks to lose their way or to make long detours before arriving at their destinations. Frequently, grain shipments are taken unnecessarily far out of their way to reach certain railroad or river transloading stations. For example, grain is hauled by truck from the Presnogor'kovka procurement center (in Kustanayskaya Oblast'), a distance of 240 kilometers to Kustanay, although there is a railroad station only 100 kilometers away.

The USSR Ministry of Motor Transportation and Highways, acutely aware of the need for better roads in the New Lands, initiated an

Figure 37. Loading wheat on a truck in Kazakhstan. Trucks currently serve as the principal means of transporting wheat in the New Lands.

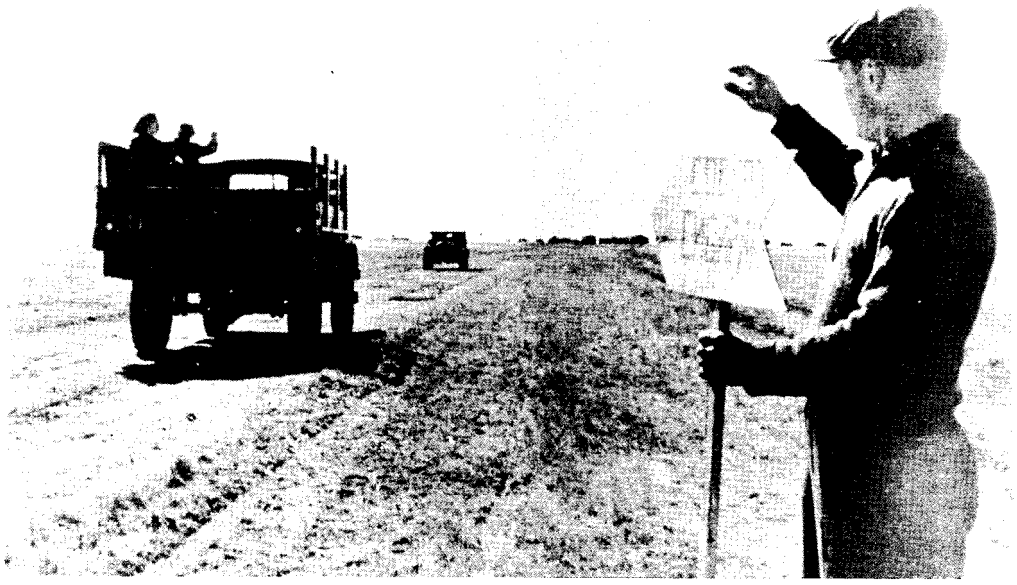


Figure 38. Track across the steppe, typical of those in the newly cultivated areas.

ambitious project involving the repair of existing roads and the construction of some 6,000 kilometers of new road. According to plans, roads are to play a major role in the rapid assimilation of the steppe lands, in addition to assuring the newly organized state farms of adequate traffic routes.

As a result of the road-construction program, a number of the existing unimproved dirt roads and cross-country steppe tracks are being repaired to accommodate year-round traffic. Several are being graded and some are being hard surfaced.* The few improved dirt and hard-surfaced roads in the New Lands area are also undergoing improvement to increase their traffic capabilities. The following five improved roads provide the backbone of the present road network in the New Lands:

(1) The Omsk-Pavlodar-Semipalatinsk highway, which parallels the right bank of the Irtysh River, continues southward to Ayaguz and then crosses the Arbagatay Mountains to Sinkiang in China. An improved branch road forks off at Cherlak and leads to Akmolinsk, the oblast capital.

(2) The Novosibirsk--Barnaul--Biysk--Kosh-Agach highway is one of five main routes between the Soviet Union and Mongolia. The northern section, which closely follows the railroad to Biysk, is partly gravel surfaced and partly unimproved dirt. From Biysk the highway continues as the Chuiskiy Trakt to Kosh-Agach and crosses the Altay mountains to Mongolia (Figure 39). In this section, the road is asphalt surfaced, three lanes wide, and has drainage ditches.

(3) and (4) Two improved roads cross the steppe lands of western Altayskiy Kray. One road leads from Novosobirsk to Kamen'-na-Obi and Aleysk; the other runs from Barnaul to Aleysk and Rubtsovsk. Along sections of their routes, both roads follow roughly the course of the Ob' or the Charysh River.

(5) The Petropavlovsk-Kokchetav-Atbasar road crosses one of the areas of heavy agricultural activity in the New Lands.

New road construction is gaining momentum in various districts of northern and northwestern Kazakhstan, the southern Urals, the Ishim and Barabinsk Plains, and in Altayskiy Kray. From the initiation of the road program in the spring of 1954 to early 1955 progress was

*Hard-surfaced roads are constructed of compact crushed rock or are paved with cobblestones, macadam, asphalt, or concrete. Most such roads are in areas of heavy year-round traffic.

Figure 39. A section of the Chuiskiy Trakt between Biysk and Kosh-Agach.

Figure 40. Travelers on a dusty road typical of the newly built roads in northern Kazakhstan.

very slow. This delay in getting started may be attributed in part to the lack of sufficient mechanized building equipment and in part to the higher priority given railroad construction. During 1955, however, the situation improved somewhat, and several of the projected roads may have been commissioned for traffic by the end of the year.

1. Northern and Northwestern Kazakhstan

In this area the Kazakh Ministry of Automobile Transport and Highways is directing an ambitious program calling for the construction of some 2,600 kilometers of new roadway. As in other parts of the New Lands area, progress at first was slow. Construction has been reported on only about one-fourth of the initially planned roads. Much of the work completed appears to be of poor quality, and the new roads are not suited to climatic conditions in the area (Figure 40). Soviet critics have reported rapid deterioration of some of the newly built hard-surfaced roads.

One of the more important roads under construction connects Severo-Kazakhstanskaya and Kokchetavskaya Oblast's, leading from Petropavlovsk on the Trans-Siberian Railroad, through the settlements of Mar'yevka and Stavropol'ka, to the planned railroad junction at Peski. The road, which is approximately 230 kilometers long, will skirt the banks of the Ishim River.

A newly built gravel road 100 kilometers long reportedly runs from Yelenovka in Kokchetavskaya Oblast' to the South Siberian railroad station at Dzhaksy in Akmolinskaya Oblast'.

Kustanayskaya and Kokchetavskaya Oblast's are to be connected by a new road leading from the railroad station at Uritskoye to the agricultural settlement of Ruzayevka. Uritskoye and Ruzayevka are connected by dirt roads with the oblast centers of Kustanay and Kokchetav, respectively.

Two gravel-surfaced roads are reported to be under construction in Kustanayskaya Oblast' proper. One leads from Kustanay northward along the Tobol' River to Vvedenka, the other extends from Uritskoye to the small settlements of Karasu and Kaybagar.

Shorter stretches of new road are reportedly under construction in Akmolinskaya, Zapadno-Kazakhstanskaya, Aktyubinskaya, Pavlodarskaya, and Karagandinskaya Oblast's. In Akmolinskaya Oblast', most of the new roads will connect remote state farms with railroad stations and grain-storage facilities. Roads now being built will lead from

Akmolinsk to the agricultural settlements of Romanovka and Rozhdestvenka. Three other new roads already connect the South Siberian Railroad with outlying farm settlements. Others lead from Atbasar southward to Ladyzhenka; from Dzhaksy northward to Chistopol'ye; and from Dzhaltyr on the South-Siberian Railroad southward to the village of Astrakhanka and northward to Makinsk on the Akmolinsk-Petropavlovsk line.

In Zapadno-Kazakhstanskaya Oblast' a recently completed road connects the urban center of Ural'sk with the agricultural settlement of Dzhambeyty, 140 kilometers to the southeast.

2. Southern Urals Region

Preparations are underway for the construction of several new roads in the virgin lands of Kurganskaya, Chelyabinskaya, and Chkalovskaya Oblast's and in the Bashkirskaya ASSR. The Soviets estimate that in the next 3 years a total of some 1,000 kilometers of new roadway will be built in the southern Urals region. Plans call for the construction of several hard-surfaced roads. Responsibility for this construction has been placed on the recently organized "Urals Trust of Road Machine Stations," which has its headquarters in Chelyabinsk. This organization apparently will handle road construction throughout the entire region.

A new motor road in Kurganskaya Oblast' connects the oblast center of Kurgan with the small settlement of Zverinogolovskoye, located on the right bank of the Ubagan River. The road, which is 125 kilometers long, has already been commissioned for truck traffic. Heavy traffic in grain, chemical fertilizers, and building materials is reported.

The building of several new roads has been reported in the steppe area east of Magnitogorsk in Chelyabinskaya Oblast'. According to the Soviets, these roads will connect state and collective farms in the Chesma, Varna, Verkhne-Ural'sk, and Agapovka areas with railroad lines leading to Magnitogorsk, Karaganda, and Chelyabinsk. One of the roads will lead from the rayon center of Chesma to Tamerlan Station on the Chelyabinsk-Orsk line near the village of Varna.

