Far North Siberia

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GEOGRAPHY OF FAR NORTH SIBERIA

I. General Observations on the Far North

Northern Siberia, which occupies the entire northern part of the Asiatic continent, has the Glacial Arctic ocean as its norther boundary from the Urals to the Bering Sea, which extends from 70 degrees longitude, east, to 169 degrees longitude, west. Its northern coastal boundary is 15,900 kilometers long. This study is concerned with the territory extending southward to the 62nd degree N. latitude, the political boundary under the Administration of the Northern Sea Route.

A plain extends from the Urals eastward to the Yenisei river. Formerly covered by the sea, this plain emerged in the tertiary period only to be flooded again by the glaciers in the quarternary period.

After the Iamal peninsula, we find the great Ob estuary, a branch of the sea, usually called the White Siberian Sea, which is 800 kilometers long and 17 kilometers at its widest point.

Further to the east is the mouth of the Yenisei river, which is 380 kilometers long and 17 kilometers at its widest point. To the north, the Taimyr peninusla, a plateau with an altitude of 600 to 900 meters, extends to Cape Chelyuskin, the highest latitude of the Asiatic continent. North of this peninsula are found the three islands of the North Land. Southe of the Taimyr peninsula is a vast mountainous plateau of eastern Siberia, which extends from the Yenisei river to the Bering and the Okhotsk seas. In this system are included the

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Cherski chain which was discovered in 1926, the Kolyma chain, and the Anadyr chain which ends at Cape Dezhnev on the Straits of Bering.

Going eastward from the mouth of the Yenisei river, the principle rivers flowing northward are: the Khatanga, the Anabar, the Olenek and the Lena with its immense delta which borders the glacial ocean on a front of 210 kilometers. The Lena river has 45 mouths, the largest of which is ten kilometers wide. Then we find the Iana, which drains in the Laptev river, the New Siberian Islands, and the mouths of the Indighirka and Kolyma rivers. Following this, is the mountainous Chuckchee peninsula, a large plateau 2,000 meters high, covered with volcanic sheets and whose topography is more or less regular. This peninsula extends towards Alaska up to the Bering Straits, and to the mouth of the Anadyr, which is south of the Polar Circle.

II. The Soil

The shores of the Glacial ocean are found in the "tundra" region, a veritable steppe. The surface is claylike and sandy, but the terrain is characterized by a subsoil perpetually frozen, called the "merzlota". This frozen bed is from 100 to 200 meters deep. Only during the summer, this so-called "active" bed thaws to an approximate depth of two meters. The nature of the soil demands special precautions for the construction of buildings, railroads and highways. When the thawing period arrives or when the heat of the house reacts on the frozen surface, the level of the ground may lower. It is necessary to assure a circulation of air under the building by raising it above the ground.

A characteristic of the tundra is the total absence of trees. Under the rocky surface is found very much lichen or "reindeer moss" which grows slowly (annually from 3 to 5 millimeters). A pasture, grazed by reindeer, needs several years to replenish itself. It is necessary to move herds continually, which explains the nomadic life that the people lead in this region.

In the claylike parts, one finds brushes that are not over two feet high. These are: dwarf willows, dwarf birch-trees, whortleberry bushes and numerous peat-bogs in the marshes. The reserves of peat in the arctic region are practically unlimited.

The southern limit of the tundra corresponds approximately to the isotherm of the 10th of July.

Further south, there is an intermediate zone of forests, not only on the river banks, but also on dispersed holms. Southward, the immense Siberian forest, the "taiga", which is the greatest forest in the world, covers the greatest part of the North-Asiatic region of USSR.

III. The Climate

The climate in these regions is especially hardy. The winter is long, the summer is short and cold. The Novaya Zembla forms a barrier preventing the warm winds from making the arctic milder. This explains why, during the greatest part of the year, the coasts are entirely blocked by ice. The coldest regions of the globe are found in northwest Siberia. The cold pole is situated in Verkhioansk, which is only the 66th degree of N. latitude.

In winter, the thermometer drops to -69.8 degrees centigrade. The average temperature in January is -50 degrees centrigrade and there are 143 days of the year when mercury freezes. On the Lower Kolyma it is -65 degrees centigrade, while in High Indighirka it is -60 degrees centigrade. Because of these extreme temperatures the wind is weak, the sky is of an intense blue and the air is dry. These colds are autochtone and when the wind blows from the Glacial ocean, the temperature rises.

Spring is late and short. Snow begins to melt in May. However, one notes very warm summers. At 70 degrees N. latitude the temperature has been 27.5 degrees centigrade. The Iakutes are known to make hay during the night because the earth is warmed by the length of the arctic days.

