Sakhalin Island
(Japan and U.S.S.R.)
Terrain Intelligence

Prepared by
U.S. Geological Survey
Under direction of
Chief of Engineers
U.S. Army

This document contains information affecting the national defense of the United States within the meaning of the Espionage Act, 50 U. S. C., 31 and 32, as amended. Its transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.

Intelligence Branch
Office, Chief of Engineers
October 1943
SPECIAL REPORT

STRATEGIC ENGINEERING STUDY

NO. 88

TERRAIN INTELLIGENCE

SAKHALIN ISLAND

(Japan and U.S.S.R.)

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Strategic Studies Section
Intelligence Branch
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October, 1943
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A. GENERAL

This folio of maps and explanatory tables outlines the principal terrain features of Sakhalin Island. Each map and table is devoted to a specialized set of problems; together they cover the subjects of terrain appreciation, climate, rivers, water supply, construction materials, suitability for roads, suitability for airfields, fuels and other mineral resources, and geology. In most cases, the map of the island is divided into two parts: N. of latitude 50° N., Russian Sakhalin, and south of latitude 50° N., Japanese Sakhalin or Karafuto. These maps and data were compiled by the United States Geological Survey during the period from March to September, 1943.

B. GENERAL MAPS

The general map was compiled by transliteration from Russian and Japanese maps and locates and names towns, important villages, and most important geographical features. Because no satisfactory hypsometric maps of the entire island were available, a terrain model was constructed from maps, sketches, and descriptions of parts of the island; photograph of the model is included. The communications map shows existing railroads, roads, telegraph lines, cables, and ports.

C. TERRAIN APPRECIATION

Terrain appreciation is based on map reconnaissance and reading of physiographic and geologic literature. Terrain appreciation appraises the effects of topography and kind of ground on movement, cover, and concealment of troops and supplies. The country has been divided into 15 terrain units, outlined on an accompanying map. The topography and kind of ground of each terrain unit is discussed, with special emphasis on movement. Types of vegetation, settlements and existing roads and railroads are briefly summarized to complete the terrain setting. For further appraisal of the cultural features, the reports of other intelligence units should be consulted. Climatic data are summarized in a separate table, accompanied by maps and graphs.

D. VIEWS

A series of views, with an index map, illustrates the principal types of terrain.
E. RIVERS

The maps and table present a general picture of the character of river valleys and rivers; ease of movement across and along valleys is discussed. A large-scale map of Japanese Sakhalin (in 2 parts) shows the character of the river valleys.

F. WATER SUPPLY

Potential water supplies are reviewed chiefly for use in planning operations, and to assist geologists attached to water-supply battalions in locating ground-water supplies. Maps and table appraise potential supplies and suggestions are made concerning equipment needed for their development.

G. SUITABILITY FOR AIRFIELDS

Areas containing ground suitable for landing fields with 6,000-foot runways are indicated on a map. Detailed maps are given of possible sites in the south part of the island, for which large-scale topographic maps were available. Accompanying tables describe the topography, climate, kind of ground, vegetation, materials available for construction, water supply, and accessibility of favorable areas and suitable sites. Locations and number of existing airfields should be checked against the latest intelligence reports.

H. SUITABILITY FOR ROADS

The country is divided into several units, outlined on an accompanying map, each of which has common problems of road construction. The accompanying tables discuss problems of road-building and maintenance related to topography, kind of ground, stream crossings, and construction materials available. Existing roads are mentioned.

I. CONSTRUCTION MATERIALS

This table and accompanying map show the distribution of rocks suitable for building stone and masonry, riprap, road metal, ballast, lime, mortar, cement, concrete aggregate, and brick. Existing quarries and sources of oil and asphalt are shown.

J. FUELS AND OTHER MINERAL RESOURCES

Locations of coal-bearing rocks, coal mines, oil fields, and synthetic oil plants are shown on the map. The accompanying tables give data on quality, reserves, production, and accessibility of coal and oil and a brief discussion of other mineral resources.
K. GEOLOGY

The basic data from which much of the foregoing was derived are summarized on the geologic map. The table provides a general lithologic description of the rocks, their structure, and the geologic history and geomorphology of the island, for the use of geologists who may be assigned specific problems of terrain intelligence.
Method of compilation and reliability of data

These data have been assembled from published reports and maps, principally geologic. A selected bibliography is included. The data presented necessarily involve more or less interpretation on the part of the compilers and the reliability depends very largely on the adequacy of the original reports and maps of the area. Each compilation is given a reliability rating as judged by the compilers. These ratings are:

Class A: Original data so complete that the compilation involves little or no interpretation by the compilers.

Class B: Original data seem accurate but incomplete for this purpose, and have required much interpretation.

Class C: Less accurate and less complete than B, better than D.

Class D: Original data very sketchy; inaccurate as well as incomplete.

Maps are rated in four classes, as follows:

Surveyed map: The original map represents an actual instrumental survey and should be entirely reliable for the scale.

Reconnaissance map: The original map was not surveyed but seems to have been carefully prepared. General features are correctly shown but the details are incomplete and inaccurate for the scale.

Sketch map: The original map is highly diagrammatic and may contain gross errors.

Generalized map: Small-scale maps generalized from large-scale surveyed or reconnaissance maps.
PRINCIPAL SOURCES OF INFORMATION

* Articles most useful in preparation of this report.

**General**

In English. Good, brief account of industries, agriculture, settlement; maps, pictures.

In Russian. Popular account.

Very detailed description of stratigraphy, structure, physiography; contour map with geology; excellent pictures. In Russian, English summary.

In English.

*The geographic system of Japan (Nihon Chiri Taikei), Hokkaido and Karafuto: Kaizosha, Tokyo, 1930.*
In Japanese. Numerous excellent photographs.


In Japanese. Devoted entirely to Japanese Sakhalin. Nine articles dealing with geology, industry, commerce, mining, farming, forestry, climate.

**Terrain**

In Russian, German summary. Physiography, geology, passability, good pictures.
Terrain (cont.)


Terrain (cont.)


Wakimizu, Tetsugoro, Podsol in South Sakhalin: Imperial University of Tokyo, Jour. Faculty of Science, section 2, vol. 1, pp. 25-33, 1925. In English. Description and photograph of podsol profile.
Fuels and Mineral Resources

In Japanese. Maps and cross-sections of Esutoru field, and others.

In Russian, English summary. Map, pictures, geology, oil analyses, topography.

In Russian. Good map. Statistics by mines and regions.

In Japanese. Map showing coal fields and areas favorable for oil.

In Russian, French summary. Discussion of coal, oil and gold.

In Japanese. Description of deposits, geology and maps of Tertiary near Otomari and Nayoro.

In Japanese. A series of articles dealing with oil fields, coal mines and synthetic oil plants of Japanese Sakhalin. Maps, cross-sections, reserves and production tables.
Fuels and Mineral Resources (cont.)


Construction Materials


Roads


Rivers

Climate


Geology


Geology (cont.)

In Russian, English summary. Geology, physiography.

In Russian, English summary. Description and geologic map of Cretaceous on west coast north of Aleksandrovsk.

*Kurosawa, Mamoru, Geology of Nakashiretoko Peninsula of South Sakhalin: Jubilee Publication in commemoration of Prof. H. Yabe 60th birthday, vol. 1, 1939.
In Japanese, English abstract. Description of Tertiary and older rocks, particular attention given to late Paleozoic. Map. Location of Mita coal mine.

In Japanese. Geologic map. Shows particularly well the folding of Tertiary formations.

In Russian.

*Uwatoko, K., Geological map of South Sakhalin: Tokyo Geog. Soc., 1939.
In Japanese, English summary of text. Large geologic map, descriptive text, stratigraphic sections. Map shows mines, oil and gas seeps, roads and railroads.

In Japanese. Description metadiabases and associated altered rocks in pre-Tertiary crystalline complex in Eastern Range.

In Japanese. Description of pre-Tertiary crystalline rocks (Paleozoic?) in Eastern Range. Geologic map.
Maps

Bolshoi Sovetski atlas mira, tom 1, Moskva, 1937; tome 2, Moskva, 1939.
(Great Soviet world atlas, vol. 1, Moscow, 1937; vol. 2, Moscow, 1939.)
In Russian.

Geological atlas of Eastern Asia, scale 1:2,000,000: Tokyo Geographical
Society, published by Kogen-Koshi, 1929.
In Japanese, English legend.

Geological reconnaissance map of Russian Sakhalin, scale 1:500,000:
Government of Karafuto, Tokyo, March 31, 1921.
In Japanese.

Geologicheskaya karta Soyusa Sovetskikh Sotsialisticheskikh Respublik,
Orgkomitet po sozyvu 17 sessii mezhdunarodnovo geologicheskovo
kongressa v Moskve, 1937. (Geological map of the Union of Soviet
Socialistic Republics, scale 1:5,000,000, sheet 8; Organization
Committee of the 17th Internatl. Geol. Cong., 1937.)
In Russian, English legend.

Topographic maps, scale 1:50,000, 1911 to 1935: Imperial Japanese
Army Land Survey Bureau.
In Japanese. Coverage of most of Japanese Sakhalin.

Topographic maps, Southern Karafuto, 20-meter contour interval, scale
1:50,000, redrawn from Imperial Japanese Army Lands Survey maps,
A.M.S. L762, 1943.

U. S. Hydrographic Charts, southeast coast of Siberia, No. 1777, 10th
Sakhalin Gulf

SIBERIA

OKHOTSK SEA

SAKHALIN ISLAND

NORTH PART
(U.S.S.R.)

SOUTH PART
(JAPAN)
(KARAFUTO)

Communications

REPORTED RAILROAD, EXISTENCE DOUBTFUL

SHOWN ON ARMY MAP SERVICE SPECIAL STRATEGIC MAP AS SECONDARY ROAD

EXPLANATION

- Railroad, standard gage
- Railroad, narrow gage
- Primary road
- Secondary road
- Trail
- Telegraph line
- Road and telegraph line
- Cable
- Anchorage
- Harbor

Compiled by U.S. Geological Survey

50° SAKHALIN ISLAND

La Perouse Strait
(Soya Strait)

SE A

EXPLA NATION

Railroad, standard gage
(Railroad, narrow gage
(3 feet wide in Japanese Sakhalin)

Railroad, narrow gage
(less than 3 feet wide)

Primary road

Secondary road

Trail

Telegraph line

Road and telegraph line

Cable

Anchorage

Harbor

50°
TERRAIN APPRECIATION

IN NORTH PART (U.S.S.R.)

Sakhalin
Gulf

NORTH PART (U.S.S.R.)

SAKHALIN ISLAND

SOUTH PART (JAPAN) (KARAFUTO)

CONFIDENTIAL

EXPLANATION

Flat plains.
Sandy beaches.
Swampy areas on flat plains.
Rough, hilly land.
High mountains.
Abrupt cliffs.

Routes and passes across mountains. Altitude of pass, (where known) in feet.

Terrain area boundary.

Terrain Areas:

1. Shiretoko Peninsula.
2. Yumna Depression.
3. Susuya Mountains.
4. Toyohara Plain.
5. South part of Western Range.
6. Central part of Western Range.
7. North part of Western Range.
10. Furanai Plain.
11. Ym Plain.
12. East Coastal Plain.
13. West Coastal Plain.
15. Schmidt Peninsula.

Compiled by U.S. Geological Survey
SAKHALIN ISLAND

Sakhalin is composed principally of north-trending mountain ranges, which form a mountainous backbone from which narrow mountainous spurs radiate to the coast. The ranges are separated in the center of the island by alluvial depressions. The Eastern Range, which occupies the eastern end of Sakhalin, reaches a maximum elevation of 5,120 feet (1,560 m) at Mount Chikhachek. The Western Range, which forms the main range of the island, reaches a maximum elevation of 3,780 feet (1,150 m) at the top of the Toyotomichi Plain. At the north the Eastern Range is separated from the large lake of the Northern Plain by a depression called the Odomar Depression. The Western Range is separated from the central part of the island by the Toyotomichi Depression, a depression bounded by the Toyotomichi Plain. The Odomar Depression at the north tip of Sakhalin is slightly higher than that of the Odomar Depression. From the Toyotomichi Plain, the mountains are separated by alluvial depressions, separated by valleys with very narrow, consisting only of the Eastern Range which is narrower and lower than alluvial. Mountains on the east side are rugged, formed of hard, massive rocks; while on the west side, the mountains are greater and form a more gentle slope. The mountains become discontinuous masses and peaks, lower to the north and die out near the Schmidt Peninsula. The

Introduction

The northern part of the island is poorly wooded, but the mountains are thought to be divided in the central part of the island by a depressed area consisting of an upfolds and dissected terraced plain. The Schmidt Peninsula at the north tip of Sakhalin is slightly higher than that of the Odomar Depression. From the Toyotomichi Plain, the mountains are separated by alluvial depressions, separated by valleys with very narrow, consisting only of the Eastern Range which is narrower and lower than alluvial. Mountains on the east side are rugged, formed of hard, massive rocks; while on the west side, the mountains are greater and form a more gentle slope. The mountains become discontinuous masses and peaks, lower to the north and die out near the Schmidt Peninsula. The

Interspersion of Glacier

Island is very narrow, consisting only of the Eastern Range which is narrower and lower than alluvial. Mountains on the east side are rugged, formed of hard, massive rocks; while on the west side, the mountains are greater and form a more gentle slope. The mountains become discontinuous masses and peaks, lower to the north and die out near the Schmidt Peninsula. The

Climate and Vegetation

Climate similar to Area 2. Peninsula is covered by forest and scrub forest of deciduous trees. Sandy areas of burned-out land, now covered by brush and young stands forest. Forest consists of conifers and sandy beaches and small islands. Forests in the mountains and on the coasts are thickly forested. In the forests outside of forest, deciduous forest and open meadows on alluvial fans.

Movement and Obstacles

Trails follow the coast and across the peninsula in several places along narrow valleys and over passes. Four road passes and two routes are possible with difficulty only by foot. Trails along coast are open and easy to follow for the most part. Forests and in the mountains, gravel and broken rock. Lower terraces are covered by thin residual soil, with steep green slopes, with steep green slopes. Forests in the mountains and on the coasts are thickly forested. In the forests outside of forest, deciduous forest and open meadows on alluvial fans.

Topographic corridor. East-west movement can be made by following the peninsula in several places along narrow valleys and over passes. Trails along coast are open and easy to follow for the most part. Forests and in the mountains, gravel and broken rock. Lower terraces are covered by thin residual soil, with steep green slopes, with steep green slopes. Forests in the mountains and on the coasts are thickly forested. In the forests outside of forest, deciduous forest and open meadows on alluvial fans.
18
Low, wide swampy plain bordered in the east by steep, high mountains and on the west by a low-lying coastal plain. Forested areas include deciduous and conifer trees. Exposed soil areas are covered by evergreen shrubs and small deciduous trees. High, steep ridges are covered by thick, dark brown forest. Land is mostly flat, with occasional low hills. Drainage varies from well-drained to poorly drained. Soils are deep, loamy, and nutrient-rich. Vegetation is dense and varied. Wildlife is abundant, with many species of birds, mammals, and reptiles. Travel is by boat or on foot. The area has a humid, temperate climate with distinct seasons. The summers are warm and humid, while winters are cold and snowy. Average temperatures range from about 70°F in July to -20°F in January. Precipitation is moderate, with about 30 inches per year. The area is rich in natural resources, including timber, fur, and fish. It is a popular destination for outdoor enthusiasts and researchers.!
TERRAIN APPRECIATION (CONT)

90 and Name

Peninsula

of Area

Schmidt

15

No. and Name

Peninsula

of Area

Schmidt

15

Elevation , and passes into mountains south

floodplains wider on north sides, and swampy

Valley

Mariat its northern end. Altitude of east

Mountain

130

Elizavety. Greater

lowland.

east coast is an abrupt cliff, across or parallel to ranges. Largest rivers, such as

contain small caves. Lagoons cut off from sea by sand bars. Inland plain is

three peaks called Tri Brata. At north, range forms

altitude of west range from

southwest and Longing sea; joined at south end but in north separated by central

cliffed

Lowland in north is soft, poorly consolidated sand and

cliffs at shore of north cape contain small caves. Storms usually drift west and east, fine

levels. steep cliffs are exposed. Pleistocene till contains peat in part. Permanently frozen
ground probably exists at shallow

Contains

Tri Brata can be crossed

movement may grow

Tundra occurs in places in the

are rarely exposed except in coastal cliffs. Marshes and rock slabs common on north and southwest coasts. Violence and

rocky, cliffed

tundra. Tri Brata command

View of central lowland and in valley bottoms, which

are covered with ice in part. Permanently frozen ground probably exists at shallow

depths.2

1/ Most population figures are as of 1930. Japanese standard-age railroad

in Sakhalin is 3 feet. See Communications map for location of roads,

and railroad.