In Chkalovskaya Oblast', a 60-kilometer road is under construction between the town of Buzuluk and the rayon center of Andreyevka to the south. A number of additional support roads are also being built from state grain farms to the nearest railroad.

Roads are also reportedly under construction in the southern rayons of the Bashkirskaya ASSR. One of them, some 100 kilometers

long, will connect the rayon center of Zilair with the village of Sibay near the Ural River.

3. Ishim and Barabinsk Plains

Road construction in this area is concentrated primarily in Omskaya and Novosibirskaya Oblast's. Soviet news items dated 1955 reveal plans for the construction of some 600 kilometers of roadway in Omskaya Oblast'. These roads will link the city of Omsk with the rayon centers of Russkaya Polyana, Novovarshavka, Poltavka, and Okoneshnikovo. When completed, the roads will facilitate the delivery of grain and other agricultural products from the outlying southern rayons to the Trans-Siberian Railroad.

In Novosibirskaya Oblast', new road construction is being handled by "the Baraba Construction Trust," under the auspices of the Department of Roads of Novosibirskaya Oblast'. According to current news items, two roads will connect the Trans-Siberian Railroad with remote areas in the southern Barabinsk Plain. One of these leads approximately 90 kilometers southward from Kargat-Station to the rayon center of Kochki on the Karasuk River. The other, which is about the same length, connects the rail center of Barabinsk with Zdvinsk, a rayon center on the Kargat River.

4. Altayskiy Kray Region

Road construction in the Altayskiy Kray is also apparently progressing at full speed. A road from Blagoveshchenka on the South Siberian Railroad to the village of Rodino about 50 kilometers to the south was to be completed by the end of 1955. Two additional roads were scheduled to be completed and opened to traffic in 1955. Of these, one runs southward about 125 kilometers from Pospelikha on the Turksib Railroad to Stantsiya Tretyakovo on the Vesëlyy Yar-Leninogorsk line. The other trends northeastward from the rail terminus at Biysk to Togul, near the confluence of the Chumysh and Togul Rivers, and when completed it will cross some 120 kilometers of reclaimed steppe land.

C. Possible Development of Waterways for Commercial Transport

In addition to new railroads and roads, the development of transportation in the New Lands area requires maximum utilization of all inland waterways suitable for navigation. The Irtysh and Ob' Rivers, crossing the area in a roughly north-south direction, provide the main routes for water transportation in the New Lands (Figures 41 and 42). Of the other rivers, the Ishim alone is navigable, but only for small craft.

Figure 41. Small river boat on the Irtysh River upstream from Ust'-Kamenogorsk.

Figure 42. Navigation on the Ob' River at the site of the Novosibirsk hydroelectric station.

The utilization of the Irtysh and Ob' Rivers for the shipment of grain from Kazakhstan and the Altayskiy Kray to distribution points in the northwestern USSR would greatly relieve the traffic loads on the new railroads. One of the major difficulties of river navigation is the short interval between the grain harvest and the end of the river-navigation season. Soviet plans call for the transloading of grain from the rails to river boats after the end of the navigation season. The grain stored on the boats would then be ready for shipment at the opening of the next navigation season. Boats navigating the Irtysh and Ob' rivers would proceed downstream to the confluence of the two rivers and then down the Ob' to its mouth. Here the grain would be transloaded into seagoing vessels for shipment to Murmansk, Arkhangel'sk, Riga, and other Soviet seaports.

The central location of the Irtysh in Western Siberia makes it a very important channel for transportation. The transportation potential of the river is being increased considerably by the development of two new dams for hydroelectric projects. 51/ The Ust'-Kamenogorsk hydroelectric project completed in 1954 raised the level of the Irtysh some 40 meters and formed a reservoir, the so-called Irtysh Sea, which is more than 70 kilometers long (Figure 43). The section of the Irtysh River upstream from the Ust'-Kamenogorsk dam will serve as a waterway from the eastern interior of the Altay Region to the railroad terminus at Ust'-Kamenogorsk and other points farther downstream (Figure 44). The Ust'-Bukhtarma hydroelectric project, which is being constructed at a point below the confluence of the Irtysh and Bukhtarma Rivers, will maintain water levels high enough to permit safe upstream navigation by large river vessels. It will also facilitate navigation farther downstream by regulating the river flow.

The Ob' is one of the largest and most important natural waterways in Siberia. Together with its chief tributary the Irtysh, the Ob' has by far the largest river drainage basin in Asia. This huge waterway network, extending from the Chinese border to the Arctic Ocean, is among the busiest in the Asiatic USSR. Traffic, however, is concentrated in the more populous middle and upper reaches of the rivers. The chief products transported are grain and lumber, to which manufactured goods and mineral products have been added in recent years.

Currently, navigation on the Ob' begins at Biysk. Throughout most of the New Lands area, river navigation on the Ob' is difficult because of its narrow channel (140 meters at Barnaul) and the presence of shallow rapids (minimum depth 1-1.5 meters at low water) 83/. Beyond Barnaul, as the river becomes wider and the current slower,

Figure 43. Irtysh River at Ust'-Kamenogorsk, looking north.

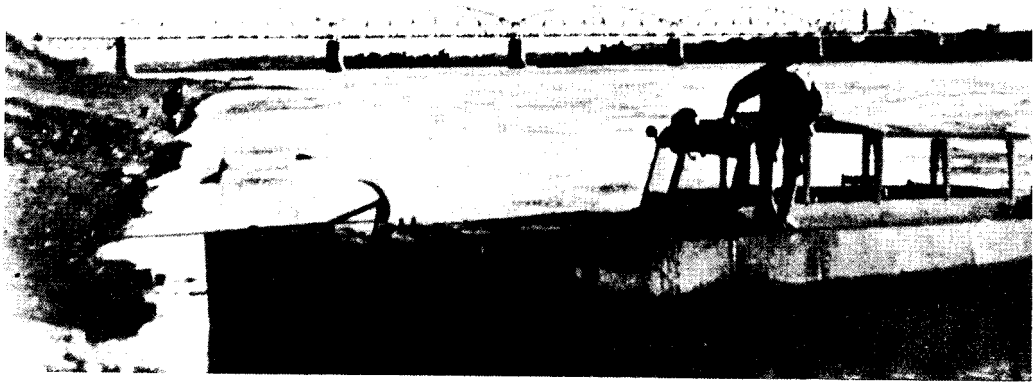


Figure 44. View of the Irtysh River in the vicinity of Semipalatinsk.

navigation hazards are less numerous. Rocky outcrops in the river bottom, however, occasionally present obstacles to navigation. A new hydroelectric project at Novosibirsk, a major port on the Ob' River, will greatly improve navigation across the New Lands region. The powerplant and dam currently under construction a short distance above Novosibirsk are rated among the largest Soviet hydroelectric developments (Figure 45). The dam will make it possible to maintain high water levels both upstream and downstream, thus permitting larger vessels to reach transloading docks at Kamen'-na-Obi and Barnaul.

The Ob' Sea, the reservoir formed by Novosibirsk Dam, will occupy an area of more than 1,000 square kilometers. Passenger motor vessels will operate between Novosibirsk and Iskitim. The latter is currently located about 20 kilometers east of the Ob' River and some 50 kilometers southeast of Novosibirsk. Freight traffic will be considerably increased. A group of engineers from the Novosibirsk branch of the State Planning and Survey Institute for the river fleet has recently completed plans to build sea wharves between Novosibirsk and Kamen'-na-Obi. Mechanized mooring operations will be possible at Iskitim, and ship repair workshops will be installed near the wharves at Berdsk.

The Ishim River, the main tributary of the Irtysh, is navigable in the New Lands region from Mar'yevka downstream to its confluence with the Irtysh (Figure 46). Recently several grain-carrying barges and two cutters were assigned to operate within the stretch between Mar'yevka and Petropavlovsk.

Other rivers in the New Lands, including the Tobol, Ubagan, Selety, and Karasuk, are not navigable for commercial shipping. These rivers are highly seasonal and have only short periods of navigability. Some flat-bottom boats and rafts, however, may use the streams for short distances during high-water periods.

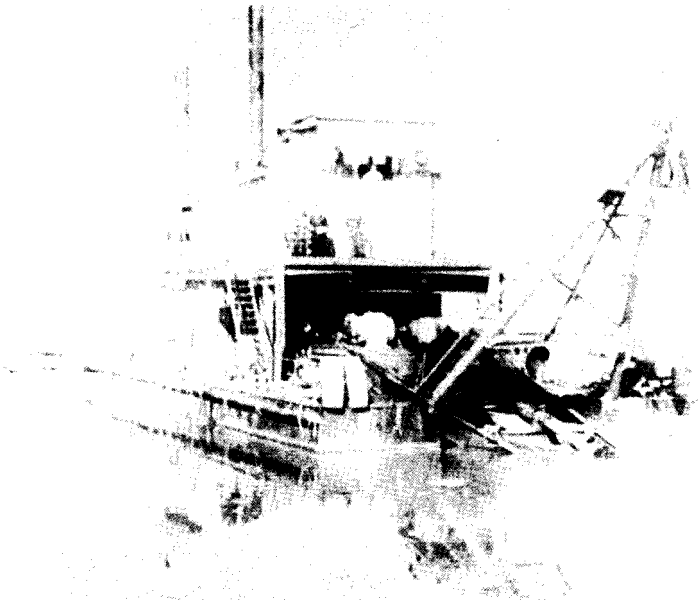


Figure 45. Dredge at the hydroelectric station site at Novosibirsk.