During the last twenty years, a certain amount of mildness has penetrated into these climates. Observations made by the Russian climatologist Berg in the arctic, show a warming up in the frozen regions. In 1920 - 1921 above-normal temperatures have been noted in the Berents Sea and in Novaya Zembla. Since 1918 there has been an abnormal thawing of the rivers in north USSR. In certain locations, wells drilled formerly in perpetually frozen soils, show that this freezing has disappeared and has moved up north for more than 40 kilometers. The arrivals of migratory birds are earlier and their departures are later. At the same time, species of fish, up to this time unknown in the arctic seas, appear there, now. Salmon, herring, and cod are found now in the Kara Sea. In 1935, the ship SATKO has

been able to sail north of Novaya Zembla and to go up to 82 degrees 40 minutes N. latitude in unblocked waters. Never before has the ice-pack receded to higher latitudes in these localities.

IV. Demography ~~Ethnic Distribution~~

In such living conditions it is easy to understand why the density of population in these northern regions is very low. The density of population, essentially dispersed, is but .01 inhabitants per square kilometer. A large portion of the Far North population consists of natives belonging to different ethnic groups.

The principle races are the Samoyedes and the Tunguzes. The Samoyedes, of a Finnish origin, with a population of about 12,000, are fur hunters and breeders of reindeer as are most of the people of the Far North. The Tunguzes, a Mongolian race allied with the Manchus, are a race which is disappearing.

The Iakutes constitute the most important portion of the population. They speak a language related to Turkish and are among the natives, the most vigorous and the most prospective race. They inhabit the vast territory of the Iakute republic which covers a large part of the Siberian east and which has a population of 225,000 inhabitants.

Being intelligent and good businessmen, their language has become the current one between the Glacial ocean and China. It is even spoken by the Russians.

Finally, the Chuckchees inhabit the northeast Chuckchee peninsula in the vicinity of Bering Sea; they belong to the Paleasiatic group and have similarities with the peoples of Alaska.

The Russians have advanced along the rivers and have formed important villages in this region. They have command posts as functionaries, businessmen, mining prospectors or as operators of weather stations. The density of population in these parts is very small.

In similar regions settlements are very rare and it is impossible to establish villages. However the principle city, the port of Igarka, 725 kilometers from the ocean on the Yenisei estuary has deep water and is well protected from the winds. Connected with the interior of the country by a long navigable route of the Yenisei, Igarka is becoming a commercial center for the importation of machines and food products and for the exportation of lumber, furs and grains coming from the southern zones.

Its population of 12,000 increases in the summer to about 16 or 17,000. It has two lumber mills and a third one is being constructed. A fish cannery is in operation, there.

Permanent and temporary research stations are the centers which later may become small villages. In 1934 there were 38 such stations and the government is encouraging their development, as they are the centers of civilized life. The natives, who know but how to fish and hunt, are learning from these stations how to construct new homes, to use practical objects which they ignored heretofore, to cultivate vegetables and to raise domestic animals. The number of illiterates is diminishing continually, as the learned Russians have developed an alphabet for the language of the natives.

V. Prospecting ~~Occupations in View~~

During the old regime, with the exception of polar expeditions, the Russians were not attracted to the northern regions of Russian Asia, which were judged too unproductive and too difficult to reach.

In 1918, a group of prisoners, deported to the Far North, began to explore the possiblities, heretofore unknown in these regions. The government began to study the problem. The "Institute for the Study of the North", later the "Arctic Institute", was directed by Professor Samoilovitsh, who took part in 1928 in the Krassin expedition of saving the distressed crew of General Nobile.

The "Komseverput" (Commission of the Northern Routes), an important economic organization, was organized in 1922. The first voyages for lumber transportation from the Ob to the Yenisei were organized. Igarka, a little town on the lower Yenisei, was then in the middle of a deserted land.

Since 1929, Soviet directors became especially interested in the problems of the Arctic, which became one of the essential chapters of the Five-Year Plan.

In 1934, Stalin grouped all the sections of Soviet power in the Arctic region into one administration. This was the creation of the "Glavsevmorput" (Main Administration of the Northern Sea Routes) centralizing the administrations of navigation and aviation, as well as local local economic trusts and the trusts of the Ob, Yenisei, Iakuta and Chuckchee. These trusts supervise all the local industries in the explored territories and are destined to become centers of the general economy of the North. They direct the installation of light-houses,

on the shores and on the islands, form a network of radio stations, draw maritime maps, prepare fuel and determine the resources of local oilwells.

The jurisdiction of this organization extends southward to the 62nd degree of latitude.

The weather stations, under the direction and the stimulus of "Glavsevmorput", are built on the most vital locations. The systematic and prolonged exploitation of their observations has furnished some valuable information for weather forecasting in Russia and Siberia, by studying the cyclonic systems in the polar regions, the knowledge of which was heretofore confused. These stations, well equipped with the most modern technology, have an international scientific interest.