2/ See Strategic Engineering Study, no. 68, "Permafrost or Permanently Frozen

Ground and Related Engineering Problems".

Reliability rating: Class C

Compiled by U. S. Geological Survey.
Index to views

NORTH PART (U.S.S.R.)

Sakhalin
Gulf

SIBERIA

Okhotsk
Sea

Tartary

SOUTH PART (JAPAN) (KARAFUTO)

Taraika Bay
(Patience Bay)

Gulf of Tartary

Sea

EXPLANATION

Large numbers and heavy lines indicate areas shown on Terrain Appreciation map and described in Terrain Appreciation table.

Small numbers refer to views shown on following pages.

- Location known.
- Location uncertain.

Compiled by U.S. Geological Survey
Flat, grassy well-drained Toyohara Plain (Area 4), the only large area in Sakhalin permitting free motorized movement. Susuya Mountains (Area 3) in background. Nihon Chiri Taikei, Tokyo, 1930.


Narrow coastal terraces that form the shore at the foot of mountain cliffs in many parts of the island. These are at the mouth of the Arkovo River (in Area 7). Tikhonovich and Polevoi, Russ. Geol. Committee, 1915.

West side of Toso Mountain (in Area 6), a small coastal ridge typical of the higher ridges and peaks of the Western Range. Railroad in foreground follows east coast of Japanese Sakhalin, from Shikuka to Ochita. Nihon Chiri Taikei, Tokyo, 1930.


Port of Maoka (in Area 5). Pulp factory in distant background. Maoka has one of the several good harbors in Japanese Sakhalin. The buildings are typical for the largest towns in Japanese Sakhalin. Nihon Chiri Taikei, Tokyo, 1930.
Mouth of Pilevo River (in Area 7). Typical of large valleys which form the best means of access into the interior where the coasts are formed by steep mountain cliffs, as is the case along much of the western and eastern ranges. Such valleys are the loci of settlement. Tikhonovich and Polevoi, Russ. Geol. Committee, 1915.

Beach at foot of coastal cliffs (in Area 7). Such beaches can be used for travel in many parts of the island. Tikhonovich and Polevoi, Russ. Geol. Committee, 1915.


Khi River near mouth (in Area 9). Typical of large streams that flow across the coastal terraces along east coast of Russian Sakhalin. D.V. Sokolov, Zemlevedenie, 1912.

Western Range (Area 7), covered by forest of fir, spruce, and larch. In valley is one of the abandoned villages common in mountain valleys south of Aleksandrovsk. D.V. Sokolov, Zemlevedenie, 1912.

SAKHALIN ISLAND


Terrace plain on east coast (Area 12). Coastal plains in places near the shore are covered by tundra type of vegetation and spreading pine (Pinus pumila), as in the foreground; elsewhere covered by thick coniferous forest, as in background. D. V. Sokolov, Zemlevedenie, 1912.


Poronai River (in Area 10). Banks are forested; plains back from river are a swampy tundra. Nihon Chiri Talkei, Tokyo, 1930.

Corduroy road on tundra in Poronai Plain (Area 10). Might be a section of the highway along west edge of plain, connecting Shikukai with Russian Sakhalin. Nihon Chiri Talkei, Tokyo, 1930.


Cape Elisavety, formed by eastern coastal range of Schmidt Peninsula (Area 15), and part of beach at north end of central lowland. Tikhonovich, Russ. Geol. Committee, 1914.

Aerial mosaic of a portion of the low, flat, tundra plain of the Poronai River (Area 10). Meandering Poronai River at left with many ox-bow lakes along its course. Meandering Furito River at east, emptying into Taraika Lake in the lower right-hand corner of the picture. Between the rivers is swampy tundra with numerous lakes. Imp. Jap. Land Survey, 1932-34.
CLIMATE CONFIDENTIAL SAKHALIN ISLAND

INTRODUCTION

Sakhalin is within the East Asia monsoon region. Winter winds blow strongly from the north and the interior; weaker summer winds blow off the ocean from the south. The east coast, chilled by the extremely cold Okhotsk Sea, is colder and more foggy than the west coast which is warmed by the south by a branch of the Japanese current. Winters are long, cold and humid; the short summers are foggy and rainy; the days may be very warm, but nights are cool. The interior of the island is colder in winter than the coasts but, because the winds are not as strong, the climate is somewhat less rigorous than in the coastal regions, particularly the southeast and the far north where the winds are very strong. The sides are cloudy much of the time.

WINDS

Winter winds are predominantly from the north and from the interior; summer winds are predominantly south. There are few calm periods. Summer is the quietest period of year except at the north end, where February is the quietest month. Winds are strongest in the southwest and greatly reduces the average winter velocity to 15 miles per hour, and the average annual velocity is 12 miles per hour, and in the far north, where the average annual velocity is 14 miles per hour. In other parts of the island the average annual wind velocity is 5 to 7 miles per hour. Sales are rare in summer and not strong. Winter gales are stronger and more common, occurring about 3 to 5 times a month in the north half, and attaining a velocity of 80 miles per hour (at Odomari). Sales blow from various directions, but rarely from the south or east.

TEMPERATURE

The average annual temperature is about 1° F. Average temperatures decrease from south to north at the rate of about 2 to 3° F. for every 1° of latitude. The east coast is 3 to 5° colder than the west coast at the same latitude. Winter temperatures are about 9° lower in the interior than along the coast; summer temperatures are about 1° higher. The average temperature in January, the coldest month, ranges from -13° F. in the north to 15° F. at the south end. The average temperature in August, the warmest month, is slightly below 60° F. in the north half, slightly above 50° F. in the south half. The coldest temperature recorded at Aleksandrovsk is -37° F., at Kirovsk, -28° F.; at Oshika, -41° F. (all in January). Summer temperatures in the interior occasionally reach 90° F. Freezing weather occurs from the end of October or early November to early or middle April. In most of the island frosts may occur in all months except July and August. It is reported that at Oshka, in the far north, in some years frosts occur in every month.

PRECIPITATION

The average annual precipitation is about 30 inches at the south, 15 to 20 inches at the north. It is highest from July to October (3 to 5 inches per month); precipitation occurs on fewer days (10 days per month on the average) than in other months but is more intense. Snow falls from October to April. Snow cover is from 2 to 5 feet deep in valleys and lowlands, and as much as 7 feet deep in mountains of the north. Winds pile up high drifts in valleys. Because of snow and complete snow cover, sleds pulled by horses, reindeer, or dogs are used for winter transportation. Skis can be used when snow cover is 4 inches deep.

EVAPORATION

Low temperatures retard evaporation and the ground is almost constantly moist. In the southern half of the island the evaporation from an open pan of water is 26 to 30 inches a year; it is higher in July and August (3.5 to 4 inches a month) and lower (about 3 inches) in September, the rainiest month. As a result, dirt roads on the east coast are in very bad condition in September. Evaporation on the west coast is somewhat higher (6 to 8 inches annually).

HUMIDITY

Breadth is high. The average annual relative humidity is 70 to 80%. It is highest in July and August (average 85% to 95%), and lowest in spring and fall, but the average relative humidity in no month is below 50%. Winter averages 75 to 80%.

VISIBILITY

Visibility is generally poor. Sales are overcast 150 to 200 days a year. The average annual cloud cover is 65 to 75%; it is greater in summer (75 to 90%) and less in spring and fall (45 to 50%). On the east coast winters are relatively clear (average cloud cover 45% in January). On the west coast 3 to 5 days a month are clear in spring and fall, 1 to 2 clear days a month in January. At Shikuka, on east coast, there are 10 clear days in January. Fogs are most frequent in May to September; the west coast has less fog than the east coast. On the west coast fogs occur on about 20 days or less a year, mostly in June and July (6 to 7 days per month), but a few as early as March and as late as November. On the east coast and in Aniva Bay there are 35 to 40 days a year, which may occur in almost every month but are most frequent in June and July (8 to 10 days a month); they are rare in winter. In the interior fogs are less common.


Compiled by U. S. Geological Survey.

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EXPLANATION
Numbers refer to areas described in table.
1. Tym Plain.
2. Poronal Plain.
3. Toyuara Plain.
4. South part of mountain ranges.
5. North part of mountain ranges.

For more detailed map of area south of 50°N. latitude see following pages.

Compiled by U. S. Geological Survey
The Tym and Hornum Flows are the only ones used for timber navigation. The string of lakes along the northeast coast are also used for navigation. Because of the high gradients of streams in the west and northwest, and the heavy rains, a wide range of watercraft is used. The Hornum Flow is navigable from the mouth to the north-east, and the Tym Flow is navigable from the mouth to the north-west.

**Rivers**

**Tym River**
- Longest river in Sakhalin, about 250 miles long. Named extensively over alluvial plains, islands, bars, and rapids along the coast. Bottom soft; many wide, shallow channels, and some rapids. Tym River is 300 feet wide at mouth, gradually narrows upstream to 150 feet, Channel, generally near steep bank, 60-100 feet deep. Tym River is 15-20 feet deep and may not cross, sometimes have to be bridged or ferried. Tym River is navigable by boat of 40-foot draft for distance of 10 miles above mouth. River is 400 feet wide near mouth, 100 feet deep. Soft bottoms throughout. Islands, bars, and rapids are common. The Hornum Flow is not navigable, but can be bridged or ferried.

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SAKHALIN ISLAND

Introduction

Water is generally abundant. The mean annual precipitation is 20 to 25 inches, highest in late summer, but fairly well distributed throughout the year. Mountainous areas contain many small streams and isolatcd mountain ponds which are occasionally deep enough to supply the towns which utilize them. The interior lowlands and coastal plains are crossed by large streams and rivers which are generally mineralized, often high in sulfate but probably majority are palatable. In the lowlands the ground is usually saturated at shallow depths. Depletions up to 20 feet water and shallow wells to some extent, but both are subject to pollution. Drilling in the oil fields on the east coast has given evidence of deeper artesian aquifers, which undoubtedly exist in all the lowland area and which should be a good source of water supply. Ground water in mountain areas is hot rock and localized in fissures or steeply dipping beds; will probably occur in areas where there is hot rock and several springs near foot of mountains. Permanently frozen ground is present in Sakhalin within a few feet or less of the surface in lowlands where the ground is peaty, and sometimes underlining all the lowlands and part of the mountain areas as well. Its distribution and thickness is highly variable. It might extend a considerable distance south into Japanese Hokkaido. The Interior frozen ground precludes shallow wells in many places, but water supply should not be much affected by it and sometimes within it, under pressure. The special problems of ground water are discussed in the section, "Engineering Study". (p. 50, "Permafrost or Permanently Frozen Ground and Related Engineering Problems.")

WATER SUPPLY

Area

Ground-water Geology

1. Toyohara Plain

Elongate plains bordering north-oriented mountains, capped by mouth-flowing andesite river and north-flowing Mabukichi River and its tributary, Tabir River. Filled with fresh, unconsolidated, porous deposits of sand, gravel, and clay. Ground surface is well drained except near coast. Alluvial fans of coarse sand and gravel at foot of mountains spread out onto plain; slim developed on high side. In places, edge of plain is terraced. North and south coast formed by sandy beaches and bar and swamp.

2. Mountainous Areas

Mountains made up principally of steeply dipping and fresh bedded rocks, highly mineralized in nature. Buried on small cones are late Paleozoic and Mesozoic formations consisting of volcanics, sand, silt, and clays. Small areas of massive crystalline rocks are present in mountain areas. Generally, between faulted lineaments, mountainous areas are covered by thick deposits of permeable sand and gravel. Weathering produces many small flat areas (wide terraced valley bottoms and limided) filled with permeable, unconsolidated sand, gravel, and clay, in most cases less than 10 feet thick, and never over 50 feet thick. These areas are generally swampy, and are subject to pollution and should be treated.

3. Coastal Plains

Elongate plains between north-trending mountain ranges, occupied by north-flowing Tym and south-flowing Poronai Rivers. At edges, plain is poorly explored and information is incomplete. The plain is elongate between north-trending mountain ranges, occupied by south-flowing Tym and south-flowing Poronai Rivers. At edges, plain is poorly explored and information is incomplete.

4. Northern Islands

Area is poorly explored and information is incomplete. On east and west coasts the lowlands are bordered by mountain peaks which are continuations of mountain ranges south to beyond. Decrease in size is north, gradual.

5. Southern Islands

Northeast, coastal area forms arc of low diastemites terraces, swampy in part, widest at north coast. Interiors of islands composed of terraced muds, sands, and clays, which are somewhat mineralized. Interior plains covered by poorly consolidated sediments composed of unconsolidated sand, gravel, and clay. Overlying flat lying or gently folded rocks similar to those of mountains.

Water-supply evaluation:

1. Toyohara Plain

Larger streams provide a good supply throughout the year. Mabukichi River in mountains is large stream westwards. Pyramid and Chets are flows for most of length on the plain. Their tributaries, flowing off mountain slopes, less water in upland areas. Rivers less source of many, particularly on east side, are nearly or completely dry. In most areas in Toyohara are 25 inches.

2. Mountainous Areas

Numerous small mountain streams provide good supplies for settlements in mountain areas. In mountain areas, springs of small flat areas, in most areas are not available. Springs are usually used by domestic wells, or drilled wells are found at many places. In most areas the ground water is in deep rock. No permanent springs are expected at flat areas. In most areas, springs are used for domestic purposes and ground water well is advisable. Spring water may be polluted. In water in deep and shallow wells will rise close to surface. Ground water may be highly mineralized; water in coastal regions may be high in sulfate and not potable.

3. Coastal Plains

Tym and Poronai are the largest streams of the coastal region. These two rivers head in interior plains, gradually passing into coastal terraced lands. Interior appears to be drained by small flat areas (wide terraced valley bottoms and lowlands) filled with permeable, unconsolidated sand, gravel, and clay. In most cases less than 10 feet thick, and never over 50 feet thick. Particularly swampy on southeast. Some of streams which are perennial although in some places they are barely large. In most areas, springs are used for domestic purposes and ground water well is advisable. Spring water may be polluted. In water in deep and shallow wells will rise close to surface. Ground water may be highly mineralized; water in coastal regions may be high in sulfate and not potable.

4. Northern Islands

Many springs, some quite large, usually water are good supplies. Direct springs. In mountain areas, supplies of water are supplied in intertidal areas. (p. 40, "Permafrost or Permanently Frozen Ground and Related Engineering Problems.")

5. Southern Islands

Many springs, similar to those in mountain areas. Good supplies are provided in intertidal areas. Shallow water in shallow, unconfined aquifers. Ground water below frozen ground and shallow, unconfined aquifers. Shallow water is abundant in terraces. At some places obtained by borings less than 75 feet depth but become polluted and wells were abandoned. In areas under pressure are present at few levels up to 10 feet. In cases covered by sand, gravel, and clay, which is not thick deposits of permeable sand and gravel. In most areas, springs are expected at flat areas. In most areas water can be found a few inches below surface. Absolutely variable; in places 30 feet. Utilization: high mineral content, shallow and surface supplies will need to be treated against pollution.

WATER SUPPLY

Reclaimed Supplies

Equipment Needed

Shallow wells can be dug by hand or by small motor; or getting rid of caves a few hundred feet depth should be preferred. Rotary drilling is necessary. Shallow and surface water is subject to pollution and should be treated.

Perforation pipes needed for deep wells to avoid caving. Rotary drilling should be employed in areas under pressure. Rotary drilling is recommended. Rotary drilling is necessary. Shallow and surface supplies should be treated against pollution.