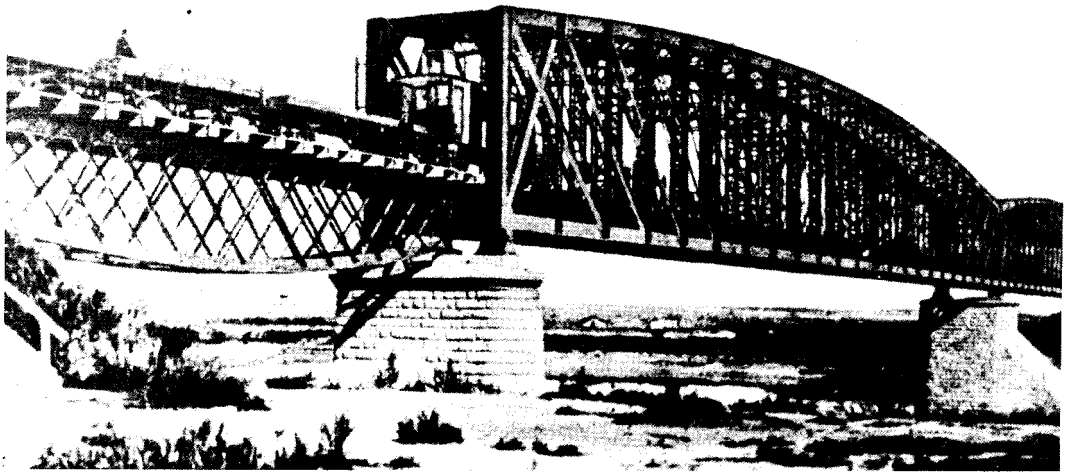


Figure 46. Bridge over the Ishim River west of Petropavlovsk.

APPENDIX A

RELIEF FEATURES OF THE NEW LANDS REGION

1. The Northern Plain

Three plains -- the Ishim, Barabinsk, and Kulunda Plains -- comprise the north-central part of the New Lands region. The Ishim Plain is separated from the Barabinsk and Kulunda Plains by the Irtysh River. The Barabinsk Plain occupies the basins of the Om', Kargat, and Karasuk Rivers. On the north, the Barabinsk Plain is bounded by the Vasyugan'ye Swamps; to the south, it merges very gradually into the Kulunda Plain. (See relief map following p. 92.)

Variations in relief are insignificant on these three plains. The Ishim Plain slopes gently downward to the north and northeast, whereas the Barabinsk Plain slopes downward from northeast to southwest. In most localities the slope is imperceptible to the eye, and level land appears to stretch uninterruptedly to the horizon (Figure 47). Much of the Kulunda Plain, by contrast, has a definitely rolling

Figure 47. The flat Barabinsk Plain, showing the characteristic steppe and wooded-steppe vegetation.

surface. Elevations on the three plains range between 110 and 160 meters above sea level. Elevations drop below the 100-meter contour only (1) along the northern margin of the New Lands region, (2) in the major river valleys, and (3) in the larger solonchak and lake depressions. The Barabinsk and Ishim Plains are only slightly dissected by river erosion. In the 500-kilometer stretch from the Irtysh River to the Tobol-Ubagan Valley, the only major valley is that of the Ishim. Other valleys are shallow, with poorly developed riverbanks.

The most conspicuous feature of the Ishim Plain is the multitude of small depressions and hollows, most of which contain lakes. The Barabinsk and Kulunda Plains, on the other hand, are characterized by a series of low, broad, parallel ridges with a pronounced northeast-southwest trend, separated by gently sloping depressions. Even the long axes of the many narrow islands in Ozero Chany are oriented in the same direction. Most of the ridges are small -- only a few kilometers in length and about 200 meters in width -- and rise only 2 to 4 meters above the surrounding land. Occasional ridges may be some 20 kilometers long and 10 or more meters high. Most notable are the two ridges bordering the Burla River. The ridge on the northern side, which is sometimes called the Karasukskaya Griva, reportedly measures about 160 by 10 to 12 kilometers. Its highest point is about 50 or 60 meters above the adjacent lowland. The ridge to the south is about the same width, but it is considerably lower and only 75 kilometers long. On the Kulunda Plain the depressions between the ridges are generally occupied by small streams, lakes, grassy marshes, meadows, or solonchak wastes.

Terrain is a limiting factor to the development of agriculture in only small areas within the Ishim, Barabinsk, and Kulunda Plains. Swamps and areas of solonchak and solonetz soils are the most important categories of nonagricultural land. With few exceptions the slope is ideal for mechanized agriculture. In fact, the best land has been used for wheat and livestock production for many decades.

Southeast of the Kulunda Plain is the Pri-Obskoye Plateau.* Absolute elevations on the plateau range between 200 and 325 meters. The relief is dominated by a series of parallel valleys separated by flat or, in some places, rolling divides. The divides rise 60 to 80 meters above the valley floor in the southwest and 110 to 120 meters in the northeast. A striking characteristic of the relief features

*Some Soviet geographers consider this plateau to be an integral part of the Kulunda Plain. The characteristics of the plateau, however, are distinctive enough to warrant a separate discussion.

is their strict parallelism, with all the long axes running from northeast to southwest. The wide valleys contain meadows, marshes, strips of forest, and a large number of elongated lakes, both fresh water and saline. Compared with the plains to the northwest, slopes are relatively steep, especially in the northeastern part of the plateau (the area between Pavlovsk and Ust' Charyshskaya Pristan'). In this area the valley slopes have been dissected by networks of gullies. Since any increase in the cultivated area on such slopes would materially increase the danger of soil erosion, Soviet writers point out that the preservation of the forest patches along the gullies in this area is essential as an erosion-control measure.

The Intermontane Valley area east of the Barabinsk Plain and northeast of the Pri-Obskoye Plateau is not a true plain although it is usually regarded as a part of the northern plains. The area consists of a series of valleys that wind among the outliers of the Altay and Sayany Mountains (Figure 48). The most extensive stretch

Figure 48. The valley of the Charysh River in the Intermontane Valley area.

of level land is the plain 20 to 50 kilometers wide along the eastern bank of the Ob' River, where marshes are a prominent feature. On the

Ob' Plain elevations range between 100 and 200 meters. Changes in elevation, however, are gradual, and most of the plain is relatively flat. The marshes would be the greatest obstacle to agricultural expansion unless extensive drainage projects were undertaken.

The remainder of the Eastern Intermontane Valley area consists of narrow lowland corridors, which penetrate into the mountains to the east. In the north, the Tom' and Inya Valleys are wedged between the Kuznetskiy Ala-Tau and the Salairskiy Range. Farther south are the valleys of the Chumysh, Biya, and a host of smaller rivers. Slopes along the valley floors are gentle enough for agriculture, and many parts of the lower mountain slopes can be and have been tilled. Extension of the cultivated area, however, is limited by the steep slopes that begin a short distance up the mountainsides.

West of the Ishim Plain is another flat, slightly elevated plain to which Soviet geographers have applied the name Predural'skoye Plateau.* From an elevation of 70 to 100 meters along the Tobol River in the east, the plain rises gradually to elevations ranging from 170 to 230 meters in the west. In contrast with the situation in the plains farther east, the stream network here is incised into the terrain. The major rivers have cut broad valleys with well-defined valley walls. On the surface of the interstream divides, however, drainage is poor. The landscape is dotted by countless lakes, few of which exceed 8 kilometers in length, and occasional patches of marsh and saltpan. In general, relief presents no obstacles to agriculture on the Predural'skoye Plateau.

South of the Uy River is another small area referred to in Soviet literature as the Kustanay Plain. Despite the term, the land here actually rises more abruptly from the floors of the Ubagan and Tobol Valleys than does that of the so-called Predural'skoye Plateau. The Kustanay Plain is bounded on the east by the Ubagan Valley and on the west by the Ural Mountains. On the south the plain extends to the vicinity of the Magnitogorsk-Kartaly-Kushmurun rail line, where it merges gradually into the Turgay Tableland. The Kustanay Plain is an area of gently rolling relief and elevations that range from 150 to 225 meters above sea level east of the Tobol River to between 175 and 250 meters west of the Tobol. Near the foothills of the Urals, elevations are still higher. The slopes are still predominantly gentle, only a few exceeding 1 or 2 percent. Except for valleys of the Ubagan, Tobol, and Toguzak Rivers, few valleys cross the Kustanay

*Not to be confused with the Podural'skoye Plateau, which lies to the southwest.