A fleet of ice-breakers, aircraft carriers circulates during the summer, in the Kara and Laptev seas, operates with thermal soundings, gravimeters, amounts of water, with plankton, etc.... The archipelagos are visited, charts are made from their photographs and the rocks in this region are analyzed.

The Glavsevmorput, now has more than 40,000 employees. From 1938 to 1942 the government has appropriated to Glavsevmorput a total of 1,720,000,000 rubles.

NATURAL RESOURCES OF FAR-NORTH SIBERIA

I. Agriculture of Far-North Siberia

It is difficult to speak of northern agriculture since the characteristic of these regions is found in the scarcity of vegetation.

However one cannot ignore the persistent efforts of the Russian scientists to extend the northern limit of growing edibles, such as wheat or vegetables.

The Soviet government has established three institutes of arctic agricultural research at Obdorsk, Igarka, and Yakutsk to study the problems of botany, freezing and the selection of forage and vegetables. The experiments and results obtained in the Khibini station in the Kola peninsula have proved that one can grow cabbage, carrots and onions in the Polar North Circle in sufficient quantities to satisfy the local needs. Species that resist night frosts (already strong in August) and that mature quickly are selected. However due to the insolation of the long days of the polar summers, the growth of the plants is much quicker than in our regions. Progress can still be made, as it is a very short time since the discovery of the possibilities of cultivation in the Far-North.

One has likewise been able to cultivate vegetables in underground hot-houses, lighted by electricity furnished by the windmills. The Soviet newspapers have used the slogan, "The storms of the North grow vegetables".

Agricultural stations exist on the Siberian coast, for instance at Igarka on Dickson Island and at Port Tiksi.

Since the northern limit of wheat cultivation is 62 degrees N. latitude it is hoped that, by using selected species, the limit can be

pushed up to 67 degrees 50 minutes N. latitude. Generally speaking, it is estimated that out of 435,000 hectares of land which can be cultivated only 85,000 hectares have been exploited. The Siberian forest is located south of the Far-North region which has relatively small forest islands. The trees in the Far-North do not grow high and are of a limited diameter.

1. Breeding

The only breeding which is extensively practiced in the polar regions is that of the reindeer. This valuable animal is used for pulling, for milking, for comestible meat, for high quality hides and for its hair which is used for warm clothing and as a mattress filler.

The stock of Soviet reindeer(northern Russia included) consists of 2,500,000 head, this being three-fourths of the stock of the world. Unfortunately the herds are frequently decimated by epizootic diseases, by polar bears and by losses in snowstorms.

Recently efforts have been made to develop their breeding, to fight against the diseases and to improve the stock. Since 1927 the farms, the sovkhozes of reindeer have been organized and experiments with artificial forage have been made.

2. Hunting for Fur-bearing Animals

The fur-bearing animals have been the only developed wealth of the Far-North for a long time. Some of the most valuable species still exist. The silver fox, the sable, the ermine, the blue fox, the squirrel(squirrel of Siberia), the otter, and the mink are the principle ones.

Unfortunately, an abusive and unrestricted exploitation has almost annihilated certain species, such as the sable. The natives still resort to primitive methods of trapping which ruins the skins. Great progress can be realized by using scientific methods of hunting, by regulating and by modernizing the industry.

Aviation industry aids by observing the migratory habits of animals. Regional meetings of the hunters are organized in order to exchange technical information.

Hunting stations are placed under the control of the Glavsevmorput, which likewise develops the breeding farms of the silver and the blue foxes as well as the breeding stations of the sledge dogs. These stations teach the local people the best methods of processing the hides.

An estimate of two million rubles of revenue from the hunting of fur-bearing animals was realized in 1935, and in 1936 it increased to seven millions.

II. Mineral Production

Although the number of geological missions has multiplied during the last few years, an inventory of the mineral wealth of the Far-North is not possible due to the immensity of the territory and communication difficulties. However there are numerous possibilities of exploitation and unsuspected wealth has been found.

1. Coal

The principle known deposits are situated in the region of Norlisk, on the Piassina basin. They were discovered in 1894 and a rudimentary exploitation began in 1898. The coal was ~~brought~~ brought by rein-

deer sleds along the banks of the Yenisei to be shipped to the port of Dudinka, a distance of 62 miles. The port is now connected with Norlisk by a railroad.

The coal is of the excellent quality found at Cardiff. It is estimated that the reserves of this coal basin are 65,900,000 tons, those of Bukharitka 70,000,000 tons, those of Noginsk on the Niznyaya Tunguska 4,500,000 tons.

There is coal in the Khatanga basin, in the Lena estuary, and further south along the river in the Villioui region.