Large quantities of water are available in wells of intermediate depth. Shallow water is supplemented by shallow driven or deep wells for permanent supplies. Rotary drilling recommended. Shallow water is available in wells of intermediate depth. Shallow water is recommended. Water is available in wells of intermediate depth. Shallow water is available in wells of intermediate depth. Shallow water is available in wells of intermediate depth. Shallow water is available in wells of intermediate depth.

WATER SUPPLY

A large supply of good water should be available in any part of plain both at shallow depths and at deeper horizons. Shallow water may be polluted. In water in deep and shallow wells will rise close to surface. Ground water may be highly mineralized; water in coastal regions may be high in sulfate and not potable.

Sampling of wells and springs is necessary. Ground water supplies should be treated against pollution.

Springs can be used for domestic purposes and ground water well is advisable. Spring water may be polluted. In water in deep and shallow wells will rise close to surface. Ground water may be highly mineralized; water in coastal regions may be high in sulfate and not potable.

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Detailed topographic maps of Russian Sakhalin are lacking. Areas having generally flat to rolling topography in which suitable sites can be found are indicated by pattern. The numbers refer to areas that are described on the following pages. A regular airdrome, using semblance, has been operating since 1938 between Koharozøy (on the Siberian mainland), Aleksandrovsk, and Okha. All the lagoons and inlets on the east and north coasts are good landings for seaplanes. Army or Navy landing fields at Vishkho and Aleksandrovsk are probably small.

Permanently Frozen Ground: Much of the low, flat land, particularly in the north, is underlain at shallow depths by permanently frozen ground. Removal of vegetation and peaty soil, deep cuts, and warmed buildings disturb the temperature equilibrium of the ground, and the frozen ground may thaw and become supersaturated and unstable. Springs may burst forth, flooding the construction and freezing. For these reasons it is best to leave the ground as little disturbed as possible and fills are preferred to cuts. High subgrades and thick-course base course are necessary for drainage and to minimize frost heave. Construction throughout the area should be preceded by an investigation of frozen ground and ground-water conditions. For a detailed discussion of the construction problems involved see Strategic Engineering Study No. 69, Permanent or Permanently Frozen Ground and Related Engineering Problems. Oil fields on the northeast coast can provide abundant crude oil and some sand for runway surfacing needs. Soil cement stabilization is not recommended because, in the north, every month may have freezing weather.

Extensive level areas suitable for airfield sites are the wide plains along the Poronai River and north and south of Toyohara. Smaller suitable areas are to be found along the coasts, on terraces, and at the widened valley mouths of the large rivers. Also a few valleys in the interior have bottom wide enough for longitudinal runways but high valley walls and surrounding mountains make hazardous approaches. Detailed topographic maps are available for areas south of latitude 45° and for some areas farther north. Sites suitable for 6,000-foot runways aligned in several directions and requiring little or no grading are indicated on the index map and shown on large-scale maps with accompanying descriptions on the following pages. Shorter runways could be accommodated on coastal terraces, beaches, and in valleys, but these sites are not described. The ground is not permanently frozen except at the north end of the Poronai Valley, but provision should be made against frost heave. Oil fields in Russian Sakhalin and two synthetic oil plants in Japanese Sakhalin can provide abundant crude oil for runway-surfacing needs. Because of cold climate soil cement stabilization is not recommended. Small emergency airfields, probably 3,000 feet long or less) are located at Nairo, Okah, Toyohara, and Okham. Scattered lagoons and coastal lakes are good natural landings for seaplanes and the calm anchorage behind breakwaters at Honto, Mako, and Okham, and on the northeast coast of Nakh Island can also be used.
1

**Tym-Poronai Plain**

Wide plain between high mountain ranges, occupied by the large, meandering Tym and Poronai Rivers. Sites can be selected where grades are 15 or less, little leveling would be necessary, and 10,000 feet runs could be aligned in any direction. The plain in both sides of the rivers is terraced and the edges pass down gently-sloping alluvial fans rising to the foot of the adjoining mountains. Large parts of the plain are swampy, particularly on the Poronai River. Along the Poronai River the most suitable areas are on the lower slopes of the alluvial fans where the topography is steeper (5 to 20 percent). A few of the divides between the Tym and Poronai Rivers is a central plain which is probably fed by the Tym River. Along the north side of the plains, rather well-drained and sites can be found. Further north, on the lower course of the river, the Tym Valley is narrow; many swampy and good sites are probably lacking. Lowlands, extending some distance from the river, are subject to flooding.

**Topography**

The highest peak of the western range is 3,400 feet altitude; the highest peak of the eastern range is 6,500 feet altitude. Hills several hundred feet high border the Tym-Poronai Plain. Coastlines rise several thousand feet from margins of plain.

**Topographic Hazards**

Power fogs and fewer severe winds than along the coasts. Mean annual precipitation at Ekvator is 22.5 inches, highest in August and September (up to 4 inches a month). Mean temperature in January, the coldest month, is -10°F. In July, the warmest month, 66°F. Floods in May and early June, when snow melts and late July through September, after heavy rains. Snow begins in October; snow cover common on the Tym and Poronai, and other Pleistocene sands. The divide between the Tym and Poronai Rivers is a gently rolling plain (altitude 360 feet) on which good fields probably can be found. On the Tym River, south of the plain, some acres will be found.

**Climate**

In swamy areas petty soil (A-1) 1 to 2 tenths thick, underlain by clay (A-2) and below, gravel, and clay in plain. Sand and gravel, and small patches of limestones and granite, in bordering mountains. Timber abundant. Oil seeps in hills west of Ekvator provide some oil. Surfacing material for airfields will probably grow to be less acceptable. Water abundant. Timber abundant. Fields not suitable for any type of crop.

**Vegetation**

Grass hay, rough grass, sedge, and fen vegetation.

**Ground Cover**


2

**East Coastal Plain**

Wide, terraced coastal plain at foot of mountains. Shore formed by chain of large lagoons and laks out of off of Okhotsk Sea by dune covered sand bars less than 60 feet high and generally 5 to 1 mile wide. Some of the widest sand bars can accommodate 6,000-foot runways aligned in several directions. Some areas will require some light grading. Terrace rises from the inland edges of the lakes. Terrace tops flat to rolling, many are swampy. Some sites will need but little leveling and can accommodate 6,000-foot runways aligned in any direction. Can such possible sites be in ternal valley at the town of Okha. Lagoons and lakes provide good landing places for seaplanes.

**Topography**

Foothills at inland edge of plains are 200 to 400 feet high. The mountains beyond are 600 to 9,000 feet high. The east coast of the plain is bordered by ridges several hundred feet high. In the central part of the length the plain is closely approached by high hills and peaks up to 1,000 feet high. The north coast of the plain is bordered by ridges several hundred feet high. In the central part of its length the plain is closely approached by high hills and peaks up to 1,000 feet high. The north coast of the plains is bordered by ridges several hundred feet high. In the central part of its length the plain is closely approached by high hills and peaks up to 1,000 feet high.

**Topographic Hazards**

Severe climate. Open to storms from the Okhotsk Sea, cold fogs and strong winds. Worst fogs in May, June, and July. Bara are particularly exposed. Predominantly south winds in summer, north and northeast winds in winter.

**Vegetation**

Tall grass, brush, and some withered trees. Ranges of May, June, and July. Bare area par ticularly common in November and December. Timber abundant, oil seeps in hills west of Ekvator provide some oil. Surfacing material for airfields will probably grow to be less acceptable. Water abundant. Timber abundant. Fields not suitable for any type of crop.

**Ground Cover**

Grass hay, rough grass, sedge, and fen vegetation.

**Construction Material**


3

**West Coastal Plain**

Wide, terraced coastal plain. In north, sandy beach, in south marly beach along shore. Behind it is low flat-topped terraces. Further north, the peninsula is bordered by rolling ground, some of which would require little or no leveling. Most of the surface is small hills and small lake. The north coast is low. Some dry areas are large enough for 6,000-foot runways in any direction. East edges of plain rise into rolling hills and dissected ridges several hundred feet high. In the central part of its length the plain is closely approached by high hills and peaks up to 1,000 feet high. In the central part of its length the plain is closely approached by high hills and peaks up to 1,000 feet high.

**Topography**

Colder than the Poronai. Winter, with less precipitation and fewer fogs than east coast, and storms are less frequent and less severe in the north end, however, heavy storms occur in October. Sites are exposed to wind and wave action. Predominantly south winds in summer, north winds in winter.

**Topographic Hazards**

Line is a sandy beach (A-3) except in the south where mud flats occur at some places (A-1). Sand dunes (A-3) cover parts of beaches and terraces. Most sites on the dry ground of the higher country will need clearing of thick coniferous forest. Others need further work.

**Vegetation**

Tall grass, brush, and some withered trees. Ranges of May, June, and July. Bare area par ticularly common in November and December. Timber abundant, oil seeps in hills west of Ekvator provide some oil. Surfacing material for airfields will probably grow to be less acceptable. Water abundant. Timber abundant. Fields not suitable for any type of crop.

**Ground Cover**

Grass hay, rough grass, sedge, and fen vegetation.

**Construction Material**


4

**Central Plain of Sakhalin Peninsula**

Wide, flat, terraced plain between mountains. North coast contains lagoons. Plain rises inland, becomes narrower and rolling. Sites can be found in which 6,000-foot runways can be aligned in any direction with little leveling necessary.

**Topography**

Mountains bordering west side 500 to 1,600 feet above plain, on east side 700 to 8,300 feet above plain.

**Topographic Hazards**

Strong winds and much fog. Bad weather much of the time. Inland part of plain sheltered by bordering ranges but climate still severe.

**Vegetation**

Less severe than coast.

**Ground Cover**

Sand and gravel, some clay lenses at surface (A-4 and A-5). Sand, beach and gravel, and some clay lenses at surface (A-6 and A-7). Sand, beach and gravel, and some clay lenses at surface (A-8). High ground is generally covered by sedge and moss.

**Construction Material**

Sand and gravel, some clay lenses at surface (A-4 and A-5). Sand, beach and gravel, and some clay lenses at surface (A-6 and A-7). Sand, beach and gravel, and some clay lenses at surface (A-8). High ground is generally covered by sedge and moss.

5

**Northern Interior Lowland**

(Little is known of this region.)

Rolling to rough, dissected, terraced lowland between mountain chains. Some small areas are somewhat less dissected, but probably require extensive grading to be usable as sites.

**Topography**

Adjacent mountains rise on each side from a few hundred to more than a thousand feet above lowland.

**Topographic Hazards**

Less severe than coast.

**Vegetation**

Sand, gravel, and small amounts of clay and gravel at surface (A-1). Road bed can be leveled.

**Ground Cover**

High ground is generally covered by sedge and moss.

**Construction Material**

Sand and gravel, some clay lenses at surface (A-4 and A-5). Sand, beach and gravel, and some clay lenses at surface (A-6 and A-7). Sand, beach and gravel, and some clay lenses at surface (A-8). High ground is generally covered by sedge and moss.

6-23

Described individually on following pages.

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**Symbols in parentheses indicate appropriate soil group according to the Soil Conservation Service, U. S. Department of Agriculture.**

**a** For locations of construction materials see Construction Materials maps and table.

**b** For additional information see Water Supply maps and table.
SUITABILITY FOR AIRFIELDS, SAKHALIN ISLAND
AREA 6 (NORTH END)

EXPLANATION
Contour interval is irregular; contours used only to show land form.
Spot elevations in feet above mean sea level.

Possible airfield site.

Source: U.S. Hydrographic Office,
Chart No. 5432, 1:25,000; from
Japanese surveys in 1920 and 1921,
with small corrections in 1942.

U.S. GEOLOGICAL SURVEY
SAKHALIN ISLAND

SUITABILITY FOR AIRFIELDS

AREA 6

TOPOGRAPHY: Only the north end of Area 6 is shown on the large-scale map. The rest of Area 6 is topographically similar; its full extent is shown on the index map. Wide-bottomed valleys of the Aleksandrovka and Agnevo Rivers. Bottoms are terraced and not wide enough to permit 6,000-foot runways transverse to the valley, however probably in several places runways could be aligned parallel to the valleys. Some leveling would be necessary on terraces above flood level. The part at the town of Aleksandrovsk is probably as good a site as any in the area. There 6,000-foot runways could be aligned along the valley.

TOPOGRAPHIC HAZARDS: Mountains rise abruptly on each side. At Aleksandrovsk those on the west side are 970 feet above the valley and on the east side 466 feet. In other parts of the area they are as high or higher. Approaches from north and south directions are limited.

CLIMATE: Mean annual precipitation at Aleksandrovsk 28 inches, highest in August and September (3 inches a month), lowest in February (one inch). Snow cover up to 7 feet deep. Blizzards every 10 days or so from December through February. Cold, strong winds. Predominantly north winds in winter, south winds in summer. Mean temperature in January, coldest month, is -7° F.; in July and August, the warmest months, is 60° F. Fogs in June and July.

GROUND, VEGETATION: Sand underlain at shallow depths by gravel, (A3 & A2). Valley bottom of peat interbedded with sandy clay (A-6 or A-7 and A-8). Terraces at edges are gravel (A-3). Poorly drained. High subgrade necessary. Valleys cleared of forest in parts, but forest or brush will need to be removed in some places.

CONSTRUCTION MATERIALS AND WATER SUPPLY: Sand and gravel in valleys. Trap rock and sandstone suitable for construction in mountains on either side. In places coal beds with associated clays suitable for brick. Coaly shales can be burned to make clinker for surfacing. Water can be obtained from rivers, and sufficient supplies might be obtained from wells dug in valley bottoms.

ACCESSIBILITY: Valleys followed by road or trail south from Aleksandrovsk. Aleksandrovsk is the administrative center of Russian Sakhalin and its chief port. It has a seaplane anchorage and an Army or Navy airfield, which is probably small. An all-weather highway (not shown on map) leads east from the town into the interior.

 Symbols in parentheses indicate appropriate soil group according to Public Roads Administration classification.

Reliability rating: Class C,
Compiled by U. S. Geological Survey.
**EXPLANATION OF SYMBOLS USED ON TOPOGRAPHIC MAPS NUMBERS 7 TO 23**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>787</td>
<td>Spot elevation in meters</td>
</tr>
<tr>
<td>5 meters</td>
<td>5 meter contour</td>
</tr>
<tr>
<td>10 meters</td>
<td>10 meter contour</td>
</tr>
<tr>
<td>20 meters</td>
<td>20 meter contour</td>
</tr>
<tr>
<td>National highway</td>
<td>National highway</td>
</tr>
<tr>
<td>State highway</td>
<td>State highway</td>
</tr>
<tr>
<td>9 3/4 feet</td>
<td>Road over 9 3/4 feet wide</td>
</tr>
<tr>
<td>6 1/4 feet</td>
<td>Road over 6 1/4 feet wide</td>
</tr>
<tr>
<td>3 1/4 feet</td>
<td>Road over 3 1/4 feet wide</td>
</tr>
<tr>
<td>Trail</td>
<td>Trail</td>
</tr>
<tr>
<td>Standard gage railroad</td>
<td>(3 feet wide)</td>
</tr>
<tr>
<td>Narrow gage railroad</td>
<td>(2 feet wide)</td>
</tr>
<tr>
<td>Depth of stream in meters</td>
<td>1.7</td>
</tr>
<tr>
<td>Meadow</td>
<td>Meadow</td>
</tr>
<tr>
<td>Swamp</td>
<td>Swamp</td>
</tr>
<tr>
<td>Burned trees</td>
<td>Burned trees</td>
</tr>
<tr>
<td>Coniferous forest</td>
<td>Coniferous forest</td>
</tr>
<tr>
<td>Deciduous forest</td>
<td>Deciduous forest</td>
</tr>
<tr>
<td>Dwarf pine</td>
<td>Dwarf pine</td>
</tr>
<tr>
<td>Anchorage</td>
<td>Anchorage</td>
</tr>
<tr>
<td>Mooring place</td>
<td>Mooring place</td>
</tr>
<tr>
<td>Boundary of area suitable for airfields</td>
<td>Boundary of area suitable for airfields</td>
</tr>
<tr>
<td>Scarp</td>
<td>Scarp</td>
</tr>
<tr>
<td>Power line or telegraph line</td>
<td>Power line or telegraph line</td>
</tr>
</tbody>
</table>
For explanation of map symbols see page preceding large-scale map of Area 7.