Plain and those few are shallow. A large number of saline and fresh-water lakes of varying sizes and depths are found in the countless depressions. From the standpoint of relief, the Kustanay Plain is well suited for mechanized agriculture.

2. The Southern Uplands

The south-central margin of the New Lands is part of the Kazakh Folded Upland. Although this upland extends over most of northeastern Kazakhstan, only two sections -- the northwestern and the central areas -- lie within the New Lands region. The northwestern part of the Kazakh Folded Upland, commonly referred to as the Kokchetav Area, is essentially a rolling plain with numerous isolated low hills or series of hills. Elevations on the plain range between 300 and 500 meters, but the hills generally rise considerably higher. The most prominent hills are the Kokchetavskiye Gory 60 kilometers southeast of the city of Kokchetav, which reach a summit elevation of 887 meters. The forest-covered slopes of these highly dissected hills rise sharply above the surrounding surface (Figure 49). The hills form a ridge

Figure 49. Kokchetavskiye Gory in the southern uplands, showing Ozero Borovoye and a cannery located on its shore.

20 kilometers long, with a convex west-facing slope. At the base of the ridge are a number of picturesque lakes, on one of which is the large resort center of Borovoye. Although many slopes are too steep to be cultivated, the northwestern section of the Kazakh Folded Upland includes much gently rolling or even level land suitable for mechanized agriculture.

The other part of the Kazakh Folded Upland within the New Lands region lies southeast of the Selety River. This area is almost congruent with what Soviet physical geographers call the Central Upland or Karkaralinsk Area. The southern limit coincides closely with the boundary between the dark chestnut and the light chestnut soils. Most of the area is hilly, and the section south of Karaganda is definitely mountainous.

The rugged relief severely restricts opportunities for agriculture in the Karkaralinsk Area. Extensive areas with slopes gentle enough for cultivation are found only along the northern and western margins (in two belts, one running directly east and the other immediately south of Akmolinsk). Within the mountain complex itself, level or gently sloping land is limited to small patches in the bottoms of valleys and depressions.

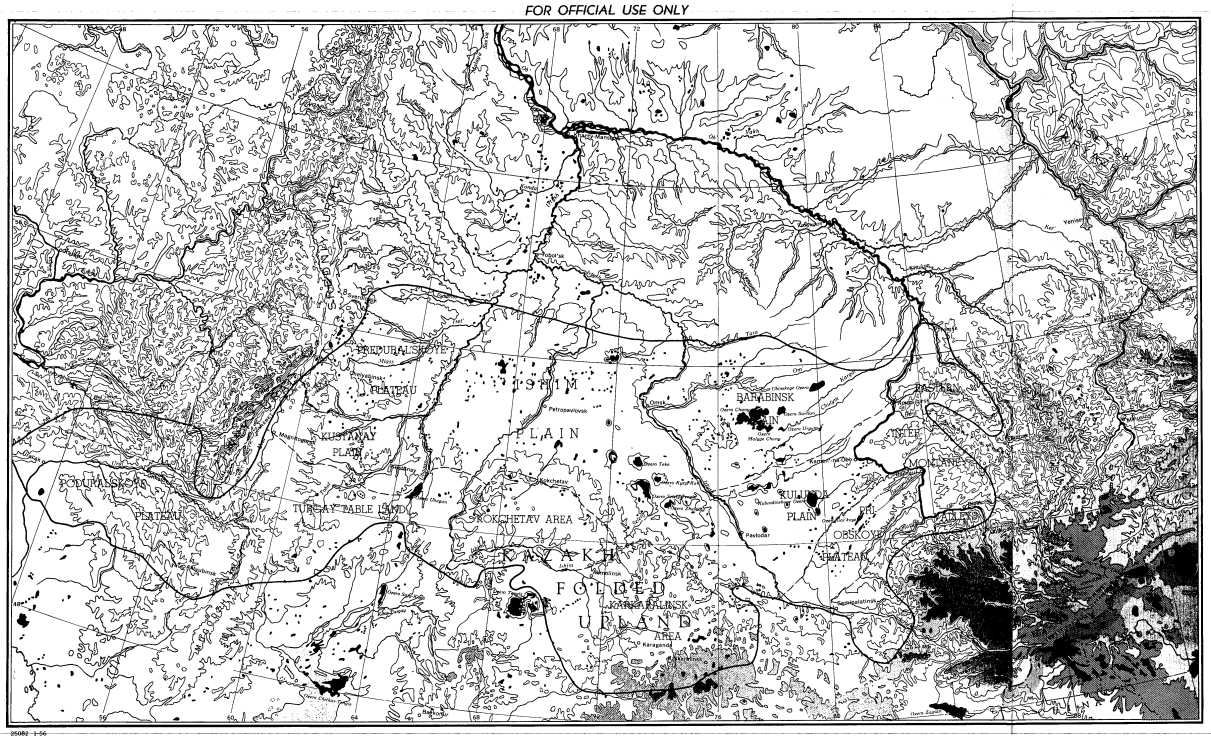
To the west of the Kazakh Folded Upland is the Turgay Tableland. This area is a fairly level plateau bisected from north to south by a broad depression known variously to the Soviets as the Turgayskaya Dolina and the Turgayskiye Vorota. The northern half of the depression is occupied by the Ubagan River valley and the southern by the valley of the Turgay River. The depression is believed to have provided drainage from the West Siberian Plain to the Aral Sea during past geological eras. At present the valley floor contains a number of lakes of various sizes, most of which lack outlets and are saline. Elevations within the depression range from 100 to 150 meters above sea level.

On both sides of the depression the land rises sharply to a fairly level plateau surface whose average elevation is between 200 and 250 meters. Although the plateau margins facing the depression have been dissected by a complex network of gullies, ravines, and stream valleys, most of the plateau surface is poorly drained. Not a single major river valley has cut headwards into the plateau. Relative relief is insignificant, the chief surface characteristic being a multitude of small depressions, most of which are occupied by shallow saline lakes. Since slopes rarely exceed 2 or 3 percent, terrain is no obstacle to the extension of mechanized agriculture.

The westernmost part of the New Lands region is the Podural'skoye Plateau. Its eastern section between the Or' and the upper Ilek is an elevated plain with a nearly level surface interrupted by narrow valleys. North of Aktyubinsk, elevations are somewhat higher (400 to 500 meters) than to the south (300 to 400 meters). Westward from the Ilek River the plateau surface is more dissected. The valleys become wider and wider until they form fairly broad lowland strips separated by narrow ridges with rounded summits and deeply eroded slopes. In the area north of the Ural River, an alternating ridge and valley landscape is especially well developed.

In general, the elevations of the ridges decrease progressively from east to west. For example, in the part of the area south of the Ural River the ridge crests average over 300 meters near Sol'-Iletsk; the highest elevation southwest of Chilik is 263 meters; and in the area between the towns of Kazakhstan and Ural'sk the maximum elevation is only 201 meters. These are absolute elevations; in any given locality the relative elevation rarely exceeds 150 meters and is generally considerably less. Slopes vary considerably. The lowland valleys and the plateau surface in the eastern part of the area contain a large amount of level or gently sloping land. On the other hand, the slopes of the dissected ridges are too steep for any type of agricultural development. Lakes are relatively few on the well-drained Podural'skoye Plateau.

FOR OFFICIAL USE ONLY



USSR: NEW LANDS

RELIEF

General limit of the main New Lands area

ALTITUDE TINTS

Meters	Feet
3000	9842
2000	6566
1000	3280
700	2297
500	1640
300	984
200	656
100	328
Sea level	Sea level

• Spot elevation (feet)

0 50 100 200 300 Statute Miles

0 50 100 200 300 Kilometers

25082 1-56

APPENDIX B

GAPS IN INTELLIGENCE

Adequate information was lacking on a number of phases of the New Lands program in spite of the availability of a voluminous amount of literature related to such a program. Detailed statistical data were completely lacking concerning the proportion of the land that is considered suitable for cultivation, pasture, and meadow and on the amount of such land that was in use before the inception of the New Lands program. Nor were figures available on the relative proportions of plains, rolling and hilly lands, or individual soil types -- information that would make possible a better evaluation of the New Lands. Recent large-scale maps that show details of relief and hydrographic features were available only for limited sections of the area.

Information was meager for many climatic factors. No data were available on the frequency of droughts for some parts of the New Lands region, and no information at all was available on evaporation-transpiration rates. In many cases, specific information was lacking on the extent and proportions of the various crops and their distribution, both within the main body of the New Lands and in areas of secondary consideration. Detailed data on the specific varieties of each crop being grown and their climatic needs and limitations were far from complete.

Although some kolkhozes and new sovkhozes are named, their exact locations are seldom given, and no adequate maps or complete listings were available. Only scattered figures were found concerning the number and place of origin of migrants to the New Lands. Population figures, whether in terms of actual numbers or general density, were always approximations or estimates, since the last published census figures were for 1939. Even recent Soviet sources may give 1939 figures, without identifying them as such. Current population estimates by United States sources were usually based on the number of election districts, which allows for a considerable margin of error.