The New Siberian Islands, in the vicinity of the mouth of the Indighirka river have coal beds situated near the sea. On the eastern extremity of the Chuckchee peninsula and in the lower region of the Anadyr river basin are found coal beds but they have scarcely been exploited.

2. Non-ferrous Metals

Deposits of pewter are found in the islands of the North Land; copper is found in the Norlisk region at Turukansk on the Niznyaya Tunguska as well as in the Kolyma basin. Important deposits of nickel, rather rare in the USSR, except in Laponia have been recently discovered near Norlisk. The geologists of USSR are happy to rank USSR second in the world's production of this mineral. More important discoveries may be made in the future, since the geological constitution of Siberia has striking resemblances with that of Canada, where the most important deposits of nickel in the world have been discovered.

Zinc, lead and tungsten have been found in the Iana region.

3. Gold

The real goldbearing regions are situated in the south, however the north regions are not barren, especially in Upper Kolyma at Srednekamsk. Alluvial gold and deposits of silver are found in the peninsula of Chuckchee as well as in the Cherski mountains to the north of Anadyr.

4. Graphite

Important deposits of graphite are abundant in the Kureika basin and east of the Yenisei near the latitude of the Polar Circle. They are estimated at 11,500,000 tons. These of Noginsk, on the Niznyaya Tunguska have a reserve of 600,000 tons. Iceland spar, cobalt and chromium are found in the Chuckchee peninsula as well as along the river Vilyuy.

5. Rock Salt

Important deposits of rock salt have been found at Norvdik near the Khatanga estuary. This is of great importance because Iakut lacks salt. Heretofore, it has been necessary to transport salt at great cost from southern Russia across the Indian or the Pacific ocean or else across the Trans-Siberian railroad to Irkutsk. This salt is used by the fishing industry, which is beginning to develop on the shores of the Glacial ocean during the short summers. It is estimated that the salt deposits range from 200,000 to 300,000 tons.

6. Petroleum

In 1941 and 1942, scientific expeditions have discovered petroleum at West-Port, on the mouth of the Yenisei and at the mouth of the Khatanga as well as on the Laptev coastal regions and on Taimyr peninsula. Sources of motor fuel are of great interest to the navigation and

to aviation industries in this region, and generally speaking to the econory of these regions. However they have not been exploited, as yet.

TRANSPORTATION IN FAR-NORTH SIBERIA

It has often been said that the great enemy of Russia was distance. This has been verified in the Far North where the isolated, unproductive, immense spaces separate it from the uninhabited places.

I. Land Transportation

The local means of land transportation are primitive and subject to all the risks of a sturdy climate where the snowstorms often block all circulation. Sleds are being used in the winter, as well as during the entire year, on the marshes of the tundra where the use of vehicles with wheels would not be feasible.

Dogs (usually twelve) harnessed to a sled can transport from two to four or five hundred founds depending whether the driver is seated or runs at the side of the sled, making from four to six kilometers an hour. A dog team, fed with fish, and well trained, can cover 250 kilometers in 15 hours, while reindeer have to rest every six hours. A couple of reindeer can transport from four to five hundred pounds.

Since there are no roads one must follow the paths made by the natives. The course of the rivers, frozen for many months of the year, offers certain facilities. Automobiles cannot be used. However, caterpillar tractors are used. For the first time in 1933-1934, four tractors were transported to [redacted] Komsomolskaya island, east of the Taimyr peninsula, and have rendered great services to the first Lena expedition. In this expedition 6,000 kilometers were covered and 60

tons of merchandise were transported. In 1934, the caterpillar tractors were taken to Nordvik Bay where they unload 2,000 tons of merchandise in ten days.

II. Air Transportation

The type of locomotion necessary to cover great distances will always be the airplane. Thus, the journalist Garri wrote in Izvestia 5 July 1934: "In the course of many years the airplane will probably be, not only the most rapid and the most convenient form, but also the only form of communication for man as well as for material".

Aviation is one of the essential elements for the future economy of the Far North whose geographic location presents a particular interest for international relations at great distances.

The shortest distance between Boston and Tokyo, between England and the Pacific, between Moscow and the Far East is across the North Pole. The great enthusiasm experienced in 1937 by Russia due to the Flight of Russia aviators over the North Pole on their way from Moscow to British Colombia has not died down. The Soviet government continues to raise appropriations for aviation in the Far North.

USSR investments for aviation in the Far North

1933	3,008,000 rubles
1934	5,3 1,000 "
1935	8,470,000 "
1936	14,300,000 "

For the year 1937, a budget of 13,710,000 rubles had been appropriated to Glavsevmorput and it was hoped that 2,135 tons and 10,849 passengers could be transported.