Source: Imperial Japanese Army Land Survey Bureau, 1:50,000 topographic maps; 1911 to 1935.
A large flat area including the Poronai Valley and extending for some distance on the coast east and southwest of the river mouth. The Poronai River is large and meandering, has numerous side and cut-off channels along its course, and the wide plain on either side is covered almost completely by swamps. At its outer edges, the plain breaks into gently rolling alluvial fans covering the foot of high steep-sided mountains which border it. In the Poronai Valley the largest areas of dry land, most suitable for airfield sites, are on the fans, although even they are dotted with swamps. A narrow strip of dry land ("natural levees") also follows the river's edge but it is usually too narrow for good sites and is subject to floods. Floods sometimes cover most of the swampy flats. The coast east of the Poronai River contains a large lake, as well as smaller lakes and lagoons. The coastal plain, which extends some distance inland is flat and consists of swamps interspersed with irregularly shaped areas of dry land. Such dry areas may be used for a site in the vicinity of Shikuka. At the east end of the coastal plain there is a narrow coastal terrace, separated from the sea by low scarps. This terrace has undulating surface, is better drained than the low flats and is a good airfield site. Southwest of the Poronai River the swampy flats pass into a narrow coastal terrace, which is bordered by a scarp at the sea edge; the top of the terrace is flat to gently undulating, and contains a good site for an airfield close to Badio. Topographic maps of the Poronai River are incomplete and, though most of the area not covered is probably in swamps and unsuitable, a few possible sites may also exist on the east edge of the depression. Such sites would be very inaccessible. The following are the most suitable parts of the known areas:

### General Description

<table>
<thead>
<tr>
<th>Topic</th>
<th>Topography</th>
<th>Topographic Hazards</th>
<th>Climate</th>
<th>Ground, Vegetation, and Water Supply</th>
<th>Accessibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>7A. Alluvial Fans on West Edge of Poronai Plain. (Good Site.)</td>
<td>Alluvial fans at edge of mountain range. Slightly rolling ground with about 15% slope. Little leveling will be necessary. 6,000-foot runways can be oriented in any direction. The portion of the fan is subject to flooding. Large-scale map of a portion of the fan shows conditions typical of the entire west edge of the area.</td>
<td>Mountains at the west edge of the fans rise steeply 2,000 to 3,000 feet.</td>
<td>Similar to that at Shikuka, see below.</td>
<td>Gravel and sand, some clay on the surface (A-2 and A-2). Most of the ground is fairly well drained, but many small swamps exist. Subsoils are not consolidated. Materials are unconsolidated and subject to erosion. The ground may be permanently frozen below a depth of about three feet. Substrate necessary. Forest covers the ground and will need to be cleared except in areas where it has been burned out, which are not uncommon, where clearing will involve only brush and young second-growth.</td>
<td>Area east of Poronai River is suitable for airfield sites; close to Shikuka (town now larger than shown on maps), which is an anchorage and a railroad terminus (railroad leading southeast from town, not shown on map). Several miles of road will need to be built to the town. The river is crossed by ferry. All the eastern coastal region is served only by a trail which follows coast, crossing lake outlets by ferry. Sites will require the construction of long roads and bridges.</td>
</tr>
<tr>
<td>7B. Low Coastal Plains near Shikuka. (Close to town of Nairo.)</td>
<td>Coastal flats, crossed by Poronai River and containing lagoons and lakes. Swamps and irregular patches of drier ground. Grade very low, almost flat. Area subject to flooding. 6,000-foot runways can be oriented in any direction.</td>
<td>Mountains at inland edges of flats, rise abruptly to 1,000 to 2,000 feet.</td>
<td>Cold and wet. Swamps exist for much of the time in summer; clear skies in winter. Snow falls from about the middle of October to the middle of May. Snow cover up to 3 feet. Predominantly forested weather from the end of October to the middle of April. In winter winds predominant from north (18°) and northeast (306°); in summer winds predominantly from south (198°) and southwest (216°). Average wind velocity less than 10 miles per hour.</td>
<td>Peaty soil (A-2) overlain by several feet of clay (A-7) which in turn lies on sand and gravel (A-3 and A-2). Unconsolidated materials can be easily worked by scrapers. Drainage poor; high water table necessary. Ground remains wet for a long time after a rain. Covered by tundra vegetation; rocks, moss, and scattered lichen growth.</td>
<td>Sand and gravel in area. Construction stone in mountains at both sites. Shallow streams have brown-stained water. River water may be brackish under certain conditions. Shallow ground water abundant, can be tapped by dug wells but is subject to pollution.</td>
</tr>
<tr>
<td>7C. Coastal Terrace near Nairo. (Good Site. Close to large town of Nairo.)</td>
<td>Flat to slightly rolling coastal terrace, bordered along shore by a low escarp and passing on inland side into mountains. Cut into blocks by a system of small, parallel, east-flowing streams.</td>
<td>Mountains rise from west edge of the terrace (about 2 miles or more west of the shore). The highest peak is 3,000 feet high (about 3.5 miles west of shore).</td>
<td>Weather similar to that at Shikuka, see above.</td>
<td>Gravel and sand, possibly a little clay on the surface (A-2 and A-2). Fairly well drained. Fills or high and substrate necessary. Conifer forest which covers the terrace will need to be cleared.</td>
<td>On coastal highway and railroad (not shown on map). Field can be located near town of Nairo (now a larger town than shown on map). Lazy-Stone water supply can be drawn from small mountain stream. Small springs may be present at the terrace escarp and at the foot of the mountains. Shallow wells will yield small amounts of water.</td>
</tr>
<tr>
<td>7D. Coastal Terrace at Southeast Corner of Area. (Good Site but poorly accessible.)</td>
<td>Coastal terrace, slightly rolling on top, cut by several small south flowing streams. Scarp 50 to 95 feet high at shore edge. Grades about 18. 6,000-foot runways can be built in any direction. Terrace edge subject to landslides.</td>
<td>High mountains several miles inland. Mountains to east rise 600 feet higher.</td>
<td>Similar to that of Shikuka, see above.</td>
<td>Sand and gravel, some clay at surface (A-2 and A-3), Fairly well drained. Subsoil slope necessary. Covered by conifer forest which will need to be cleared.</td>
<td>A few small fishing villages on coast. Nearest town, Taraika, is 26 miles southeast of the area on the shore of Taraika Bay. Water can be obtained from mountain springs, shallow wells, and possibly from springs at terrace edges and sites of mountain slopes.</td>
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</table>

### Data collected at Shikuka over a period of 22 years:

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Average wind velocity, miles per hour</td>
<td>2.1</td>
<td>1.8</td>
<td>2.2</td>
<td>1.8</td>
<td>2.2</td>
<td>6.9</td>
<td>5.7</td>
<td>5.9</td>
<td>7.6</td>
<td>8.0</td>
<td>8.0</td>
<td>9.1</td>
<td>7.6</td>
</tr>
<tr>
<td>Maximum wind velocity, miles per hour</td>
<td>54</td>
<td>49</td>
<td>49</td>
<td>48</td>
<td>40</td>
<td>26</td>
<td>22</td>
<td>13</td>
<td>12</td>
<td>10</td>
<td>40</td>
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<tr>
<td>Average monthly precipitation, inches</td>
<td>1.1</td>
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<td>1.0</td>
<td>2.1</td>
<td>1.6</td>
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<td>1.6</td>
<td>1.4</td>
<td>1.3</td>
<td>1.0</td>
<td>1.8</td>
<td>2.9</td>
</tr>
<tr>
<td>Average number days with precipitation</td>
<td>10.8</td>
<td>12.1</td>
<td>12.1</td>
<td>12.1</td>
<td>15.0</td>
<td>15.0</td>
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<td>15.0</td>
<td>15.0</td>
<td>15.0</td>
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</tr>
<tr>
<td>Average number days with overcast skies</td>
<td>1.3</td>
<td>1.2</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
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</tr>
<tr>
<td>Average number days with fog</td>
<td>1.4</td>
<td>1.8</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
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</tr>
<tr>
<td>Average number clear days</td>
<td>15.1</td>
<td>15.1</td>
<td>15.1</td>
<td>15.1</td>
<td>15.1</td>
<td>15.1</td>
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</tr>
<tr>
<td>Average thickness snow cover, inches</td>
<td>20.6</td>
<td>21.5</td>
<td>20</td>
<td>20</td>
<td>7.4</td>
<td>0</td>
<td>0</td>
<td>3.5</td>
<td>3.8</td>
<td>3.8</td>
<td>3.8</td>
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</tr>
<tr>
<td>Average air temperature, Fahrenheit</td>
<td>0</td>
<td>5</td>
<td>16</td>
<td>21</td>
<td>26</td>
<td>31</td>
<td>36</td>
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<td>36</td>
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</tr>
<tr>
<td>Average minimum air temperature, Fahrenheit</td>
<td>9</td>
<td>15</td>
<td>26</td>
<td>34</td>
<td>46</td>
<td>54</td>
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<td>62</td>
<td>62</td>
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</tr>
<tr>
<td>Average relative humidity at 2 p.m., percent</td>
<td>73</td>
<td>65</td>
<td>59</td>
<td>53</td>
<td>43</td>
<td>35</td>
<td>28</td>
<td>28</td>
<td>28</td>
<td>28</td>
<td>28</td>
<td>28</td>
<td>28</td>
</tr>
</tbody>
</table>

/a/ Symbols in parentheses indicate appropriate soil group according to Public Roads Administration classification.
/b/ See Construction Materials map and table.
/c/ See Water Supply map and table.
For explanation of map symbols see page preceding large-scale map of Area 7.

Source: Imperial Japanese Army Land Survey Bureau, 1:50,000 topographic maps; 1911 to 1935.

U.S. GEOLOGICAL SURVEY
SAKHALIN ISLAND
SUITABILITY FOR AIRFIELDS
AREA 8

Topography suitable, but accessibility and weather conditions poor.

TOPOGRAPHY: Low flat arcuate plain on coastal terrace at foot of mountains. Slopes very gently (1% or less) toward the sea, ending at the shore in a low scarp. Danger of landslides at the seaward edge. Little leveling necessary. Flat ground sufficiently wide for 6,000-foot runways in any direction but ridges around the western edge of the plain block approaches so that runways cannot be used crossways of the plain.

TOPOGRAPHIC HAZARDS: Mountain ridges which bound the inland edge of the plain are 800 to 1,200 feet high, rise steeply and abruptly.

CLIMATE: Very foggy. Worst fogs in May, June and July. Strong cold winds from Okhotsk Sea. Temperatures lower on this coast than on west coast or interior. Winter winds from north and northwest, summer winds from south. Snow cover about 3 feet.

GROUND, VEGETATION (Class C data): Gravel and sand, possibly a little clay (A-2 and A-3). Fairly well drained. Can be worked by scrapers except when frozen. High subgrade and fill probably unnecessary. Open meadow with patches of forest, hence little clearing necessary.

CONSTRUCTION MATERIALS AND WATER SUPPLY (Class C data): Sand and gravel on area. Clay might be found in adjacent mountains. Sandstone and traprock suitable for building stone and crushed rock in mountains; possibly some granite a few miles south of the area. Timber on slopes. Water supply probably inadequate. Mountain streams are small. Small springs might be found at the foot of the mountains and at base of coastal scarp. Shallow dug wells can yield only a little water.

ACCESSIBILITY: Very poorly accessible. In an unsettled mountainous region. Coast is straight and rocky and has no anchorages. A few small fishing villages several miles north and south of area. The coast is followed by a poor trail, the only means of communication with the rest of the island. A road to the settled interior will need to built either west over high rugged mountain range or else south along the coast and around the shore of Taraika Bay for almost a hundred miles.

a/ Symbols in parentheses indicate appropriate soil group according to Public Roads Administration classification.

Reliability rating: Class B, except as otherwise indicated
Compiled by U. S. Geological Survey.
For explanation of map symbols see page preceding large-scale map of Area 7.

Source: Imperial Japanese Army Land Survey Bureau, 1:50,000 topographic maps; 1911 to 1935.
Topography suitable, but accessibility and weather conditions poor.

**TOPOGRAPHY:** One of several narrow flats strung along the Kitashiretoko Peninsula, separated by low hills. South and central parts low, flat (grades up to 1%) and very narrow; some land is less than 5 feet above sea level. Scarps at shore at south end; shore edged by beaches in central part. 6,000-foot runways can be oriented only north to northwest and no leveling is necessary. North end is wider, higher, and rolling, has grades of about 2% and will need some leveling. Bordered at shore by high scarps. 6,000-foot runways can be oriented in various directions. Small swampy areas in north and central parts.

**TOPOGRAPHIC HAZARDS:** Hills 470 feet high north of area; hill 410 feet high south of area.

**CLIMATE:** Climate severe. Area exposed to cold, strong winds from Okhotsk Sea which often has violent storms. Fog frequent, particularly in May, June and July. Winter winds predominantly from north and northwest, summer winds from south.

**GROUND, VEGETATION** (Class C data): Beaches and low ground are sandy, contain some gravel (A-3). Higher, rolling ground is composed of bedrock (sandstone and shale, possibly some traprock) overlain by a few feet or less of sandy loam soil (A-2). Swampy ground is A-8. Grading may involve hard rock excavation. Ground generally well drained, fill not necessary and subgrade need not be high. Much of flat land is open meadow covered in part by low spreading pine; in places conifer forest will need to be cleared.

**CONSTRUCTION MATERIALS AND WATER SUPPLY** (Class C data): Hard traprock in Hokeyama, south of area, suitable for building stone and crushed rock. Sandstone can probably be found in hills at north end of area. Sand and some clay and gravel in area. Small amount of water might be obtained by shallow wells; probably inadequate. Lakes may be brackish. High water table.

**ACCESSIBILITY:** Kitashiretoko Peninsula joins an unsettled, mountainous region and is far removed from the nearest well populated region, which is the Poronai Valley. Area 70 miles from Shikuka, the nearest large town, to which it is connected by a trail which will need much improvement (widening and grading) and construction of many bridges to be usable as road. Several small fishing villages in the peninsula.

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a/ Symbols in parentheses indicate appropriate soil group according to Public Roads Administration classification.

Reliability rating: Class B, except as otherwise indicated
Compiled by U. S. Geological Survey.
SUITABILITY FOR AIRFIELDS, SAKHALIN ISLAND AREA 10

For explanation of map symbols see page preceding large-scale map of Area 7.

Source: Imperial Japanese Army Land Survey Bureau, 1:50,000 topographic maps; 1911 to 1935.

U. S. GEO. SURVEY
Topographically good but accessibility and weather conditions poor.

TOPOGRAPHY: Narrow, low flat section of Kitashiretoko Peninsula, bordered on north and south by hills. Land 5 to 20 feet above sea. East and west shores formed by alternating scarps and beaches. Contains several lakes and a small swamp. Grades about .5%. No leveling necessary. 6,000-foot runways can be aligned in various directions.

TOPOGRAPHIC HAZARDS: Hill 410 feet high north of area; hill 700 feet high south of area.

CLIMATE: Same as Area 9.

GROUND, VEGETATION: Same as Area 9.

CONSTRUCTION MATERIALS AND WATER SUPPLY (Class C data): Hard traprock in Hokeyama, north of area, suitable for building stone and crushed rock. Sand and some clay and gravel in area. Small amount of water might be obtained by shallow wells; probably inadequate. Lakes may be brackish.

ACCESSIBILITY: Same as Area 9.

Reliability rating: Class B, except as otherwise indicated
Compiled by U. S. Geological Survey.
SUITABILITY FOR AIRFIELDS, SAKHALIN ISLAND AREA II

For explanation of map symbols see page preceding large-scale map of Area 7.

Source: Imperial Japanese Army Land Survey Bureau, 1:50,000 topographic maps; 1911 to 1935.

U. S. GEOL. SURVEY
SAKHALIN ISLAND SUITABILITY FOR AIRFIELDS
AREA 11

Topographically good but accessibility and weather conditions poor.