Information on some phases of the transportation network was lacking. Neither reports nor maps gave complete information on the alignment, classification, and extent of new railroads and roads completed or under construction, and the location of new railroad stations and sidings. The periodic progress bulletins on rail and road construction frequently disagree, and many are ambiguous. Information on the extent of reservoirs of the new hydroelectric projects and their effect on water transportation is far from complete.

Data on the amount and nature of shipments of grain and other commodities by both new and previously existing railroads, roads, and waterways were practically nonexistent.

APPENDIX C

SOURCE REFERENCES

The source material available for this study was extensive but spotty in topical coverages. The bulk of the information was derived from unclassified sources -- primarily Soviet scientific texts, periodicals, newspapers, and maps. Intelligence reports and documents and the National Intelligence Survey (NIS) were also extensively utilized.

For the terrain, soil, and hydrographic analyses, the Soviet regional and topical textual materials that served as the primary sources were supplemented by Soviet maps and the NIS. The climatic study was based largely on Soviet regional and topical textual materials, intelligence documents, and U.S. periodicals and books dealing with the relation between climate and agriculture. The main sources for the settlement section were Soviet newspapers, FDD summaries, STATSPEC [redacted] and the second edition of the Great Soviet Encyclopedia. The majority of the railroad and road data was obtained from Soviet newspapers, FDD summaries, STATSPEC [redacted] and Treasure Island translations of Soviet materials. For settlement and transportation particularly, current Soviet information comes largely from radio and press releases. Because of the propaganda value attached to these subjects in the New Lands program, every account had to be carefully screened and compared with other data to determine its accuracy.

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

The sources used in this study were generally found to be reliable as of the date of publication. Soviet books and periodicals dealing with subjects of an academic nature were generally free from "ideological bias." Press and radio reports, however, contained many accounts of doubtful reliability, and these were carefully screened before any data were accepted.

Evaluations following the classification entry have the following significance:

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

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

Sources such as established reference works cited in their entirety, official documents of foreign governments, and other material not susceptible of evaluation have not been given an evaluation symbol.

---

1. Agriculture. Climate and Man, 1941 Yearbook of Agriculture, Washington, 1941, p. 308-35, 545-50, U

2. Air, AFOIN, Air Research Division. 1956 Annual Estimates: Political and Demographic Composition of USSR Population, 1 Apr 55, S

3. Air, AFOIN-1A1. IR-385-55, 27 Jun 55, Transportation Problems of the "Virgin Land" Area, p. 1-25, info 1954-55, CIA D257881, U. Eval RR 2

4. Air, Air University, Studies and Research Branch. Inland Waterways of the Soviet Union, Jan 50, p. 24-28, S. Eval RR 2

5. Air, USAFE. AIIR 52HD-DOC-55-21A, 11 Feb 55, Narrow-Gauge Railway from Kustanay to Peski, C. (tr from Gudok, 3 Feb 55, U) Eval RR 2

6. Air, USAFE. AIIR 52HD-DOC-55-21D, 16 Feb 55, New Railroads in Kazakhstan, CIA D180427, C. (tr from Stroitel'naya Gazeta, 9 Feb 55, U) Eval RR 3

7. Air, USAFE. AIIR 52HD-DOC-55-36J, 3 Mar 55, Narrow-Gauge RR Line Between Kustanai and Peski, info 26 Feb 55, CIA D208562, C. Eval F-6 (RR 2)

8. Air, USAFE. IR-1179-55, 24 May 55, New Rail Trackage in Northern Kazakhstan, info 11 May 55, CIA D243050, C. Eval F-6 (RR 2)

9. Air, USAFE. IR-963-55, 20 Jul 55, New RR Line in Kurgan Steppe Region, info 8 Jul 55, CIA D297890, C. Eval F-6 (RR 2)

10. Aksarin, I.I. Zapadnaya Sibir' (Western Siberia), Vysshaya Partiynaya Shkola pri Ts. K. KPSS, Moscow, 1954, 46 pp, U

11. Alisov, B.P. Klimaticheskiye Oblasti i Rayony SSSR (Climatic Regions and Areas of the USSR), OGIZ Geografgiz, 1947, U. (tr as CIA FDD Translation U-1695, 13 Mar 52, p. 142-58, OFF USE) Eval RR B-2

12. Alsberg, C.L. "Forecasting Wheat Yields from the Weather," Wheat Studies of the Food Research Institute, v. 5, no 1, Stanford Univ, Nov 28, 44 pp, U. Eval RR 2

13. Army, AFFE. Doc no 83941, 7 Feb 55, Railroads in the Vicinity of Barnaul, p. 9-12, CIA 1272933, S. (tr of Hoshi Report, no 50, Sec B, 25 Aug 54, S) Eval RR 3

14. Army, FECOM, Allied Translator and Interpreter Section, MI Section, General Staff. Doc 50642A-50642F, 12 Sep 49, Soviet Central Asia and Kazakhstan, R

15. Army, Moscow. R-182-55, 12 Apr 55, Soviet Desert Automobile Highways, p. 1-4, info 8 Apr 55, U. Eval RR 3

16. Army, Moscow. R-373-55, 18 Aug 55, New Soviet Narrow-Gauge Railroad, info 18 Aug 55, CIA D299080, U. Eval RR 2

17. Army, Moscow, R-379-55, 19 Aug 55, New Railroad in Kurgan Oblast, info 18 Aug 55, CIA D299076, U. Eval RR 2

18. Army, Research and Development Branch, Military Planning Division, Office of the Quartermaster General. "Western USSR," Clothing Almanac, no 6, Sep 50, 63 pp, C

19. Army, Research and Development Branch, Military Planning Division, Office of the Quartermaster General. "Snow Cover of USSR," Environmental Protection Section Report, no 168, Jun 50, 25 pp, U. (tr from Russian by George S. Mitchell) Eval RR 3

20. Army, USAREURIC. RT-448-53, 16 Jun 53, The Nura Taldinskiy Livestock Sovkhoz South of Karaganda, p. 4, info Nov 46, C. Eval RR 3

21. Army, USFA. R-353-53, Feb 53, Karabas Urban Area Report, p. 3, info Dec 46-Apr 50, C. Eval RR 3

22. Army, USFA. R-527-54, 12 Feb 54, Urban Area Karaganda, p. 2-5, info June 45-Dec 47, CIA 2504131, C. Eval F-6

23. Bakonin, L. "Karasuk-Kamen'-na-Obi," Gudok, 17 Aug 55, p. 1, U. Eval RR 3

24. Baranskiy, N.N. Ekonomicheskaya Geografiya SSSR (Economic Geography of the USSR), Moscow, 1951, 422 pp, U

25. Berg, L.S. Natural Regions of the USSR, New York, 1950, p. 90-110, U. (tr from Russian by Olga A. Titlebaum) Eval RR B-2

26. Bol'shaya Sovetskaya Entsiklopediya (Great Soviet Encyclopedia), 2d ed, Moscow, 1949-, U

27. Botanicheskiy Institut im. V.L. Komarova. Pustyni SSSR i ikh Osvoyeniye (Deserts of the USSR and Their Mastery), Leningrad, Izdatel'stvo Akademii Nauk SSSR, 1954, v. 2, 801 pp, U

28. Bova, N.V. "Agroklimaticheskiye Zony Yugo-Vostoka SSSR" (Agro-climatic Zones of Southeastern USSR), Sotsialisticheskoye Zernovoye Khozyaystvo, no 1, 1946, p. 26-33, U. Eval RR 3

29. "Building in Kazakhstan," Central Asian Review, v. 3, no 2, 1955, p. 95-101, U. Eval RR 3

30. Carleton, M.A. The Small Grains, New York, 1916, 685 pp, U

31. "Central Committee Decree on Virgin and Idle Lands - I," Current Digest of the Soviet Press, v. 6, no 9, 14 Apr 54, p. 3-6, U. (tr of decree in Pravda, 6 Mar 54, p. 1-4, U)

STATSPEC

32. [redacted]

33.

34.

35.

36.