The number of airplanes, ~~which was~~ six in 1932, was raised to 42 in 1933, to 56 in 1934, to 104 in 1935 and to 125 in 1936.

The number of kilometers traversed, which was 1,780 in 1933, was raised to 11,395 in 1936. The airplanes in service then, were the twin-engined nine-passenger monoplanes with a speed of 200 kilometers per hour.

The air liaison between the east and the west has been prepared by the Chkalov expedition which in 1936 made a flight over Frants Joseph Land, the islands of the North Land, the Taimyr peninsula and the Lena at Bulum before arriving at Petropavlovsk and Mexico. In February 1941, a regular airline was inaugurated between Moscow and Cape Schmidt crossing Arkhangel, Igarka, Khatanga, Tiksi and Anadyr. A secondary line joins Dudinka to Khatanga, while another reaches from Turukhansk to the base of culture of the Turu.

From the south to the north three airlines extend to the arctic. In the west, Tyumen is joined to Novyi-Port at the mouth of the Ob. In the Far North, Dickson is reached from Krasnoiarsk by the way of Igarka and Dudinka or else by Baikit and Norlisk. In the east, a route extends from Yakutsk to the Glacial ocean (Tiksi), with an additional route towards Verkhoiansk.

The airplane is of prime importance in a country of such difficult communications. Besides postal services, it transports medical supplies, foodstuffs, technical instruments and brings back valuable furs. It is

an imcomparable instrument of civilization and the Times 14 November 1936 has cited an observation revealing the reverse order of the procedure and progress of civilization penetrating into the backward countries. A native, who was asked to describe an automobile, said,"It is an airplane without wings which runs on the ground". In fact, on the peninsula of Taimyr, the airplane was known before the automobile.

In order to mark out these aviation routes, a chain of radioelectric stations has been established on the boundary of the Glacial ocean.

Actually, many service stations are being operated, one on Dickson Island, one on Cape Chelyuskin, two on the mouth of the Lena river, one on the New Siberian Islands, one on Wrangel Island and three on Chuckchee peninsula.

Two radioelectric beacons have been installed, one on White Island and the other on Dickson Island. This is the beginning of a vast plan of installing radioelectric beacons on the entire coast. Specialists, being supplied every summer by ice-breakers, hibernate there. Electrical ~~energy~~ power is furnished by windmills.

III. ~~Marine~~ Water Transportation

Navigation along the 7,000 kilometers of the Siberian coasts on the Glacial Arctic ocean has been a scientific exploration before becoming a commercial enterprise.

The region, which we are studying, has its southern limit at the port of Archangel (latitude 64 degrees 30 minutes) and its northern limit

at the northernmost point of Cape Chelyuskin (77 degrees 30 minutes). In width it begins with Murmansk (25 degrees E. meridian) and extends to the east to Cape Dezhnev in the Bering Straits (169 degrees W. meridian).

The presence of ice and the length of polar nights which paralyze all activity from 9 to 10 months of the year are the main obstacles to navigation in the arctic waters.

Despite these difficulities, which seem insurmontable, Russia has been able to establish a transportation sea lane in these arctic regions.

Still there is no regular traffic, however convoys have been able, during the short summer season, to sail from the White Sea ports to the Pacific, and to visit at the same time the ports of the mouths of the Yenisei, the Lena and the Kolyma.

This has been achieved by the establishment of radio stations and light-houses at various points, as well as by maintaining a fleet of ice-breakers and hydrographic installations, and by the creation of a special service of reconnaissance airplanes.

Due to the difficulties that one has to overcome and to the constant efforts necessary to keep this new sea route open, one questions its actual economical value.

Yet without question, the Northern Sea Route is the shortest route between Russia and the Far East. This possibility of traffic has been recognized for a long time, and to resolve this maritime problem, it is necessary to retrace the various attempts of travel made since the discovery of Siberia.

1. Historical

The first known expedition was that of the Englishman Sir Hughes Willoughby, who left on the 23rd of May 1550 from Harwich and didn't reach further than the coasts of Russian Lapland.

In 1595 Barents left Holland, passed through Spitzberg, rounded New Zembla on the north and was stopped by ice in the Kara Sea, where he had to pass the winter in an uninhabited New Zembla bay, which bears his name.

Between 1646 and 1648, Semion Dezhnev arrived at the mouth of the Kolyma and went up to the straits which bear his name.

Peter the Great, who was not convinced of the passage, ordered in his Last Will that an exploration be undertaken beyond Kamtchatka.

Peter Bering left the port of Petropavlovsk in the Pacific on the 13th of July 1728, but was unable to reach the Siberian Arctic coast. This task was assigned to him to prove the existence of the straits, a fact then denied by certain geographers.