TOPOGRAPHY: Narrow, low, flat tip of Kitashiretoko Peninsula, 5 to 30 feet above sea. Shore mainly sandy beach, scarp in a few places. Grades .5 to 1% in most of area. Little or no leveling necessary. 6,000-foot runways can be aligned lengthwise of peninsula in all parts of area, crosswise in the north end only.

TOPOGRAPHIC HAZARDS: Hill 700 feet high north of area.

CLIMATE: Same as Area 9.

GROUND, VEGETATION: Same as Area 9.

CONSTRUCTION MATERIALS AND WATER SUPPLY (Class C data): Sandstone for building stone and crushed rock might be available in hill north of area and possibly in coastal scarps in central part of area and at the south end. Sand and some clay and gravel in area. Small amounts of water might be obtained by shallow wells; probably inadequate. Lakes may be brackish.

ACCESSIBILITY: Same as Area 9.

Reliability rating: Class B, except as otherwise indicated
Compiled by U. S. Geological Survey.
SUITABILITY FOR AIRFIELDS, SAKHALIN ISLAND AREA 12

For explanation of map symbols see page preceding large-scale map of Area 7.

Source: Imperial Japanese Army Land Survey Bureau, 1:50,000 topographic maps; 1911 to 1935.

U.S. GEOL. SURVEY
SAKHALIN ISLAND

SUITABILITY FOR AIRFIELDS

AREA 12

Poor location for site: wet, small, surrounded by high mountains.

TOPOGRAPHY: Valley floodplain, flat, swampy, subject to floods. Little if any leveling necessary. Flat ground large enough for 6,000-foot runways in any direction but mountains on both sides of valley block approaches for east to northeast runways. Similar valley, possibly wider, continues north and west to the coast, but no map was available of that area.

TOPOGRAPHIC HAZARDS: On the east side mountains rise abruptly to about 1,000 feet. On the west side mountains rise more gently but attain 400' to 650 feet within a half mile of valley bottom and up to 2,000 feet within 2.5 to 3 miles.

CLIMATE: Not known. Probably similar to west coast but somewhat sheltered from coastal winds and fogs.

GROUND, VEGETATION (Class C data): Unconsolidated river alluvium: sand, gravel and clay, finest materials on top (A-2 and A-6). Easily worked by scrapers. Ground is poorly drained, swampy in part, where soil is class A-8. Grading for drainage and high subgrade necessary. Much of the valley floor is probably now under cultivation.

CONSTRUCTION MATERIALS AND WATER SUPPLY (Class C data): Sand, gravel and clay in valley and surrounding hills. Traprock suitable for crushed rock, probably in hills. 10 miles south are large areas of traprock, suitable for building stone and crushed rock. Water may be obtained from river and by shallow wells in flood plain. Small amounts of oil or asphalt might be obtained from oil seeps west of area.

ACCESSIBILITY: On highway leading about 8 miles to Esutoru on coast. Valley bottom used for agriculture and crossed by network of roads and trails (not shown on map). Village near south end of area.

a/ Symbols in parentheses indicate appropriate soil group according to Public Roads Administration classification.

Reliability rating: Class B, except as otherwise indicated
Compiled by U. S. Geological Survey
SUITABILITY FOR AIRFIELDS, SAKHALIN ISLAND AREA 13

For explanation of map symbols see page preceding large-scale map of Area 7.

Source: Imperial Japanese Army Land Survey Bureau, 1:50,000 topographic maps; 1911 to 1935.

U.S. GEOLOGICAL SURVEY
Good location for site, but will probably involve rock excavation.

**TOPOGRAPHY:** More or less level-topped promontory. Up to 15% slopes at edges. Top with low grades, rolling, and will need leveling. 6,000-foot runways possible in any direction.

**TOPOGRAPHIC HAZARDS:** May be some hills near interior edge.

**CLIMATE:** Probably intermediate between conditions at Maoka to the south and Ambetsu to the north. Cold climate; winters windy and uncomfortable. Winds predominantly from south and east in summer, from the north and east in winter. Windy most of the time all year, but least windy in summer. May snow falls from middle of November to middle of April. Snow cover up to 2 feet. See below for additional data at Maoka and Ambetsu.

**GROUND, VEGETATION (Class C data):** Hard traprock overlain by thin, rocky, clay soil (A-6 or A-7) probably not more than a few feet thick. Leveling will involve rock excavation. Soil probably will be sticky when wet but area well drained and ground will dry quickly after a rain. Conifer forest will need to be cleared from part of area.

**CONSTRUCTION MATERIALS AND WATER SUPPLY (Class C data):** Traprock in area suitable for crushed rock for surfacing and concrete aggregate (unless found to contain zeolites, injurious to cement). Sand, gravel and clay on hills at shore a few miles north of area. Oil seep near coast, about 25 miles south may provide sufficient oil or asphalt for surfacing (see Construction Materials map, for location). Rivers can be used for water supply. Springs may be found in the vicinity and wells into rock may tap large flows but well prospecting is highly uncertain.

**ACCESSIBILITY:** Coastal highway (not shown on map) skirts east edge of area, connects it with small towns and anchorages several miles away north and south.

### Statistics collected at Maoka over a period of 15 years or more and at Ambetsu over a period of 7 years:

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<td>2.0</td>
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<td><strong>Average number days with precipitation</strong></td>
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<td>15</td>
<td>16</td>
<td>16</td>
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<td><strong>Average number days with overcast skies</strong></td>
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<tr>
<td><strong>Average number clear days</strong></td>
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<td>2.5</td>
<td>3.1</td>
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<tr>
<td><strong>Average thickness snow cover, inches</strong></td>
<td>5.0</td>
<td>7.6</td>
<td>10</td>
<td>10</td>
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<tr>
<td><strong>Average maximum air temperature, Fahrenheit</strong></td>
<td>20.0</td>
<td>23.0</td>
<td>26.0</td>
<td>29.0</td>
<td>32.0</td>
<td>35.0</td>
<td>38.0</td>
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<td>12.1</td>
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<tr>
<td><strong>Average minimum air temperature, Fahrenheit</strong></td>
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<td>0.5</td>
<td>3.9</td>
<td>7.3</td>
<td>10.7</td>
<td>14.1</td>
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<td>28.0</td>
<td>31.5</td>
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<tr>
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<td>0.0</td>
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<td><strong>Average relative humidity at 2 p.m., in percent</strong></td>
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<td>75.0</td>
<td>77.0</td>
<td>83.0</td>
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</tbody>
</table>

a/ Symbols in parentheses indicate appropriate soil group according to Public Roads Administration classification.
For explanation of map symbols see page preceding large-scale map of Area 7.

Source: Imperial Japanese Army Land Survey Bureau, 1:50,000 topographic maps; 1911 to 1935.

U.S. GEO SURVEY
SAKHALIN ISLAND
SUITABILITY FOR AIRFIELDS
AREA 14

Good location for site.

TOPOGRAPHY: Low flat land on inland shores of coastal lagoon. Contains a large, meandering stream and several smaller ones, cut-off channels, ox-bow lakes, and spotty areas of swamp. Very flat and no leveling necessary unless runways located at north and west edges where ground becomes slightly rolling; better drained than flats, and there are suitable areas with 1 to 2% grade. Flats subject to floods.

TOPOGRAPHIC HAZARDS: Hills at north edge up to 300 feet high. Mountain at east edge 1,200 feet high. Mountains several miles north of site 1,400 feet high.

CLIMATE: Similar to area 13.

GROUND, VEGETATION (Class C data): Unconsolidated sand, gravel and clay (A-2) covered in part by peaty soil (A-8). Poorly drained in flats where fill and high base course will be necessary. Conifer forest will need to be cleared in almost all the area.

CONSTRUCTION MATERIALS AND WATER SUPPLY (Class C data): Mountains east and south of area contain coal beds and associated beds of oil-impregnated sand. The size of the deposits is not known, but the material could possibly be used directly for surfacing. Also shaly coal can be easily burned to produce clinker suitable for surfacing. Five miles northwest of area is an oil seep, which might provide some oil or asphalt. Mountains at north edge contain much hard traprock suitable for crushed rock surfacing and as building stone. Sand, gravel and clay at site. Water can be obtained from stream. The lagoon south of area is probably slightly brackish.

ACCESSIBILITY: Several miles of access road will need to be constructed, including several bridges across streams leading to coastal road.

Symbols in parentheses indicate appropriate soil group according to Public Roads Administration classification.

Reliability rating: Class B, except as otherwise indicated
Compiled by U. S. Geological Survey.
SUITABILITY FOR AIRFIELDS, SAKHALIN ISLAND AREA 15

For explanation of map symbols see page preceding large-scale map of Area 7.

Source: Imperial Japanese Army Land Survey Bureau, 1:50,000 topographic maps; 1911 to 1935.
Good location for site but may be poorly drained.

TOPOGRAPHY: Flat swampy plain at coastal edge of mountains. Crossed by meandering stream, on either side of which is flat swampy ground passing into dry rolling ground with grades of 1 to 4% or higher. 6,000-foot runways can be aligned in any direction on fairly well-drained ground in the rolling areas but some leveling will be necessary. Flats subject to flooding. Sand bar along the shore is well drained, grade lengthwise is less than .5% and a runway can be constructed lengthwise of it.

TOPOGRAPHIC HAZARDS: Ridge extending north along the east side is 700 to 1,200 feet high.

CLIMATE: Similar to area 13.

GROUND, VEGETATION (Class C data): Unconsolidated sand, gravel and clay (A-2 and A-7). Wet and swampy in flats where some soil is class A-7 and much fill and high subgrade will be necessary. In rolling land soil better drained, but clayey and may remain wet for some time after a rain. May be good soil for mechanical stabilization. Bar at the coast is sand (A-3), well drained. Conifer forest will need to be cleared in much of the area.

CONSTRUCTION MATERIALS AND WATER SUPPLY: Same as area 14.

ACCESSIBILITY: Highway runs along west edge of site. Town of Chinnai at the site has a large anchorage.

a/ Symbols in parentheses indicate appropriate soil group according to Public Roads Administration classification.

Reliability rating: Class B, except as otherwise indicated
Compiled by U. S. Geological Survey.
SUITABILITY FOR AIRFIELDS, AREA 16  SAKHALIN ISLAND

For explanation of map symbols see page preceding large-scale map of Area 7.

Source: Imperial Japanese Army Land Survey Bureau, 1:50,000 topographic maps; 1911 to 1935.

U. S. GEOL. SURVEY
Location for small site.

TOPOGRAPHY: Wide, flat valley at mouth of large stream. Flat area is small. Area south of river has a grade of about .5%, large enough for 6,000-foot runways in any direction but hills at the south block approaches and south runways can be used only on the rolling coastal area north of the river where grades are about 3% and grading will be necessary. Railroad (not shown on map) crosses area running north and may interfere with the location of an east-west runway.

TOPOGRAPHIC HAZARDS: Mountains at south edge rise 400 to 600 feet above plain. At east edge hills are 300 feet high. Two miles south peaks up to 1,000 feet high.

CLIMATE: Similar to area 13. Weather probably much like that at Maoka.


CONSTRUCTION MATERIALS AND WATER SUPPLY (Class C data): Lumber mill less than 10 miles south, on railroad. Sand, gravel and clay in area and in hills at edges. Traprock, suitable for crushed rock, might be found in hills. Mountains 10 miles or more inland may have hard sandstone suitable for construction. River will give good water supply; shallow wells will probably yield adequate supplies.

ACCESSIBILITY: Crossed by railroad (not shown on map) and several highways. At small town of Nayoro. Less than ten miles north of Tomarioru, a large town and anchorage.

Symbols in parentheses indicate appropriate soil group according to Public Roads Administration classification.

Reliability rating: Class B, except as otherwise indicated
Compiled by U. S. Geological Survey.
For explanation of map symbols see page preceding large-scale map of Area 7.

Source: Imperial Japanese Army Land Survey Bureau, 1:50,000 topographic maps; 1911 to 1935.

U.S. GEOLOGICAL SURVEY
SAKHALIN ISLAND

SUITABILITY FOR AIRFIELDS

AREA 17

Poor location for site; very small.

TOPOGRAPHY: Widened valley mouth. River is large, meandering. Space only for east-west 6,000-foot runway. Area probably subject to flood.

TOPOGRAPHIC HAZARDS: Valley sides rise 300 feet. Peak three miles south rises 1,000 feet. Mountains west of area 600 feet high.

CLIMATE: Bad weather 150 days a year, most in January (20 days); on the average 60 days a year of rainy weather, most in July and August (13 to 14 days each month). Snow 90 days a year on the average, mostly in December to February. More cloudy in summer than west coast.

GROUND, VEGETATION (Class C data): River alluvium: sand, clay and gravel (A-2). Easily worked by scrapers. Covered by conifer forest which will need clearing.

CONSTRUCTION MATERIALS AND WATER SUPPLY (Class C data): Lumber mill at town of Manui, in area. Sand, clay and gravel in area. Traprock and sandstone suitable for crushed rock and building stone might be found in mountains at west side. River provides water supply, shallow wells will probably yield adequate supplies.

ACCESSIBILITY: Crossed by highway and railroad. Town of Manui at site. Five miles north of Shiraura, which has an anchorage.

a/ Symbols in parentheses indicate appropriate soil group according to Public Roads Administration classification.

Reliability rating: Class B, except as otherwise indicated

Compiled by U. S. Geological Survey.
SUITEABILITY FOR AIRFIELDS, AREA 18  
SAKHALIN ISLAND

Cape Konotoro

Gulf of Tartary

Wind rose at Maoka  
(on the coast 15 miles south of area)


U.S. GEOLOGICAL SURVEY

for explanation of map symbols see page preceding large-scale map of Area 7.
SAKHALIN ISLAND

SUITABILITY FOR AIRFIELDS

AREA 18

Good location for site.

TOPOGRAPHY: Low area extending from foot of mountains to sea. Crossed by meandering river and broken up by a number of cut-off river channels, elongate lakes and swamps. Ground is slightly rolling. Dry areas at north and south ends large enough for 6,000-foot runways in any direction. Grades .5% or less. Little grading necessary except for drainage.

TOPOGRAPHIC HAZARDS: Approach from the east is interfered with by mountains 400 feet high at the site edge, up to 1,000 feet high two miles farther inland.

CLIMATE: Similar to that at Maoka, see table given for area 13. Strong north winds in winter. Winters cold but somewhat warmer than east coast. Maximum cloudiness in winter, and fogs only in summer. Greatest rainfall in summer. Freezing weather from middle of November to early April. Snow falls from late October to middle of May. Snow cover up to 2 feet.

GROUND, VEGETATION (Class C data): Sand, gravel and clay (A-2)\(^a\). Swampy areas covered by soil of class A-8. Poorly drained, probably stays wet a long time after rains. Grading for drainage and high subgrade will be necessary. Conifer and deciduous forest cover will need to be cleared but there are patches of open meadow and cleared farm fields.

CONSTRUCTION MATERIALS AND WATER SUPPLY (Class C data): Sand, gravel and clay in site and in mountains at east edge. Traprock in mountains at east edge, suitable for crushed rock and possibly as building stone. Lumber mill at town of Noda, ten miles north. Oil seep on coast about 15 miles north might give enough oil or asphalt for surfacing. Water supply can be drawn from the stream.

ACCESSIBILITY: Railroad and highway follow the foot of the mountains. Small town of Konotoro at east edge of area. Larger town of Noda, which has an anchorage, about 10 miles north. The north end is farmed and contains a network of dirt roads.

\(^a\) Symbols in parentheses indicate appropriate soil group according to Public Roads Administration classification.

Reliability rating: Class B, except as otherwise indicated

Compiled by U. S. Geological Survey.
SUITABILITY FOR AIRFIELDS, SAKHALIN ISLAND AREA 19

For explanation of map symbols see page preceding large-scale map of Area 7.

Source: Imperial Japanese Army Land Survey Bureau, 1:50,000 topographic maps; 1911 to 1935.

U.S. GEOLOGICAL SURVEY
Good location for site, well drained.

TOPOGRAPHY: Wide beach, twenty feet above sea level at west edge, slopes gently east toward sea. Cut across by several small parallel streams. At the south end, between two streams, is sufficient space for 6,000-foot runways in any direction. Little leveling if any is necessary. Grades about 0.5%.