STATSPEC

37. [redacted]

38. [redacted]

39. CIA. FDD, Summary, no 19, "Meteorology of the Moscow-Irkutsk Air Route," 7 Feb 50, 158 pp, C

40. CIA. FDD, Summary, no 577, 12 Jul 55, p. 7-11, C. Eval RR 3

41. CIA. FDD, Summary, no 644, 8 Sep 55, p. 11, C. Eval RR 3

42. CIA. FDD, Summary, no 667, 28 Sep 55, p. 62-63, info Mar-Apr 55, OFF USE. Eval RR 2

43. CIA. FDD, Summary, no 732, 1 Dec 55 [Operation of Rail Lines Begun in Virgin Lands], info 28 Aug 55, S. (tr from Sovetskaya Molodezh') Eval RR 3

44. CIA. FDD, Translation, no 317, "The Climates of the USSR," 14 Feb 52, 231 pp, C. (tr of A.A. Borisov. Klimaty SSSR, Moscow, 1948, U)

45. CIA. FDD, Translation, no 431, "An Aid to Agricultural Specialists in the Reclamation of Virgin and Fallow Lands -- Collection of Material and Articles," 30 Jun 55, 92 pp, OFF USE. (tr of V Pomoshch' Spetsialistam Sel'skogo Khozyaystva Po Osvoyeniyu Tselinnykh i Zalezhnykh Zemel' -- Sbornik Materialov i Statey, v. 1, 1954, p. 25-144, U) Eval RR 3

46. CIA. Intelligence Memorandum 340, 31 Oct 50, Seeding and Harvesting Dates of Soviet Cereal Crops in Specified Regions, 18 pp, S. Eval RR 3

47. CIA. NIS 26-III, Ch 2, Sec 23, Dec 48, p. 40, C

25X1A

48. [redacted]

49.

50.

51. CIA. RR-MR-45, May 55, Important Multipurpose River-Development Projects in the USSR, p. 12-20, info 1930-55, S. Eval RR 2

52. "Construction of Narrow-Gauge Railroads in Areas Developing Virgin Lands," Kazakhstanskaya Pravda, 24 Oct 54, p. 1, U. Eval RR 2

53. Daniel, Clifton. "Report on a City in Siberia," New York Times Magazine, 10 Jul 55, p. 8 ff, U. Eval RR 3

54. Datsenko, M., and Pospelov, I. "Well-Planned Highways are Important and Necessary," Current Digest of the Soviet Press, v. 7, no 33, 28 Sep 55, p. 28, U. (tr from Moskovskaya Pravda, 9 Aug 55, p. 2, U) Eval RR 3

55. Denisov, P.S. Bor'ba s Zasukhoy v Zaural'ye i Sibiri (The Struggle with Drought in the Trans-Urals and Siberia), Izdatel'stvo Akademii Nauk SSSR, 1954, 76 pp, U. Eval RR 3

56. Dzerdzeyevskiy, B.L. "Meteorologicheskiye Osobennosti 1954g. na Tselinnykh i Zalezhnykh Zemlyakh Altayskogo Kraya i Severa Kazakhstana" (Meteorological Peculiarities in 1954 in the Virgin and Idle Lands of Altay Kray and Northern Kazakhstan), Izvestiya Akademii Nauk SSSR, Seriya Geograficheskaya, no 2, Mar-Apr 55, p. 30-42, U. Eval RR 2

57. Fedorovich, B.A., and Shuvalov, S.A. "Prirodnyye Predposylki Sel'skokhozyaystvennogo Rayonirovaniya Territorii Zemel' Novogo Sel'skokhozyzystvennogo Osvoyeniya v Severnykh Oblastyakh Kazakhstana" (Natural Bases of Agricultural Regions in Territory of Lands of New Agricultural Development in the Northern Regions of Kazakhstan), Izvestiya Akademii Nauk SSSR, Seriya Geograficheskaya, no 2, Mar-Apr 55, p. 54-61, U. Eval RR 3

58. Fel'dman, Ya. I., and Shvareva, Yu. N. "Klimaticheskiye Usloviya Territorii Zemel' Novogo Sel'skokhozyaystvennogo Osvoyeniya v Severnom Kazakhstane i Predgornykh Rayonakh Altayskogo Kraya" (Climatic Conditions in the Territory of Lands of New Agricultural Development in Northern Kazakhstan and Premountainous Regions of Altay Kray), Izvestiya Akademii Nauk SSSR, Seriya Geograficheskaya, no 2, Mar-Apr 55, p. 43-53, U. Eval RR 2

59. "From the Neva to the Ob," Current Digest of the Soviet Press, v. 7, no 33, 28 Sep 55, p. 29, U. (tr of Sovetsky Flot, 13 Aug 55, p. 1, U) Eval RR 3

60. Gerasimov, I.P., Ocherki po Fizicheskoy Geografii Kazakhstana (Sketches of the Physical Geography of Kazakhstan), Alma-Ata, Izdatel'stvo A.N. Kazakhskoy SSR, 1952, 492 pp, U. Eval RR 2

61. [German] Generalstab des Heeres, Abteilung für Kriegskarten und Vermessungswesen. Militärgeographische Angaben über das Asiatische Russland, Allgemeiner Überblick (Military-Geographic Data on Asiatic Russia, General Survey), Berlin, 1942, U. (tr in part as CIA FDD Translation 130, 25 Mar 48, 54 pp, R)

62. Glavnoye Upravleniye Gidrometeorologicheskoy Sluzhby SSSR pri SNK Soyuza SSR. Mirovoy Agro-Klimaticheskiy Spravochnik (World Agro-Climatic Handbook), Leningrad, Gidrometeorologicheskoye Izdatel'stvo, 1937, 418 pp, U. Eval RR 2

63. Glavnoye Upravleniye Gidrometeorologicheskoy Sluzhby SSSR pri SNK Soyuza SSR. "Zapadnaya Sibir'" (Western Siberia), Spravochnik po Vodnym Resursam SSSR (Handbook of Water Resources of the USSR), Leningrad, Gidrometeorologicheskoye Izdatel'stvo, 1937, v. 15, part 2, p. 607-19, U. Eval RR 2

64. Golubev, G. "Puteshestviye Zhemchuzhnogo Zerna" (Migration of the Pearly Grain), Vokrug Sveta, no 8, Aug 55, p. 2-6, U. Eval RR 4

65. [redacted]

25X1C

66. Hinrichs, C.G. Limits of the Spring Wheat Belt in European Russia, Master's Thesis, Dept Geography, Univ Iowa, Aug 52, 66 pp, U

67. Horbaly, William. Migration of Agriculture in the Soviet Union, Master's Thesis, Dept Geography, Univ Chicago, Dec 47, 70 pp, U

68. "Hundreds of Kilometers of New Railroad Lines in Virgin Land Areas," Current Digest of the Soviet Press, v. 7, no 26, 10 Aug 55, p. 25-26, U. (tr of Pravda, 26 Jun 55, p. 1, U) Eval RR 3

69. Institut Geografii, Akademiya Nauk SSSR. Kazakhstan, Izdatel'stvo A.N. SSSR, 1950, 490 pp, U

70. Ivanova, Ye. N., and Fridland, V.M. "Osvoyeniye Tselinnykh i Zalezhnykh Zemel'" (Development of Virgin and Idle Lands), Priroda, Apr 54, p. 3-10, U. Eval RR 3

71. Jackson, W.A.D. "The Virgin and Idle Lands of Western Siberia and Northern Kazakhstan: A Geographic Appraisal," The Geographical Review, v. 46, no 1, Jan 56, p. 1-19, U. Eval RR 2

25X1C 72. [redacted]

73. Koloskov, P.I. Agroklimaticheskoye Rayonirovaniye Kazakhstana (Agroclimatic Divisions of Kazakhstan), Moscow, Institut Geografii Akademiya Nauk Kazakhskoy SSR, Izdatel'stvo A.N. SSSR, 1947, part I (text), 260 pp, U. Eval RR 2

74. Krukov, S. "Provide Virgin Land Areas with Good Roads," Current Digest of the Soviet Press, v. 7, no 16, 1 Jun 55, p. 25-26, U. Eval RR 3

75. Kuzin, P.S. Rezhim Rek Yuzhnykh Rayonov Zapadnoy Sibiri, Severnogo i Tsentral'nogo Kazakhstana (River Regimes of the Southern Regions of Western Siberia, Northern and Central Kazakhstan), Leningrad, Ministerstvo Sel'skogo Khozyaystva i Zagotovok SSSR, 1953, 538 pp, U. Eval RR 2

76. Kuznetsov, N.T. "Nekotoryye Osobennosti Ozer i Ikh Osvoyeniye na Tselinnykh i Zalezhnykh Zemlyakh Severnykh Oblastey Kazakhstana" (Some Characteristics of Lakes and Their Utilization in the Virgin and Idle Lands of the Northern Regions of Kazakhstan), Izvestiya Akademii Nauk SSSR, Seriya Geograficheskaya, no 2, Mar-Apr 55, p. 62-68, U. Eval RR 2

77. Lebed, A. "Transportation Beyond the Urals and in Central Asia," Bulletin of the Institute for the Study of the History and Culture of the USSR, Munich, v. 1, no 9, Dec 54, p. 3-14, U. Eval RR 3

78. "Life in the New Lands of Kazakhstan," Central Asian Review, v. 3 no 1, 1955, p. 32-36, U. Eval RR 3

79. Lorimer, Frank. The Population of the Soviet Union, League of Nations, Geneva, 1946, 284 pp, U

80. Mattice, W.A. "Weather and Corn Yields," Monthly Weather Review, v. 59, no 3, Mar 31, p. 105-13, U. Eval RR 2

81. Ministerstvo Prosveshcheniya RSFSR. Ekonomicheskaya Geografiya SSSR (Economic Geography of the USSR), Gosudarstvennoye Uchebno-Pedagogicheskoye Izdatel'stvo, 1954, 427 pp, U. Eval RR 3