Since then, numerous expeditions have been undertaken. The Kara Sea has been crossed for the first time in 1738. In 1742, Chelyuskin rounded the famous cape which bears his name and was able to explore the coast as far as the Lena river.

Wrangel discovered the island which now bears his name and found the first of a group of free waters called the "polynies". His discoveries will be of great service to polar navigators.

However, it was not until 1879 that Nordenskjold, a Swede, traversed the entire route from the west to the east. He left Tromsoe on the 20th of July 1879. An early Siberian winter forced him to hibernate 120 miles from Cape Dezhnev which he reached on the 20th of July 1879.

In America, Gordon Bennett, who was not aware of Nordenskjold's arrival in the Pacific, sent an expedition, the "Jeannette", under the command of Le Long to meet Nordenskjold. Le Long's expedition met with disaster at the mouth of the Lena.

All these explorations, even though they did not attain their goal, contributed nevertheless to the development of navigation in this western part of the "North-East" passage. Since the construction of the Trans-Siberian railroad, one can transport rails from Archangel to the mouths of the great Siberian rivers, and then by barges to the vicinity of the points of their utilization.

Still, it was not until 1932 that professor O. Schmidt, aboard the ice-breaker Sibiriakov was able, without wintering, to travel from the Atlantic to the Pacific by the way of the Arctic ocean.

In 1933, the ice-breaker Chelyuskin, after having successfully traversed the northern route, sank in the northern parts of the Bering Straits. The crew and the passengers, stranded on the Ice-floe, were saved by the heroic efforts of the Russian aviators.

In 1934, the ice-breaker Litke travelled the entire route and on the 20th of June 1935 the Northern ~~Maritime~~ Water Route was officially inaugurated.

2. Exploration of the Northern ~~Maritime~~ Water Route

The principle functions of the Glavsevmorput are as follows:

a) To assure traffic from Murmansk to Vladivostok and return without wintering;

b) To discover and explore oil deposits necessary for navigation.

The northern navigation line of Soviet Asia is being explored by two of the six national companies:

1) Company of the Arctic Seas, headquarters at Archangel.

2) Company of the Far East, administratively connected with the Valdivostok base.

The organization, which the GSMP controls, consists of:

a) Ports;

b) A fleet of ice-breakers, hydrographic installations, ships especially constructed for arctic navigation;

c) Polar scientific stations;

d) A network of radio telegraphs, telephones and radio weather forecasting stations;

e) Radio beacons;

f) A special aviation service;

g) Deposits of coal.

a) Ports

The ports, which are the terminals of this route of the North, are Murmansk, Archangel in European Russia and Vladivostok on the Pacific.

Murmansk, which had played an important role in World War II for the food supply furnished by Anglo-Saxons to USSR, is free from ice during the entire year, due to the warm currents from the Gulf Stream Archangel and Vladivostok are kept open during the winter months by ice-breakers. The ports, situated along the route, are:

Igarka: situated 725 miles from the ocean on the Yenisei river at

62 degrees 27 minutes latitude. Rebuilt in 1929, it is an excellent port where ships of over 6,000 tons may dock. It is open in the summer-time, due to the deep bay formed by the Yenisei river. This bay is 20 kilometers wide.

Ust Yeniseiskiy: (Port of the mouth of the Yenisei) is situated further up stream, on about 69 degrees 40 minutes latitude. The information published about this port is as sparse, as that about the other installations on the arctic route.

Port Dickson is situated on Dickson Island, north of White Sea, at about 67 degrees 30 minutes latitude.

Noviy Port, constructed in the Ob Bay, greater than the mouth of the Yenisei, is a very important polar station and is the main port of the ice-breakers. It is likewise a radio weather station.

Ships and ice-breakers take fuel fron the coal mines on this island.

Among the other ports, actually being constructed, are Bulkur, Bulum on the Lena, and Nizhe-Kolymsk on the Kolyma. Settlers are being transphanted definitely to these parts.

All these Siberian ports, situated on the rivers, are free from ice from the middle of June to October, that is, for three and one-half months of the year. The Straits of Bering are free for navigation from the beginning of August till the last days of September.

[redacted] b) Fleet of Ice-breakers

The Iermak was the first of the Ice-breakers. The plates of the hull at the water mark were three centimeters thick and the vessel was divided into 48 water-tight compartments. The hull has been especially shaped, bulging outwards, so that it might be pushed up if the pressure of the ice became to great. The weight of the vessel falls on the keel and breaks the ice before continuing its course. The Iermak had been able to break an ice pack with a thickness of 4.20 meters, however a blanket of snow 45 centimeters in depth could stop the vessel.

During its recent transformation it has been equipped with a hydraulic ice cutter; all the mechanical installations have been transformed, [redacted] powerful electric generators and an electric crane have been installed on board. A radio is an important part of the equipment of the vessel. The Iermak weighs 7,875 tons and has 700,000 volts of power. Its speed is 15 knots an hour.