TOPOGRAPHIC HAZARDS: Low hills at west edge, highest point 600 feet, two miles west of area. Four to five miles west of site is a mountain ridge 1,800 feet high.

CLIMATE: Exposed to strong winds and cold fogs of Okhotsk Sea. Climate similar to that at Ochiai (see table given for area 20), but somewhat more severe.

GROUND, VEGETATION (Class C data): Sand and gravel, possibly a little clay on surface (A-3 and A-2). Can be easily worked by scrapers. Well drained. East half open meadow, west half covered by forest which will need to be cleared.

CONSTRUCTION MATERIALS AND WATER SUPPLY (Class C data): Sand and gravel in area and in hills at west side. Clay in hills. Some hard sandstone suitable for construction might be found on ridge several miles west of area. Water can be obtained from small mountain streams. Shallow, dug wells might yield adequate supplies.

ACCESSIBILITY: Railroad and highway on coast at east side. Small town at southeast corner.

Symbols in parentheses indicate appropriate soil group according to Public Roads Administration classification.

Reliability rating: Class B, except as otherwise indicated
Compiled by U. S. Geological Survey.
For explanation of map symbols see page preceding large-scale map of Area 7.

Source: Imperial Japanese Army Land Survey Bureau, 1:50,000 topographic maps; 1911 to 1935.

U.S. GEOLOGICAL SURVEY
Good location for field near Ochiai.

**TOPOGRAPHY:** Low wide plain between high mountains. Middle part flat, swampy, occupied by large streams, is subject to flooding. Edges are alluvial fans which slope away from mountains at grades of about 1% on west side and 1 to 2% on the east side. Best locations are on the fans. 6,000-foot runways can be aligned in all directions. Small amount of leveling would be necessary on east side.

**TOPOGRAPHIC HAZARDS:** Mountains on both sides rise 1,000 to 1,500 feet or more within a mile or so of the suitable land.

**CLIMATE:** Wet and cloudy. Fogs mainly in summer. Winds predominantly from south, but also much of the time from north, northeast and southwest. Coldest in winter (17% calms) and spring (10% calms). Winters cold but more comfortable than on coast because of fewer winds. Freezing weather from early November to middle of April. Snow falls from late October to late May. Snow cover up to 3 feet. Floods in spring and late summer. For additional data at Ochiai see below.

**GROUND, VEGETATION (Class C data):** Unconsolidated sand and clay (A-2) underlain by gravel (A-3). Materials are coarser in alluvial fans, probably little clay (A-3). Drainage good on fans, poor in middle portion of valley where the soil contains organic material (A-8). Many areas cleared and under cultivation (not shown on map) but forest may need to be cleared in places.

**CONSTRUCTION MATERIALS AND WATER SUPPLY (Class C data):** Sand, gravel and clay in plain and bordering mountains. Hard sandstone in mountains on west and hard sandstone, quartzite and possibly limestone in mountains on east side, can be used for building stone and crushed rock. Streams and shallow wells will give abundant supplies of water. Synthetic oil plant reported west or north of area see Fuels and Other Mineral Resources sheets.

**ACCESSIBILITY:** Area south of Ochiai is on railroad and highway leading from the town. Flatter land, southwest of Ochiai is farther from town and less easily accessible. It is reached from the highway south of Ochiai by a poor road or trail which will need improvement.

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Data collected at Ochiai over a period of 22 years

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<thead>
<tr>
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<tbody>
<tr>
<td>Average wind velocity, miles per hour</td>
<td>6.5</td>
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</table>

a/ Symbols in parentheses indicate appropriate soil group according to Public Roads Administration classification.

Reliability rating: Class B, except as otherwise indicated.

Compiled by U.S. Geological Survey.
For explanation of map symbols see page preceding large-scale map of Area 7.

Source: Imperial Japanese Army Land Survey Bureau; 1:50,000 topographic maps; 1911 to 1935.
U.S. Geol. Survey
SAKHALIN ISLAND CONFIDENTIAL

SUITABILITY FOR AIRFIELDS

AREA 21

Good location for fields near Toyohara or Rutaka.

TOPOGRAPHY: Low, wide plain between high mountains. A continuation of plain of area 20, but wider and drier. Plain quite flat in the middle, grades less than .5%, crossed by several large meandering streams, swampy in spots. Lowland is subject to flooding. The edges of the plain are slightly rolling alluvial fans, sloping away from the mountains at grades up to 1%, and in places, near the mountains, to 2%. 6,000-foot runways can be constructed in all directions with little or no grading. Best locations are on the lower part of the fans where the drainage is good, the ground is above flood level, and runways will be at a sufficient distance from the bordering mountains. Coastal strip of flat land at the southwest slopes toward the bay with a grade of about 0.5%; runways can be aligned only north to northeast.

TOPOGRAPHIC HAZARDS: Mountains on both sides rise 500 to 1,000 feet within a mile or so of the plain. Peaks over 3,300 feet altitude several miles east of Toyohara.

ULTIMATE: Mean annual precipitation at Toyohara is 30 inches, and at Rutaka is 20 inches, where the highest monthly precipitation is in September (2.5 inches). In summer south and east winds are predominant. In winter north winds are predominant. Floods occur in spring when snow melts, and in summer (July to September) when the greatest rains come. Weather at south coast similar to that at Odornari where statistics have been collected over a period of about 25 years (see table below).

GROUND, VEGETATION (Class C data): Unconsolidated sand and clay (A-2) underlain by gravel (A-3). Materials are coarser in alluvial fans (A-3), probably little clay, and drainage on them is good. In the middle flat area the drainage is poor in many places, the soil probably contains organic matter (A-8). Many cleared areas under cultivations (not shown on map) but forest may need to be cleared in places.

CONSTRUCTION MATERIALS AND WATER SUPPLY (Class C data): Lumber mill at Rutaka. Brick kiln at Toyohara. Sand, gravel and clay in plain and in bordering mountains. Hard sandstone, quartzite and possibly limestone in mountains at northwest edge suitable for building stone and crushed rock. Large streams can be used for water supply and wells less than a hundred feet deep should yield abundant good water.

ACCESSIBILITY: Fields can be located close to Toyohara, the largest town in Sakhalin (1930 population over 35,000), and Rutaka, a somewhat smaller town. Area well served by railroads and highways.

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<td>1.7</td>
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<tr>
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<tr>
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<tr>
<td>Average minimum air temperature, Fahrenheit</td>
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</table>

a/ Symbols in parentheses indicate appropriate soil group according to Public Roads Administration classification.

Reliability rating: Class B, except as otherwise indicated Compiled by U. S. Geological Survey.
SUITABILITY FOR AIRFIELDS, AREA 22

SAKHALIN ISLAND

Tonnai Bay

Tonnai Lake

For explanation of map symbols see page preceding large-scale map of Area 7.

Source: Imperial Japanese Army Land Survey Bureau, 1:50,000 topographic maps; 1911 to 1935.
SAKHANLIN ISLAND SUITABILITY FOR AIRFIELDS AREA 22

Good location for site.

TOPOGRAPHY: Narrow strip of land between Tonnai Lake and sea, broken up by several small lakes and swamps. Surface is a flat to very slightly rolling plain about 50 feet above sea level and edged by a scarp along most of the shore on both sides. Grades are .5% in central part, increase at the shore edges. 6,000-foot runways can be constructed in all directions with little or no grading necessary and clear approaches.

TOPOGRAPHIC HAZARDS: About 5 miles east is a north trending mountain range, about 800 feet high. To the west the flat land passes into hill 300 feet high. SE. of site, mountains rise to 1,660 feet altitude.

CLIMATE: Similar to that at area 20 though probably more windy and more severe.

GROUND, VEGETATION (Class C data): Unconsolidated sand, gravel and clay (A-2); swampl area contain peaty soil (A-8). Can be easily worked by scrapers. Drainage outside of swampy areas probably fairly good but will need some improvement by grading. Conifer forest will need clearing.

CONSTRUCTION MATERIALS AND WATER SUPPLY (Class C data): Sand, gravel and clay in area. Mountains 5 to 10 miles east and south have granite and limestone but are difficult to reach. Water can be had from small mountain streams east of area and shallow wells will give small supplies but heavy pumping may bring in sea water. Lake Tonnai is probably usable but may be slightly brackish. Building stone quarry west of site across lake.

ACCESSIBILITY: Poor road on the coast leads west about 10 miles to the town of Tonnai which has a small anchorage. Road will need to be widened and improved.

Symbols in parentheses indicate appropriate soil group according to Public Roads Administration classification.

Reliability rating: Class B, except as otherwise indicated
Compiled by U. S. Geological Survey.
For explanation of map symbols see page preceding large-scale map of Area 7.

Source: Imperial Japanese Army Land Survey Bureau, 1:50,000 topographic maps; 1911 to 1935.

U. S. GEOLOGICAL SURVEY
SAKHALIN ISLAND

GOOD LOCATION FOR SITE.

TOPOGRAPHY: Low flat plain on bar across mouth of lagoon, 15 feet above sea level, bordered on most of seaward and lagoonward sides by a scarp. Surface flat or gently undulating, grade .5% or less. To the east it passes into rolling land between adjacent lagoons where grades are 1%. Little if any leveling is necessary. 6,000-foot runways can be constructed in any direction with clear approaches.

TOPOGRAPHIC HAZARDS: Three miles inland from east end hills are up to 230 feet high. Mountain range eight miles east with peaks 1,200 to 1,600 feet high. Mountains eight miles west 1,000 feet high.

CLIMATE: Similar to that of area 21. Closest town where climatological data available is Odomari, about 25 miles west, see table for area 21.

GROUND, VEGETATION (Class C data): Loose, unconsolidated sand, gravel and some clay (mostly at east end), (Class A-3 and A-2). Easily worked by scrapers. Fairly well drained. Natural slopes at east end probably sufficient for drainage but flat, west portion will need some drainage grading. High subgrades may not be necessary. In east and west conifer forest will need to be cleared. In central part forest is burned out.

CONSTRUCTION MATERIALS AND WATER SUPPLY (Class C data): Sand, gravel and clay in area. Limestone deposit suitable for quarrying in hills a mile or less east of isthmus between Waivai Lake and Tofuchi Lake. Limestone quarry near coast about 10 miles south produces stone for lime burning and suitable for cement manufacture. Quarry connected to area by dirt road. Twenty miles or more farther south are granite quarries. Water can be drawn from mountain streams on east and west edges. In the area shallow wells (15 feet or less will probably give some water but heavy pumping may draw in salt water. Lakes may be brackish.

ACCESSIBILITY: Not shown on the map is a road which branches east from the coastal road, crosses the isthmus between the two lakes and extends along northeast shore of Tofuchi Lake. The coastal road connects area with small towns (which have small anchorages) several miles north and south of it. Between the towns are several villages. Roads are now better than shown on map and may need no improvement.

Symbols in parentheses indicate appropriate soil group according to Public Roads Administration classification.

Reliability rating: Class B, except as otherwise indicated Compiled by U. S. Geological Survey.
**SUITABILITY FOR ROADS**

**NORTH PART**  
(U.S.S.R.)

- Flat plains, suitable for roads.
- Sandy beaches, suitable for roads.
- Swampy areas on flat plains; poorly suitable for roads.
- Rough land, poorly suitable for roads.
- High mountains, unsuitable for roads.
- Routes and passes across mountains. Altitude (where known) of pass in feet above sea level.
- Abrupt cliffs; coastal road construction very difficult.

**EXPLANATION**

Large numbers and heavy lines refer to areas described in table.

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<thead>
<tr>
<th>Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Flat plains, suitable for roads.</td>
</tr>
<tr>
<td>2</td>
<td>Sandy beaches, suitable for roads.</td>
</tr>
<tr>
<td>3</td>
<td>Swampy areas on flat plains; poorly suitable for roads.</td>
</tr>
<tr>
<td>4</td>
<td>Rough land, poorly suitable for roads.</td>
</tr>
<tr>
<td>5</td>
<td>High mountains, unsuitable for roads.</td>
</tr>
</tbody>
</table>

**SAKHALIN ISLAND**

- Reconnaissance map
- Compiled by U.S. Geological Survey
SAKHALIN ISLAND

Introduction

Sakhalin Island is admirably suited to automobile travel all year round. A number of other secondary roads in Japan and all are poor except the highway from Adatymovo south to the Russian-Japanese border, north-trending mountain ranges, from several hundred to several thousand feet high.

Toko hara

In coast, in south a few swamps on plain. Where Nysh enters river, by large streams and lagoon inlets which must be crossed by ferries or long fans of valley narrower and difficult to follow because of waves spread swamps. Can be constructed at river edge; alternate roads and detours possible. Roads have rougher topo
gography to cross, require clearing of thick larch and

Area

Tokomaru Plains

Low plain, about 3 to 10 miles wide, cut by several north and south-flaring streams. Bounded on east and west by mountains whose bases large, gently-sloping all of face, most of which are forested. Grades on flat country persist to roads to be built fairly in different directions with space for detours and other roads. Suitable for roads for parts of swampy lowland which must be bridged or ferried. Swamp extensive at north end of area, in south a few swamps on plain.

Tym-Portonai Plains

Low plain, a few miles to which 10 miles wide, crossed by many, meandering north-flaring Tym and Portonai rivers. Country near Tym-Portonai more flat, low, and swampy. Plains along gorge toward set at average gradient of about 5 to 10 feet to miles. Bounded on both edges by mountains whose slopes gentle, but streams cut deep valleys. Plains along west edge of fans can have long terraces and low grade; room for alternate roads and detours. Several rivers, tributary to Tym-Portonai, must be bridged; several others, too, can be crossed by ferries or long fans. Plains not well defined. Tym and Portonai rivers mainly high, flow slowly, and are in terraces on plain.

Rush mountains extend length of island and form much of coastline. In central part of island, mountains are relatively low, facing south and west; in western part, mountainous and north-facing. Plains between Tym and Portonai rivers readily crossable. Plains drained by Tym river in low steppe than 3000 feet wide and nearly 100 miles long, with few swamps, may be crossed by ferries or ferry. North-south roads build in dry areas will require clearing of thick larch and
trees, if not forested except during Flash floods.

Mountain Ranges

Mountains range west-northwest along length of island. Several mountain ranges of equal length extend along coast that are south-facing. On much of mountain range, slopes are barren, by blowing snow. Poor roads on summit of contractor, or along small streams in mountainous west. Roads are located to east of Sakhalin Island in coastal areas and to south of the island.

Toko hara

In coastal areas, without swamps, ground is sandy also soil (A-2) with few inches to 3 feet thick, resting on marine clay. Drained by small streams. Water table high, very shallow. Larch, willow, birch, peat. Surface water in swamp; drainage in small streams necessary. Detours and temporary roads may require construction of embankments and dikes. Surface and temporary roads may require additional water control works to prevent flood.
Coastal Plateau

Sakhalin Island

Confidential Suitability for Roads

Area

Topography

Kinds of Ground

Class C data

Streams and Stream Crossings

Class C data

Materials available

4

Coastal Plateau

Terra ce surfaces broader and more dissected. In some places successive terraces separated by swamps, in other places by lakes and bays. Along east coast is series of large lagoons and estuaries. Acme of mountains; a continuation of mountain ranges of Area 3. North and south limits of coastal terraces united with Honshu Peninsula latera to form slightly dissected plains, up to 800 feet altitude. Some are nearly level, others with gently undulating slopes. Knolls, out crops from steep by long sand bars. Well suited for road construction; flat, suitable for roads along base are sand beaches except in south where some are muddy.

Terra ce filled with gravel overlain by sand with clay lenses (A-2, A-3). Deposits 50 to 700 feet thick in lower terraces, 700 to 1,000 feet thick in upper terraces. Slopes usually free from trees except near rivers. In some places there are patchy growths of grass and heather. Light upper soils, 10 to 25 feet thick, and rocky clay subsoil, 6 to 9 feet thick, underlie much of area at depths averaging 150 to 200 feet. Alluvial fans extend north along coast. Lower terraces extend north along east and west coasts excepting in rocky coves. As west coast rises northward, many fans are cut off.