82. "Nachalos' Dvizheniye po Novoy Magistrali" (The Opening of Traffic on a New Trunk Line), Pravda, 19 Aug 55, p. 1, U. Eval RR 2

83. Navy, ONI. IR Serial 52-50, 6 Jul 50, Inland Waterways of the USSR and Satellite Countries, p. 17-19, C. Eval B-2

84. "New Roads in Raions of Virgin Lands," Joint Press Reading Service - Moscow Daily Press Review, sec B, no 344, 10 Dec 54, U. (tr of D. Zhdankin. Krasnyy Zvezda, 10 Dec 54, p. 1, U) Eval RR 3

85. "Novym Sovkhozam--Povsednevnoye Vnimaniye" (To New Sovkhozes--Daily Attention), Pravda, 30 Jun 55, p. 1, U. Eval RR 2

86. "Novyy Oblik Kustanaya" (The New Appearance of Kustanay), Pravda, 10 Apr 55, p. 2, U. Eval RR 3

87. Nuttonson, M.Y. "Agricultural Climatology of Siberia, Natural Belts, and Agro-Climatic Analogues in North America," American Institute of Crop Ecology, International Agro-Climatological Series, Study no 13, Washington, 1950, 64 pp, U. Eval RR 2

88. Nuttonson, M.Y. "USSR: Some Physical and Agricultural Characteristics of the Drought Area and Its Climatic Analogues in the United States," Land Economics, v. 25, no 4, Nov 49, p. 347-51, U. Eval RR 3

89. "Okruzhit' Vnimaniyem i Zabotoy Novoselov na Tseline" (To Surround the New Settlers on the Virgin Land with Attention and Care), Pravda, 12 Sep 55, p. 1, U. Eval RR 3

90. Orlova, V.V. Klimaticheskiy Ocherk Barabinskoy Nizmennosti (Climatic Sketch of the Barabinsk Lowland), Leningrad, Ministerstvo Sel'skovo Khozyaystva i Zagotovok SSSR, 1954, 235 pp, U. Eval RR 2

91. Orlovskiy, N.V. Osvoyeniye Tselinnykh i Zalezhnykh Zemel' v Altayskom Kraye (Development of Virgin and Idle Lands in Altay Kray), Moscow, Izdatel'stvo Akademii Nauk SSSR, 1955, 104 pp, U. Eval RR 2

92. "O Sisteme Vedeniya Khozyaystva i Poryadke Izpol'zovaniya Osvaivayemykh Tselinnykh i Zalezhnykh Zemel'" (Concerning a System of Conducting the Economy and Sequence of Utilization of Virgin and Idle Lands), Sel'skoye Khozyaystvo, no 121, 24 May 55, p. 3, U. Eval RR 3

93. Panadiadi, A.D. Barabinskaya Nizmennost' (Barabinsk Plain), Gosudarstvennoye Izdatel'stvo Geograficheskoy Literatury, 1953, 232 pp, U

94. "Party and Government Decree on Virgin and Idle Lands," Current Digest of the Soviet Press, v. 6, no 13, 12 May 54, p. 11, U

95. "Pervenets Zhelezorudnoy Industrii Kazakhstana" (The New Iron Ore Industry of Kazakhstan), Geografiya v Shkole, no 5, Sep-Oct 55, p. 55-56, U. Eval RR 3

96. "Plans for New Railroad Lines in Virgin Lands," Current Digest of the Soviet Press, v. 7, no 4, 9 Mar 55, p. 5-7, U. (tr of Gudok, 28 Oct 54, p. 2, U) Eval RR 2

97. Pravda, 16 Oct 55, p. 2, U. Eval RR 5

98. "Railroads in Virgin Land," Current Digest of the Soviet Press, v. 7, no 33, 28 Sep 55, p. 28-29, U. (tr of Pravda, 18 Aug 55, p. 1, U) Eval RR 2

99. "Railroads on Virgin Lands," Current Digest of the Soviet Press, v. 6, no 47, 5 Jan 55, p. 21, U. (tr of Trud, 21 Nov 54, p. 1, U) Eval RR 2

100. "Railroads to New State Farms," Current Digest of the Soviet Press, v. 7, no 19, 22 Jun 55, p. 22, U. (tr of Pravda, 10 May 55, p. 2, U) Eval RR 3

101. Rikhter, G.D. "Znacheniye Snezhnogo Pokrova v Prirode i Khozyaystve i Zadachi ego Izucheniya" (The Importance of Snow Cover to Nature and the Economy and the Problems of its Study), Priroda, no 4, 1946, p. 20-28, U. Eval RR 3

102. Rose, J.K. "Corn Yield and Climate in the Corn Belt," The Geographical Review, v. 26, 1936, p. 88-102, U. Eval RR 2

103. "Russia's Asian Frontier," New York Times Magazine, 5 Jun 55, p. 8-9, U. Eval RR 3

104. Shashko, D.I. "Agro-Klimaticheskiye Zony i Rayony Zapadnoy Sibiri i Severo-vostochnykh Oblastey Kazakhstana po Uvlazhneniyu" (Agro-Climatic Zones and Regions of Western Siberia and North-eastern Regions of Kazakhstan According to Moisture), Izvestiya Vsesoyuznogo Akademii Sel'skokhozyaystvennogo Nauka im. Lenina, v. 13, no 4, 1948, p. 3-9, U. Eval RR 2

105. Shul'gin, A.M. "Ob Izmenenii Klimata g. Barnaula" (Concerning the Changing Climate of Barnaul), Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva, v. 85, no 1, Leningrad, Jan-Feb 53, p. 95-98, U. Eval RR 3

106. State, Moscow. Dsp 265, 30 Dec 54, Agricultural Observations Made on Trip Through Kazakhstan and Central Asia, C. Eval RR 2

107. State, Moscow, Dsp 471, 25 Aug 55, C. Eval RR 2

108. State, Moscow, MA 1561, Sep 55, WEEKA 38 ECON, S. Eval RR 2

109. State, OIR. "New Village Plans Resurrect Khrushchev's Ideas," Soviet Affairs, OIR Report 4800.76, May 55, p. 16-17, S. Eval RR 2

110. State. "The New Soviet Frontiersmen," Soviet Affairs Notes, no 176, 6 Jul 55, 8 pp, U. Eval RR 2

111. Suslov, S.P. Fizicheskaya Geografiya SSSR: Aziatskaya Chast', 2d ed, Moscow, 1954, p. 7-83, 520-43, U. Eval RR B-2

112. Suslov, S.P. Zapadnaya Sibir' (Western Siberia), Moscow, 1947, 176 pp, U. Eval RR B-2

113. Takhayev, Kh. Ya. Bashkiriya, Moscow, Gosudarstvennoye Izdatel'-stvo Geograficheskoy Literatury, 1950, 325 pp, U

114. Talanov, Viktor. Rayony Sortov Yarovay i Ozimoy Pshenitsy SSSR i ikh Kachestvo (Regional Types of Spring and Winter Wheat and Their Quality), Leningrad, Institut Prekladnoy Botaniky i Novykh Kul'tur, 1928, U

115. Thornthwaite, C.W. "An Approach Toward a Rational Classification of Climate," The Geographical Review, v. 38, 1948, p. 55-94, U

116. Tikhomirov, I.K., and Ryazantseva, Z.N. Klimat Zavolzh'ya (Climate of the Trans-Volga), Moscow, Gosudarstvennoye Izdatel'-stvo Kolkhoznoy i Sovkhoznoy Literatury, 1939, no 9, 395 pp, U. Eval RR 2

117. "Traffic Begins on New Line," Current Digest of the Soviet Press, v. 7, no 33, 28 Sep 55, p. 29, U. (tr of Pravda, 19 Aug 55, p. 1, U) Eval RR 2

118. Tulaikov, N.M. "Agriculture in the Dry Region of the USSR," Economic Geography, v. 6, no 1, Jan 30, p. 54-80, U. Eval RR 2

119. Unstead, J.F. "The Climatic Limits of Wheat Cultivation, with Special Reference to North America," The Geographical Journal, v. 39, no 4, Apr 1912, p. 347-66, U. Eval RR B-2

120. USIA. IS-19-54, 28 Dec 54, 1954 Developments in the Soviet Union and Satellites, U. Eval RR 2

121. "Vesti s Poley" (News From the Fields), Pravda, 10 Aug 55, U. Eval RR 2

122. Volin, Lazar. "A Survey of Soviet Russian Agriculture," U.S. Dept Agriculture, Agricultural Monograph, no 5, Aug 51, 194 pp, U. Eval RR A-2

123. Volin, Lazar. "Effects of the Drought and Purge on the Agriculture of the Soviet Union," Foreign Agriculture, v. 3, no 5, May 39, p. 175-96, U. Eval RR A-2