Other vessels modelled after this improved type have been constructed. The Krassin, which displaced 10,630 tons with 1,000,000 volts has a speed of 15 knots in free water and from two to five knots in ice. The vessel is equipped with rapid maneuvering ballasts, which are controlled from the bridge. Placed in front, in the rear and on the sides, the ballasts can break very thick ice-floes with the rapid pitching and listing of the vessel.

Vessels of this type have but one propellor and are equipped with improved snow-plows as well as powerful projectors which enable one to work at night.

Before World War II, new Diesel-electric propelled ice-breakers with a displacement of 12,000 tons, have been constructed.

Among these are the Joseph Stalin and the Viatsheslav Molotov. They are much superior to the former vessels in power and in their ability to break the ice. They are equipped with catapults for launching reconnaissance hydroplanes.

In 1939, USSR had 14 ice-breakers in service or being constructed, plus eight more transport ice-breakers.

Before the war, more than 60 small hydrograph stations, a number of tugs and a humdred special ships were in service to sagefuard explorations and transportation in the polar zone.

The construction of special long-range cargos designed to make a direct voyage without refueling at a coaling station, was proposed before the war.

In 1939, 5.9 percent of the tonnage of Russian merchandise was carried on in the White Sea and in the Glacial ocean.

3 ##

c) Polar Stations, Radio Weather Station Networks and Scientific Research

Several scientific organizations: the Arctic Institute, the Hydrographic Service of the Administration of the Northern Sea Route, etc... have been able, with the aid of many radio stations, weather stations and polar stations, to institute a great number of scientific studies directly concerning Arctic navigation. Due to this, the first hydrographic map of Kara Sea was published in 1930. This map, similar to the American "Pilots Charts" has been corrected and improved during the ensuing years. Systematic observations have been undertaken since 1921, on one of the branches of the Gulf Stream, known as the "Current of the North Cape". The findings of Professor N. Zoubov make it possible to predict the actual condition of the ice-floe in Barents Sea,

according to the average temperature of the current during the month of May. The map of the depths and the currents of the entire Arctic was about to be completed when the Russo-Germanic war broke out.

These observation stations contributed to the study of meteorology, geophysics, cosmic rays and to the electrical and magnetic perturbations. These studies, of the greatest interest to polar navigators, have aided considerably in the installation of temporary and permanent observation stations in regions where life seemed impossible.

Development of the network:

1918 ..... 3 stations

1931 ..... 15 stations

1935 ..... 51 stations

1937 ..... 77 stations

The Second Five-Year Plan called for 145 stations. In 1947 there were 350 stations.

Meteorological observations are made in the numerous stations bordering the coasts, on the ice-floes, on the islands and at the mouths of the rivers.

An ice patrol has been created in the Kara and the Bering Seas to observe ice conditions amd to furnish forecasts of ice breaks and movements. A group of hydrologists is operating the stations on Dickson Island and Cape Schmidt.

These gathered observations are transmitted regularily to the central station, which in 1935 was on Dickson Island. This station is in liaison with the Moscow Weather Office. Graphs, maps and complete information concerning the evolution of time and ice in the Siberian seas is furnished rapidly to the navigators.

At times hydraplanes take aerial photographs and observe the location, formation and dislocation of ice blocks. A study of the safety of navigation in free water channels, the forecasts of storms and the movement of ice is made and relayed to radio stations for rapid transmission.

Every summer, the hydraships make soundings, draw charts, mark out the shores and reefs and chart the routes for navigation. Due to the short season in which this work may be carried out, the work must be exact. Areal photographs are used to make maps and plans.

[redacted] d) Radio stations

Twelve radio stations mark out the route from [redacted] Vaigatch Island at the southern entrance of Kara Sea to Cape Dezhnev at the far eastern point of Asia.

There are two stations on Novaya Zembla, one on Vaigatch Island, one on Dickson Island, one on Cape Chelyuskin, two at the mouth of the Lena, one on the Liaxov (archipelago of New Siberia), one on Wrangel Island and three on Chuckchee peninsula.

Electric power is often furnished by windmills. In the regions where oil is found, it is used for the operation of radio stations.

[redacted] e) Radio beacons

A plan of installation radio beacons in the entire Soviet arctic region is being realized. At the beginning of World War II, two radio beacons were in operation, one on White Island and the other on Dickson Island. In the regions where land or astronomical observations are always difficult or even impossible at times and where the setting of buoys is limited or even non-existent, the installation of wireless beacons is very important for water and air navigators.