Terra ce large and align flat, slide bottomed. Flow between beds of overlapping past, and gravel, sand and shelly, varying in width from 25 to 100 feet. Worst terraces are where swamps increase in size in late spring and early summer, often flooding valleys. In winter can be crossed on ice. ferry service is often needed from one terrace to next can be easily made. Lower terraces wide, flat, and swampy; upper terraces are lower, dissected, rocky, with many short-radius curves, and require much rock excavation. Valleys would be difficult to cross. Best way to cross area is by valleys through mountain chain s and across low interior divide. Roads along east coast are a series of large lagoons and estuaries. Acme of mountains; a continuation of mountain ranges of Area 3. North and south limits of coastal terraces united with Honshu Peninsula latera to form slightly dissected plains, up to 800 feet altitude. Some are nearly level, others with gently undulating slopes. Knolls, out crops from steep by long sand bars. Well suited for road construction; flat, suitable for roads along base are sand beaches except in south where some are muddy.

5

Northern Uplands

(Wet gently sloping) Informa tion on materials may be obtained. Roads at edges of terraces and near front of terrace scarp are unsuitable for permanent roads. In lower terraces wide, flat, and swampy; upper terraces are lower, dissected, rocky, with many short-radius curves, and require much rock excavation. Valleys would be difficult to cross. Best way to cross area is by valleys through mountain chains and across low interior divide. Roads along east coast is series of large lagoons and estuaries. Acme of mountains; a continuation of mountain ranges of Area 3. North and south limits of coastal terraces united with Honshu Peninsula lateral to form slightly dissected plains, up to 800 feet altitude. Some are nearly level, others with gently undulating slopes. Knolls, outcrops from steep by long sand bars. Well suited for road construction; flat, suitable for roads along base are sand beaches except in south where some are muddy.

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6

Shihokai Peninsula

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Sakhalin Island

Confidential Suitability for Roads

Area

Topography

Kinds of Ground

Class C data

Streams and Stream Crossings

Class C data

Materials available

4

Coastal Plateau

Terra ce filled with gravel overlain by sand with clay lenses (A-2, A-3). Deposits 50 to 700 feet thick in lower terraces, 700 to 1,000 feet thick in upper terraces. Slopes usually free from trees except near rivers. In some places there are patchy growths of grass and heather. Light upper soils, 10 to 25 feet thick, and rocky clay subsoil, 6 to 9 feet thick, underlie much of area at depths averaging 150 to 200 feet. Alluvial fans extend north along coast. Lower terraces extend north along east and west coasts excepting in rocky coves. As west coast rises northward, many fans are cut off.

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CONSTRUCTION MATERIALS

NORTH PART
(U.S.S.R.)

Sakhalin Gulf

SIBERIA

OKHOTSK

SOUTH PART
(JAPAN)
(KARAFUTO)

Sakhalin

Explanatory numbers refer to areas described in table.

1. Sand beaches and dunes. Lenses of gravel and in places large boulders.

2. Sand and gravel, covered in places by clay, silt and peat. Locally limestone concretions, or fragments of trap rock.

3. Clay, sand, soft sandstone, and volcanic ash; small deposits of conglomerate, clay, and coal.


5. Hard rocks. Slate, quartzite, chert, sandstone, and indurated volcanic ash. Small areas of limestone and marble.


Massive, hard granite and similar rocks.

- Granite quarry.
- Limestone quarry.
- Limestone deposit, suitable for quarrying.
- Brick kiln.
- Building stone quarry (limestone or sandstone).
- Producing oil field and large asphalt deposits.
- Producing oil field.
- Oil seep, in places small deposits of asphalt or oil-saturated sand.
- Synthetic oil plant.
- Lumber mill.


**SAKHALIN ISLAND**

**CONFIDENTIAL CONSTRUCTION MATERIALS**

**CONSTRUCTION MATERIALS**

**Introduction**

Sakhalin is the most common construction material on the island and almost all the houses, buildings, bridges, and other structures are of wood. Sakhalin is known for its abundant forests, and wood is the main construction material. Sakhalin's wood is of high quality and is used throughout the island.

**Sandstone and Granite**

Sandstone and granite are the most common construction materials on Sakhalin. Sandstone is used for roofing and flooring, while granite is used for building stone. Both materials are easily worked and handled, and excel in their respective fields. Sandstone is excellent for roofing and flooring, while granite is best suited for building stone.

**Limestone**

Limestone is another important construction material on Sakhalin. It is used for building stone and for concrete. Limestone is also used for the production of oil in the north half of the island.

**Clay**

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**Travertine**

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**Volcanic Ash**

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**Boulder Clay**

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**Bentonite Clay**

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FUELS AND OTHER MINERAL RESOURCES

NORTH PART
(U.S.S.R.)

Sakhalin
Gulf

SIBERIA

CONFIDENTIAL

SAKHALIN ISLAND

SOUTH PART
(JAPAN)
(KARAFUTO)

EXPLANATION

Important coal mine.

Minor coal mine.

Producing or potential oil field.

Synthetic oil plant.

Oil seep.

Bituminous coal-bearing rocks.

Lignite-bearing rocks.

Sketch map

Compiled by U. S. Geological Survey
**SAKHALIN ISLAND**

**FUELS AND OTHER MINERAL RESOURCES**

### 1. COAL

The island contains much bituminous coal and lignites in Quadratic, Tertiary, and Cretaceous rocks; only the bituminous coal is worked. The coal occurs in strongly folded and faulted rocks; the intensity of formation and the quality of the coal decrease north and south from Due. Coking coals are found chiefly in Russian Sakhalin, at Due and in some distance north and south.

**Coal Production in Russian Sakhalin**

 Mines produce bituminous coal from older Tertiary and Cretaceous rocks. Mines in the vicinity of Aleksandrovsk were originally worked by the Russians under primitive conditions by prize labor. The Japanese during their occupation of the entire island from 1915 to 1925 did some considerable mining. In 1928 the Russians took over and have intensified production and developed new mines. The Japanese retained concessions later than 1920 and the present production figures are leaving; most information in the table below is as of 1925, but Japanese production figures are lagging, and the table is supplemented by Japanese concessions.

**Wines**

<table>
<thead>
<tr>
<th>Mine</th>
<th>Estimated Reserves and Production</th>
<th>Quality</th>
<th>Accessibility and Transportation Facilities (as of 1925)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POYUSHKOV (south) MINE</strong></td>
<td>1920: known reserves 400,000 tons; possible additional reserves 33,000,000 tons in depth of 1,000 feet. Production not shown; small mine.</td>
<td>Non-coking, similar to Khash coal.</td>
<td>Not known. Bear count.</td>
<td>Beds faulted and dipping; 9 workable beds; 5 feet total thickness.</td>
</tr>
<tr>
<td><strong>VLADIMIROVKA MINE</strong></td>
<td>1925: known reserves 1,200,000 tons; possible additional reserves 25,000,000 tons. Highest annual production before Japanese occupation 38,500 tons, Greatest annual production during Japanese occupation 1,397,000 tons, in 1925. From opening of mine in 1920 to 1925 a total of 1,000,000 tons produced.</td>
<td>Non-coking, long-life bituminous. Likely to spontaneous combustion. 40-60% hang. 256-288 steam. Volatile matter 45%; moisture 6%; ash 29%; sulfur 0.7%; hydrogen 6.8%. Heating value 7,180-7,500 calories (18,600-18,600 B.t.u.).</td>
<td>Narrow-gage (10.1 inches) railroa; one mile long. 1,000-foot pier. No mine in narrow valley for storage.</td>
<td>Feuilles syncline. Beds dip 45°; 5 workable beds; 30 feet total thickness. Incised shafts and drifts; longest, 45 feet.</td>
</tr>
<tr>
<td><strong>POYUSHKOV MINE</strong></td>
<td>1925: known reserves 1,700,000 tons; possible additional reserves 33,000,000 tons; total 25,000,000 tons. Highest annual production to 1925 was 8,000 tons in 1924. Estimated annual capacity 30,000 tons.</td>
<td>Coking; bituminous. Upper beds have higher ash content than lower. Best bed: volatile matter 25%; moisture 0.6%; ash 0.6%; heating value 7,000 calories (18,600 B.t.u.).</td>
<td>Aerial tram 2.5 miles long, ore 90 feet above ground; steamed powered; weather permits its use from May to middle October. Pier 300 feet long. Nine 9 miles from Aleksandrovsk.</td>
<td>On east side of antaull, 4 workable beds, up to 25 feet total thickness. Beds dip 15 to 45°. In 1925 dr ills were 40 feet long, inclined shafts 500 feet long, vertical shafts were begun. Flooding occurred in mine.</td>
</tr>
<tr>
<td><strong>POYUSHKOV MINE</strong></td>
<td>1925: known reserves 2,000,000 tons. 1924 production: 30,000 tons.</td>
<td>Coking; high-grade bituminous. When stored disintegrates under load. Volatile matter 35%; moisture 1.5%; ash 0.6%; sulfur 0.9%; coke 68%.</td>
<td>6 miles from Aleksandrovsk by road.</td>
<td>Upper and Lower Due series (Olgiaceus). 6 workable beds with average total thickness 20 feet. Thickest bed 7.5 feet. Difficult mining. Large fire in 1925 temporarily closed mine.</td>
</tr>
<tr>
<td><strong>POYUSHKOV MINE</strong></td>
<td>Possible reserves (1925) 7,000,000 tons. 1924 production: 25 tons.</td>
<td>Coking; bituminous.</td>
<td>9 miles from Aleksandrovsk by road.</td>
<td>3 workable beds; total thickness 16 feet. In 1925 4 incised shafts, 50 to 60 feet deep. Coal was removed in muck.</td>
</tr>
<tr>
<td><strong>POYUSHKOV MINE</strong></td>
<td>Reserves (1925) 17,100,000 tons. 1923 production 50,000 tons. Estimated annual capacity 60,000 tons.</td>
<td>Coking; high-grade bituminous. Disintegrates under load when stored. Volatile matter 24.6%; moisture 0.4%; ash 0.6%; sulfur 0.8%; hydrogen 1.8%. Coke 65-75%. Heating value 8,400-8,700 calories (18,140-18,600 B.t.u.).</td>
<td>6 miles from Aleksandrovsk by poor dirt road. One mile long narrow-gage (10 inches) railroad to dock 700 feet long; locomotive. Dock suitable for vessels of 4- or 4.5-foot draft, loading impossible in rough weather. Tracks covered for vessels of 4.5-foot draft.</td>
<td>Japanese concession. Goal in Upper Due series (Olgiaceus). Highly thrust-faulted syncline. 1 workable coal bed, total thickness 24 feet; thinnest bed 15 feet. Stripping started before 1920. In 1926 drills ran above the mine, 70 to 120 feet apart; impressed 1,000 feet.</td>
</tr>
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<td>Reserves (1925) 17,100,000 tons. 1923 production 50,000 tons. Estimated annual capacity 60,000 tons.</td>
<td>Coking; bituminous.</td>
<td>1,600-foot long narrow-gage railroad to shore where coal is stored; protected by gallery; bank powered. Pier 200 feet long; suitable for vessels of 4.5-foot draft.</td>
<td>Coal occurs in Due series (Olgiaceus). Faulted syncline; size 50 to 100 feet west. 6 workable beds. In 1925 mined by drifts; longest, 8,600 feet.</td>
</tr>
<tr>
<td><strong>POYUSHKOV MINE</strong></td>
<td>Principal mine of Khatynsky Field. Mine reserves in 1926 were estimated at 10,500,000 tons. Up to 1925 highest annual production of Khatynsky Mine, 40,000 tons. Estimated annual capacity 60,000 tons, with improvements, up to 100,000 tons.</td>
<td>Coking; bituminous. Volatile matter 25.6%; moisture 12.6%; ash 26%; sulfur 0.9%; hydrogen 2.6%. Heating value 8,000-8,600 calories (18,000-18,600 B.t.u.).</td>
<td>Aerial tram 2.5 miles long; narrow-gage railroad to shore; where coal is stored; protected by gallery; bank powered. Pier 200 feet long; suitable for vessels of 7-foot draft.</td>
<td>Central deposit 5 miles from shore.</td>
</tr>
<tr>
<td><strong>POYUSHKOV MINE</strong></td>
<td>Reserves (1925) 10,000,000 tons. 1924 production 1,700,000 tons.</td>
<td>Coking; bituminous.</td>
<td>Coal is due.</td>
<td>Coal occurs in Due series (Olgiaceus). Deposit 10,000 feet long, 5,000 feet wide. 6 workable beds; total thickness 20 feet; thickest bed 7.5 feet. Dug steeply west or almost vertical.</td>
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<td>Coking; bituminous. Volatile matter 25.6%; moisture 12.6%; ash 26%; sulfur 0.9%; hydrogen 2.6%. Heating value 8,000-8,600 calories (18,000-18,600 B.t.u.).</td>
<td>Aerial tram 2.5 miles long; narrow-gage railroad to shore; where coal is stored; protected by gallery; bank powered. Pier 200 feet long; suitable for vessels of 4.5-foot draft.</td>
<td>Faulted syncline in Due series. 6 workable coal beds, total thickness 20 to 30 feet. Average dip 80°. In 1925 mined by drifts; longest, 1,000 feet. In concession to the Japanese.</td>
</tr>
</tbody>
</table>

**ACCESSIBILITY AND TRANSPORTATION FACILITIES (AS OF 1925)**

The 1,300-mile-long railroad from Sakhalin to the sea, and transportation is accomplished by freighters and barges. The coast is straight and arid, without sheltered harbors; landing can take place on the average 100 days a year (May to October) and is often difficult.
### SAHALIN ISLAND

**Coal Production in Japanese Sakhalin**

All the coal mined is bituminous, and occurs in rocks of Oligocene and Miocene age. Lignite deposits are not worked and are not shown on the map. The Japanese designate the Oligocene coal-bearing strata the "Upper coal bed" and the Miocene coal-bearing strata the "Lower coal bed." Each of these units generally contains two or more coal beds. All the coal-bearing rocks are Faults, so that practically every mine is in intricated beds. Only two of these are of any dimensions and in some cases the beds are very steep or vertical. Mines that follow the more steeply inclined coal beds down to dry pit level ground: many mines have to be pumped. This water problem is the main difficulty of the coal fields of Sakhalin. In 1924, reserves of coal were estimated at 1,601,931,000 tons. Of this, 944,216,000 tons were above ground water and 2,641,715,000 tons were below ground water. In that year, 1,037,078 tons of coal were produced; the total reserves, inclusive of tabulation, of which produced over 7,000 tons in 1924 and most of which produced only a few tons of tons. The only mine in Japanese Sakhalin that produced coal was the Shiraura, some of the coal from the base of the esutoru (not open in winter) is exported to Japan. Coal from other mines is used to supply pulp plants and synthetic oil plants at the mines or shipped to rail or other parts of Japanese Sakhalin.