124. Volin, Lazar. "The New Battle for Grain in the Soviet Union," Foreign Agriculture, v. 18, no 11, Nov 54, p. 194-99, U. Eval RR A-2

125. Von Poletika, W.P. "A Climatic Survey of Russian Agriculture," Bulletin of the Institute for the Study of the History and Culture of the USSR, Munich, v. 2, no 8, Aug 55, p. 3-12, U. Eval RR 2

126. Von Poletika, W.P. "Zernovaya Problema i Osvoyeniye Tselinnykh Zemel'" (Grain Problems and the Development of the Virgin Lands), V Konferentsiya Instituta po Izucheniyu Istorii i Kul'tury SSSR, Doklady i Diskussii (Conference of the Institute for the Study of the History and Culture of the USSR, Papers and Discussion, 25-27 Apr 55), Munich, 1955, p. 65-73, U. Eval RR 2

127. Vsesoyuznyy Institut Rasteniyevodstva Narodogo Komissariata Zemledeliya Soyuza SSR. Rasteniyevodstvo SSSR (Plant Culture of the USSR), Leningrad, Sel'khozgiz, v. 1, 1933, part 1, 379 pp, part 2, 674 pp, U. Eval RR 2

128. Zanin, G.V., and Aleksandrova, V.D. "Fiziko-Geograficheskaya Kharakteristika Territorii Osvoyeniya Tselinnykh i Zalezhnykh Zemel' v Altayskom Kraye" (Physical-Geographic Characteristics of the Territory of Development of Virgin and Idle Lands in Altay Kray), Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva, v. 87, no 3, May-Jun 55, p. 205-19, U. Eval RR 2

129. Zanin, G.V., Aleksandrova, V.D., Kravtsova, V.I., and Shavrygin, P.I. "Prirodnoye Rayonirovaniye Territorii Zemel' Novogo Sel'skokhozyaystvennogo Osvoyeniya v. Altayskom Kraye" (Natural Regions in the Territory of Lands of New Agricultural Development in Altay Kray), Izvestiya Akademii Nauk SSSR, Seriya Geograficheskaya, no 2, Mar-Apr 55, p. 69-72, U. Eval RR 2

130. "Zheleznyye Dorogi na Tseline" (Railroads in the Virgin Land), Pravda, 18 Aug 55, p. 1, U. Eval RR 2

Maps and Atlases

131. Altay i Sayany, 1:1,500,000, Glavnoye Upravleniye Geodezii i Kartografii (GUGK) MVD SSSR, Moscow, 1954, U

132. Atlas Mira (Atlas of the World), GUGK MVD SSSR, Moscow, 1954, U

133. Atlas SSSR (Atlas of the USSR), GUGK MVD SSSR, Moscow, 1954, U

134. Bol'shoy Sovetskiy Atlas Mira (The Great Soviet Atlas of the World), Sovet Narodnykh Komissarov SSSR, v. 1, Moscow, 1937, U

135. Chkalovskaya Oblast', 1:750,000, GUGK MVD SSSR, Moscow, 1954, U

136. Geograficheskiy Atlas (Geographic Atlas), GUGK MVD SSSR, Moscow, 1954, U

137. Karta Narodov SSSR (Map of the Peoples of the USSR), 1:5,000,000, 4 sheets, GUGK MVD SSSR, Moscow, 1953, U

138. Klimatologicheskiy Atlas" Rossiyskoy Imperii (Climatological Atlas of the Russian Empire), Nikolayevskaya Glavnaya Fizicheskaya Observatoriya, St. Petersburg, 1900, U

139. Klimatologicheskiy Atlas SSSR (Climatological Atlas of the USSR), no 3, Izdaniye Gosplana SSSR i GMK SSSR i RSFSR, Leningrad, 1933, U

140. Kuznetskiy Basseyn (Kuznetsk Basin), 1:600,000, GUGK MVD SSSR, Moscow, 1954, U

141. Novosibirskaya Oblast', 1:600,000, 2 sheets, GUGK pri Sovete Ministrov SSSR, Moscow, 1950, U

142. Plotnost' Naseleniya SSSR (Density of Population of the USSR), 1:5,000,000, 4 sheets, GUGK pri Sovete Ministrov SSSR, Moscow, 1953, U

143. Pochvennaya Karta SSSR (Soil Map of the USSR), 1:4,000,000, 6 sheets, GUGK MVD SSSR, Moscow, 1954, U

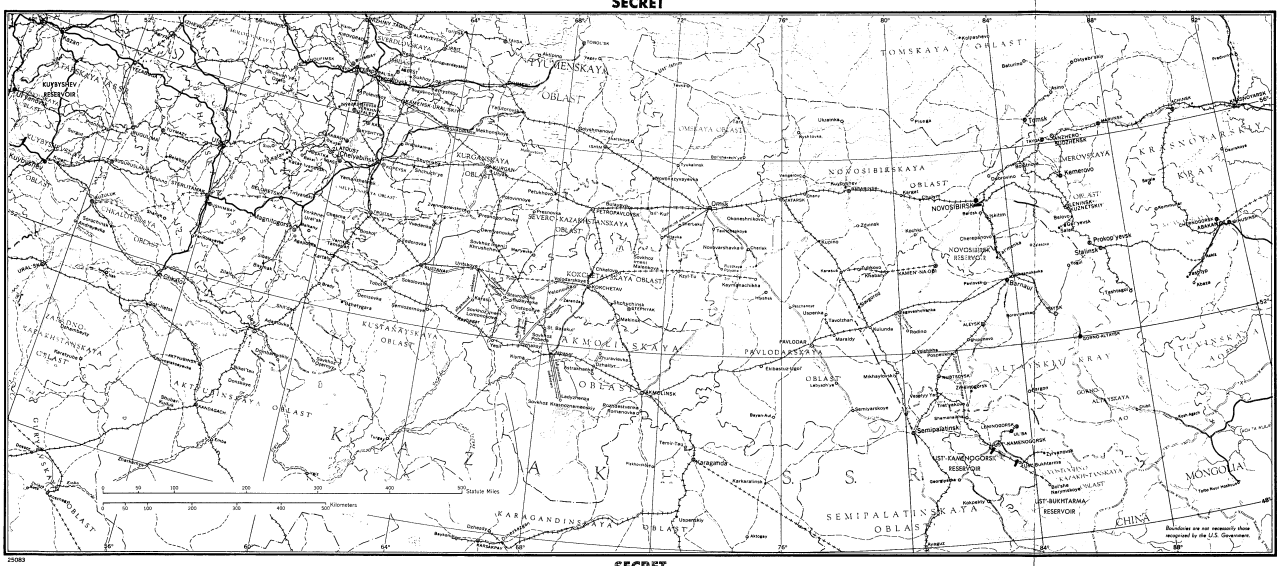
144. Politiko-Administrativnaya Karta Kazakskoy SSR (Political-Administrative Map of the Kazakh SSR), 1:1,500,000, 4 sheets, GUGK pri Sovete Ministrov SSSR, Moscow, 1950, U

145. Skhema Novykh Zheleznodorozhnykh Liniy v Rayonakh Osvoyeniya Tselinnykh i Zalezhnykh Zemel' (Scheme of New Railroad Lines in Regions of Development of Virgin and Idle Lands), photostat of map in Gudok, Moscow, 28 Oct 54, p. 2, CIA 94085, U

146. Soyuz Sovetskikh Sotsialisticheskikh Respublik (USSR), 1:5,000,000, 4 sheets, GUGK MVD SSSR, Moscow, 1955, U

147. Trans-Siberian Railroad -- Ufa-Novosibirsk, 1:12,500,000. Sep 55, CIA 13944, C

SECRET



25083

SECRET

USSR: NEW LANDS
GENERAL REFERENCE MAP

General limits of the main New Lands area

RAILROADS

Broad gauge (5'0") — completed

Narrow gauge

under construction

The exact alignments of certain railroads are unknown. Points which are known to lie along these railroad lines have been used where possible to aid in approximating the actual alignments.

ROADS

Main motor road

Improved dirt road

Improved dirt road under construction

Other route (possibly improved)

In most cases roads shown submerged by new reservoirs presumably have been relocated, but specific information is lacking on this point.

Reservoir

Dam

Head of navigation

POPULATED PLACES

- over 500,000
- 100,000-500,000
- 50,000-100,000
- 25,000-50,000
- 10,000-25,000
- under 10,000 (selected)

Source for population data: *

Soyuz Sovetskikh Sotsialisticheskikh Respublik 1:4,000,000. Kartografich. Ch. VTU Genshtab Voorzhennykh Sil Soyuza SSR, 1967.

*Supplemented by additional settlements which figure in the New Lands program, or which are related to transportation routes.

SECRET

~~SECRET~~

CONFIDENTIAL

CONFIDENTIAL

~~SECRET~~

Approved For Release 2001/08/08 : CIA-RDP79T01018A000200020001-0