### Mines

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</tr>
</thead>
<tbody>
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<td></td>
<td></td>
<td>fixed carbon, 51.35% volatile matter, 45.17% moisture, 0.09% ash, 5.76% sulfur, 1.55% ad. 120°F., heating value, 8,220 calories (10,400 B.t.u.)</td>
<td>Mine about a mile inland from north coast of Sakhalin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fixed carbon, 50.06% volatile matter, 39.07% moisture, 0.36% ash, 9.20% sulfur, 0.69% ad. 120°F., heating value, 8,300 calories (10,400 B.t.u.)</td>
<td>Mine about a mile inland from north coast of Sakhalin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fixed carbon, 51.93% volatile matter, 47.73% moisture, 0.25% ash, 12.48% sulfur, 1.36% ad. 120°F., heating value, 8,000 calories (9,700 B.t.u.)</td>
<td>Mine about a mile inland from north coast of Sakhalin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fixed carbon, 53.20% volatile matter, 39.01% moisture, 0.84% ash, 8.26% sulfur, 0.49% ad. 120°F., heating value, 8,300 calories (10,700 B.t.u.)</td>
<td>Mine about a mile inland from north coast of Sakhalin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fixed carbon, 50.73% volatile matter, 49.75% moisture, 1.49% ash, 9.23% sulfur, 1.46% ad. 120°F., heating value, 8,200 calories (10,300 B.t.u.)</td>
<td>Mine about a mile inland from north coast of Sakhalin</td>
</tr>
<tr>
<td></td>
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<td>fixed carbon, 53.98% volatile matter, 46.68% moisture, 0.71% ash, 9.32% sulfur, 0.65% ad. 120°F., heating value, 8,200 calories (10,300 B.t.u.)</td>
<td>Mine about a mile inland from north coast of Sakhalin</td>
</tr>
<tr>
<td></td>
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<td>fixed carbon, 52.69% volatile matter, 47.29% moisture, 0.22% ash, 8.64% sulfur, 0.58% ad. 120°F., heating value, 8,200 calories (10,600 B.t.u.)</td>
<td>Mine about a mile inland from north coast of Sakhalin</td>
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<td>fixed carbon, 51.34% volatile matter, 45.57% moisture, 0.38% ash, 6.75% sulfur, 1.53% ad. 120°F., heating value, 8,200 calories (10,400 B.t.u.)</td>
<td>Mine about a mile inland from north coast of Sakhalin</td>
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<tr>
<td></td>
<td></td>
<td>fixed carbon, 53.80% volatile matter, 47.19% moisture, 0.24% ash, 8.93% sulfur, 0.58% ad. 120°F., heating value, 8,000 calories (9,700 B.t.u.)</td>
<td>Mine about a mile inland from north coast of Sakhalin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fixed carbon, 54.13% volatile matter, 45.57% moisture, 0.23% ash, 12.57% sulfur, 1.34% ad. 120°F., heating value, 8,000 calories (9,700 B.t.u.)</td>
<td>Mine about a mile inland from north coast of Sakhalin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fixed carbon, 53.83% volatile matter, 46.48% moisture, 0.34% ash, 8.71% sulfur, 0.79% ad. 120°F., heating value, 8,000 calories (9,800 B.t.u.)</td>
<td>Mine about a mile inland from north coast of Sakhalin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fixed carbon, 54.97% volatile matter, 44.67% moisture, 1.56% ash, 12.96% sulfur, 0.58% ad. 120°F., heating value, 8,200 calories (10,700 B.t.u.)</td>
<td>Mine about a mile inland from north coast of Sakhalin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fixed carbon, 52.38% volatile matter, 48.33% moisture, 0.62% ash, 8.87% sulfur, 1.47% ad. 120°F., heating value, 8,000 calories (10,900 B.t.u.)</td>
<td>Mine about a mile inland from north coast of Sakhalin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fixed carbon, 54.36% volatile matter, 45.07% moisture, 0.26% ash, 9.27% sulfur, 0.69% ad. 120°F., heating value, 8,000 calories (9,700 B.t.u.)</td>
<td>Mine about a mile inland from north coast of Sakhalin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fixed carbon, 52.20% volatile matter, 47.29% moisture, 0.35% ash, 8.75% sulfur, 1.35% ad. 120°F., heating value, 8,000 calories (9,700 B.t.u.)</td>
<td>Mine about a mile inland from north coast of Sakhalin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fixed carbon, 53.93% volatile matter, 47.67% moisture, 0.24% ash, 8.95% sulfur, 0.62% ad. 120°F., heating value, 8,000 calories (9,700 B.t.u.)</td>
<td>Mine about a mile inland from north coast of Sakhalin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fixed carbon, 51.34% volatile matter, 45.57% moisture, 0.35% ash, 8.98% sulfur, 1.37% ad. 120°F., heating value, 8,000 calories (9,700 B.t.u.)</td>
<td>Mine about a mile inland from north coast of Sakhalin</td>
</tr>
</tbody>
</table>

**Remarks**

- Nearest source of coal for the pulp factory at Sakaiko, operated by the Mitsui Mining Co. in the district of Etorofu.
- Nearest source of coal for the pulp factory at Tomariaro, operated by the Karafuto Mining and Railways Co. (Sakhalin).
- Nearest source of coal for the pulp factory at Sakhalin.
- Nearest source of coal for the pulp factory at Shikuka.
- Nearest source of coal for the pulp factory at Shikuka.
- Nearest source of coal for the pulp factory at Noda.
- Nearest source of coal for the pulp factory at Tsurumai.
- Nearest source of coal for the pulp factory at Tsurumai.
- Nearest source of coal for the pulp factory at Tsurumai.
- Nearest source of coal for the pulp factory at Tsurumai.
- Nearest source of coal for the pulp factory at Tsurumai.
Sakhalin Island

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Fuel and Other Mineral Resources (Cont.)

<table>
<thead>
<tr>
<th>Mines</th>
<th>Estimated Reserves and Production (1926)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NABAHO MINE</td>
<td>A part of Nabaho Field, the total reserves of which are 49,649,000 tons; 13,077,000 tons above ground water, 36,542,000 tons below ground water. Production of Nabaho Mine, 53,048,000 tons (recent increases in production since 1931).</td>
</tr>
<tr>
<td>MITA MINE</td>
<td>A part of Mita Field; no estimate of reserves available. Production of Mita Mine, 17,023,000 tons (steady increase in production since 1931).</td>
</tr>
</tbody>
</table>

The following fields contain only small mines according to 1935 report. Reserves in these fields have been estimated as follows:

<table>
<thead>
<tr>
<th>Field</th>
<th>Oil Production</th>
<th>Quality</th>
<th>Development of Field</th>
<th>Transportation Facilities</th>
<th>Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior area west of Personal Valley</td>
<td>Reserves above Ground Water (tons)</td>
<td>Reserves below Ground Water (tons)</td>
<td>Total Reserves (tons)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nishihakushu-Oshiu Field</td>
<td>61,000,000</td>
<td>54,560,000</td>
<td>115,560,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minamihayai Field (Oligocene in age)</td>
<td>0,041,000</td>
<td>57,900</td>
<td>57,900</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oyuu Field (Oligocene in age)</td>
<td>0,020,000</td>
<td>57,900</td>
<td>57,900</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

III. Oil and Gas

Russian Sakhalin

Along the northeast coast are several commercially producing oil fields on a series of north¬

Sakhalin Island

Order (listed in geographic order)

ore (graphic order)

duction of oil. In 1938 the Russians produced 80,000,000 tons. The proven reserves estimated in 1926 were 110,000,000 barrels; estimated total reserves 350,000,000 tons. The crude oil has a gravity of 23° to 40° Sp. 11. The highest gasoline content is 33°, at Nihourou; some oils have none. The deeper oil has a paraffin base.

There are no refineries in Sakhalin. Oil produced by the Japanese is sent to refineries at Khabarovsk and Vladivostok on the Siberian mainland; oil from China is carried by pipe line to the west-coast port of Nakanoshita; it is reported that the pipe line has been continued across the Pacific to Tertury to Dubropetropovsk, where it is turned into vessels of 60,000-ton capacity. Oil from Japan is shipped from the north coast by boat to refineries in Japan. Most of the Fields are located in areas where production is not presently extensive.

51 cubic meters of gas per ton of oil. 1924 production: 8,950,000,000 cubic meters, or 36,500,000,000 cubic meters, or 110,000,000 barrels. Estimated ultimate recovery of oil is 350,000,000 tons. The crude oil has a gravity of 23° to 40° Sp. 11. The highest gasoline content is 33°, at Nihourou; some oils have none. The deeper oil has a paraffin base.

In 1933, wells were drilled to 4,912 feet. Some producing horizons are below 500 feet. These were sampled by 1935. Field connected to Khabarovsk by standard gauge railroad and pipe line. Khabarovsk is port for loading contains vessels of 60,000-ton capacity. Pipe line for loading extends into the sea. Port on coast north of the fields is not known. Fields are not known.

In 1935, wells were 1,000 feet deep. Several producing horizons. Field connected to Khabarovsk by narrow-gage railroad; for loading contains vessels of 10,000-ton capacity. A set of small oil fields is not known.

In 1935, some oils were produced at 200 feet. Several producing horizons. Field connected to Khabarovsk by narrow-gage railroad; for loading contains vessels of 10,000-ton capacity. A small oil field is not known.

In 1935, some fields were 30 to 50 feet deep. Some producing horizons below 500 feet. Field connected to Khabarovsk by narrow-gage railroad; for loading contains vessels of 10,000-ton capacity. A small oil field is not known.

In 1936, some fields were drilled to 4,912 feet. Some producing horizons are below 500 feet. These were sampled by 1935. Field connected to Khabarovsk by standard gauge railroad and pipe line. Khabarovsk is port for loading contains vessels of 60,000-ton capacity. Pipe line for loading extends into the sea. Port on coast north of the fields is not known. Fields are not known.

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FUELS AND OTHER MINERAL RESOURCES (CONT)

SAKHALIN ISLAND

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III. REFINING MATERIALS

Thick deposits of diatomite (very fine-grained siliceous, soft rock) occur in beds of lower Pliocene age on the Schmidt Peninsula; it has been tested and found suitable for oil refining. Diatomaceous material has been reported in lower Pliocene beds at several places in Japanese Sakhalin, notably north of Chinnai, but the extent and quality of the deposits is not known. Material which may have bentonitic properties has been found in the Miocene beds of the Schmidt Peninsula, on the Tym River, and on the east coast of Russian Sakhalin south of Cape Tapadylo. It is a dense, dull, white, clayey material, thought to be a weathering product of volcanic ash; its suitability for oil refining is not known.

IV. PEAT AND WOOD

Thick peat covers a large part of the lowland areas of Sakhalin. The largest deposits are in the Tym and Poronai Valleys (maximum thickness, 18 feet), and on the northwest coastal plains (maximum thickness 10 feet). Peat is not used for fuel because coal and wood are abundant. Forests cover most of the island and provide a source of fuel almost everywhere.

V. MINERAL RESOURCES OTHER THAN FUELS

Workable deposits of glauconite (a hydrous silicate of potash and iron used in water treatment and as a source of potash for fertilizers) occur in Tertiary rocks a mile east of Odomari (outcrop several miles long) and about 7 miles south of Kushunnai (outcrop over a mile long). The deposits at both localities range in thickness from a few feet to more than 30 feet and consist of beds of glauconitic sand and shale, alternating with purer beds of glauconite.

No deposits of metallic minerals are commercially important in Sakhalin. A little gold was mined in Russian Sakhalin from several placer deposits on the upper tributaries of the Tym and Poronai Rivers previous to 1905. The best deposit, in the mountains west of Kiryovskoe, has a low gold content, about .001 to .01 ounces per ton, and was mined by primitive methods. In Japanese Sakhalin gold is found in tributaries to the Poronai River, in streams west of Ochoi, and in the Shiriyoko Peninsula. Platinum is reported associated with serpentine rocks in the mountains northeast of Odomari and a small amount is known to have been produced in that region, but whether from placers or from bedrock is not known. A deposit of cinnabar (mercury ore) is known about 8 miles northeast of Odomari. Sphalerite occurs in a network of small veins and is reported to contain 60% copper; the deposit is probably small. Byssites in small veins in diabase anodesite is found at several places in Shiretoko Peninsula north of Cape Soi; it is reported to have been mined to some extent.

Reliability rating: Japanese part, Class A. Russian part, Class C.

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EXPLANATION

Quaternary. River alluvium, sand dunes and beaches; coastal terraces, and inland terraced plains composed of sand and gravel with beds of clay and peat. Terrace deposits are marine.


Oligocene. Black shale, sandstone (shaly or tuffaceous in part), and conglomerate, chiefly marine. Coal and oil bearing.


Uncirrificated pre-Eocene. Chiefly metamorphic rocks. Two main units: one is largely slate and quartzite with small amounts of hornstone, graywacke, and limestone; the other is schist, limestone, metagabbro, altered basaltic tuff, pyroxenite, and serpentine.

Extrusive igneous rocks and associated dikes. Chiefly basaltic and andesitic flows and dikes, of Tertiary and Quaternary age.

Intrusive igneous rocks. Chiefly granite and gneiss; some quartz diorite and other types. Out Tertiary and Cretaceous rocks.
SAKHALIN ISLAND

Stratigraphy

Cretaceous and Tertiary rocks overlie most of Sakhalin; pre-Cretaceous rocks cover less than one-sixth of the surface of the island. The structure of the pre-Cretaceous rocks is essentially horizontal; it is largely faulted in only one part of the western half of the island. The Cretaceous and Tertiary rocks are relatively simple. They are folded along axes that are nearly NE-SW, and they have been cut by faulting along axes of various strikes of the rock formations, and sometimes by the sidewise alignment of all the major structures. The rocks are generally hard and resistant to weathering, many having been subjected to intense weathering. The pre-Cretaceous rocks are generally much thinner than the Cretaceous and Tertiary rocks. Faults cut the Tertiary rocks in various directions; most of the faults are normal, but some are reverse faults. The Cretaceous and Tertiary rocks extend farthest in the west, while the pre-Cretaceous rocks are confined to the vicinity of the island. These rocks are overlain by a layer of marine terraces, which are composed of sand and gravel.

Recent deposits. Lenses of sand and clay and, at some places, beds of gravel are extensive; they form the crest of the continental shelf. The continental shelf, which is about 100 feet thick off Sakhalin, increases in thickness to about 200 feet off the Kurile Islands and decreases to about 20 feet off the mouth of the Sea of Japan. The continental shelf is bounded on the landward side by the continental slope, which is about 500 feet thick off Sakhalin, increasing to about 3,000 feet off the Kurile Islands. The continental slope is bounded by the continental rise, which is about 3,000 feet thick off Sakhalin, decreasing to about 1,000 feet thick off the Kurile Islands.

Sakhalin Island is divided into three distinct zones: a south and north; a middle zone; and an intermediate zone between. The south and north zones are separated by a series of mountain ranges. The south zone is characterized by a series of volcanic mountains, which are composed of pyroclastic rocks, and a series of mountain valleys, which are filled with alluvial deposits. The north zone is characterized by a series of mountain ranges, which are composed of metamorphic rocks, and a series of mountain valleys, which are filled with alluvial deposits. The intermediate zone is characterized by a series of mountain ranges, which are composed of sedimentary rocks, and a series of mountain valleys, which are filled with alluvial deposits.

Palaeozoic and Mesozoic rocks are widespread in the Tertiary rocks of Japan. The Palaeozoic and Mesozoic rocks are characterized by a series of folds, which are composed of sedimentary rocks, and a series of faults, which are composed of volcanic rocks. These rocks are overlain by a layer of marine terraces, which are composed of sand and gravel.

Geology

The rocks of Sakhalin Island have many features in common with those of the Pacific Coast of North America. The Tertiary and Cretaceous rocks resemble those of the California coast in lithology, sequence, and even in appearance. However, Sakhalin Island has had a less eventful and much less violent tectonic history than California.

The pre-Cretaceous rocks consist of the basement rocks of Sakhalin. They have been little studied, but their history is thought to be complex. It is undoubtedly similar to that of the Sakhalin and Khabarovsk rocks, which resemble them. They consist of a long period of erosion, which has been followed by the deposition of sediments, which have been metamorphosed to quartzite and schist. The pre-Cretaceous rocks are thought to be a continuation of the Tornai Depression. The characteristic nor-south trend in Sakhalin was maintained in the Tertiary period, but partly continued, accompanied at times by volcanic activity. They have been faulted, folded, and metamorphosed, and have been characterized by a series of faults, which have been superimposed on the pre-Cretaceous rocks. The Tertiary rocks are characterized by a series of marls, which have been deposited in the marine terraces, and a series of sandstones, which have been deposited in the continental terraces.

The continental terraces are characterized by a series of alluvial fans, which have been deposited in the mountain valleys, and a series of alluvial plains, which have been deposited in the mountain valleys.

Volcanic activity has been slight but a minor part of the geologic history of Sakhalin. Outbreaks have occurred from time to time in the past, strictly in pre-Cretaceous and Miocene time, but none of them has been spectacular. The only field of volcanism activity worthy of noting is the area near Cape Ustvo. This volcanic field is accompanied by several cones, but none of them has been active in recent times.

Although Sakhalin Island is structurally a northern element of the Japanese Island arc, it lies beyond the belt of seismic activity in which earthquakes are frequent and destructive. It has experienced no exceptionally severe earthquakes in historic times, so far as we know.

Compiled by C. R. Geologist, Surveyor