These radioelectric stations are equipped with very modern instruments and are operated by specialized personnel who hibernate there, being supplied or relieved during the summer season by ice-breakers.

f) Aviation

Airplanes are used for direct or photographic observations. Despite the rigorous temperatures, the Soviet aviators are increasing regularly their flight time and distance travelled. In comparison with 8,954 flight hours in 1933, there were 12,900 flight hours with a distance of 2,238,000 kilometers in 1936.

Several air bases, important ones on Franits Joseph land and on Cape Chelyuskin are specialized in the work of weather observation and ice movement surveillance.

In 1939, long distance air reconnaissance had been operating for the first time in the most important sections of the route of the North. Three airplanes have explored the Kara Sea, two the Laptev Sea and three others the eastern Siberian Seas.

Air reconnaissance has likewise yeilded important information for hunting and fishing.

g) Fuel deposits

The GSMP supplies fuel for the navigation projects in the arctic, by bringing coal to the mouths of the various rivers, to the Tiksi Bay, on Dickson Island, to the bays of Chuckchee, Ambarchik, Providence and Ugolnaia and to the Gulf of Anadyr. Coal is found in the nearby mines. In 1940, coal production from these deposits yielded 363,000 tons.

3. Organization of Routes.

Navigation is usually operated with convoys, whose route is opened with a powerful ice-breaker

This route is divided into four branches:

a) Archangel to Dickson

b) Dickson to Bulkur on the Lena

c) Bulkur to Sukharnoe on the Kolyma

d) Sukharnoe to Bering Sea and beyond

Ice-breakers operate at each of these stations and patrol their sector. Air patrols observe the condition of ice, the natural channels and survey the channels made by the ice-breakers. When obstructions are noticed, they are immediately radio-transmitted to the interested parties and to radio stations for transmittion. It appears that this navigation is exclusively reserved for Soviet projects and that the USSR does not want to internationalize the route.

a) Murmansk-Vladisvostok Route

The "Route of the North" is interesting only if a round-trip one season voyage can be made on it. Otherwise, the ships have to return by the way of the Indian Ocean or hibernate until the next summer.

Until recently, two years time was necessary to complete the one-way 5,700 mile trip. Russia has realized one of her greatest ambitions due to the opening of this route; that is, she now has access to the

open sea. Due to the opening of this route and the system of the canals (Moscow-Volga-Don and Baltic-White Sea), Russian navigation can be practised in waters, uniquely, under the USSR control.

In 1934, the ice-breaker Litkes had travelled the entire route from the east to the west without hibernation. However, it is only since the official inauguration of the water route of the North on June 20, 1935 that regular voyages have been organized and the Passage of the North-East has become a commercial route for Soviet ships.

In the summer of 1935, two vessels have made the trip to the east and two others have made the trip in the opposite direction.

Also, in 1936, the Institute of the Economy of the North established the rates for the transportation of a ton of wheat from Leningrad to Vladivostok, being mindful of the opening of the water route and of the difficulties of its upkeep.

The scale is as follows: Transportation - 275 rubles per ton; Additional expenses (weather stations, ice-breakers, aviation) - 135 rubles. Thus the total cost of transporting a ton of wheat was over 400 rubles.

At the same time, the price of transportation of one ton of wheat by the Trans-Siberian railroad between the two places was raised by about 135 rubles.

As important as this sea route may be it does not penetrate into the interior of the country.

Despite their great size, the Siberian rivers are not accessible to ship transportation. Barges bring the merchandise to the ports near the mouths of the rivers where it is transferred to the ships. The port of Igarka is an exception, where ships drawing 6.75 meters of water can dock.

b) Kara Sea Expedition

Every summer ships make expedition in the arctic seas. These were considered dangerous in the Kara Sea and in the Barents Sea and took place only under favorable conditions.

Today, due to the radio, aviation and ice-breakers, the expeditions are less difficult. The average time, necessary for a round-trip voyage between England and the mouth of the Ob or the Yenisei was, formerly, 95 days. In 1929, it was 77 days, and in 1931 it was reduced to 68 days.

Insurance premiums for ordinary navigation risks, being six percent ad valorem in 1914, dropped to 3.25 percent in 1922, to one percent in 1928 and to .05 percent in 1932.

The following tabel, for the years 1922 to 1936, shows the expansion of navigation traffic in the north and the volume of commercial transactions. A study of the statistics shows that the water traffic has grown and that tonnage has been increasingly important. The lowering of imports is due to the drive of the Soviet government to save its foreign exchange.

Years	Number of ships	Volume of Commercial Exchange (in tons)		
		Exports	Imports	Total traffic
1922	5	5,837	7,790	13,627
1923	1	24	1,076	1,100
1924	3	4,148	6,523	10,671
1925	4	5,582	7,602	13,184
1926	5	10,070	9,098	19,168
1927	6	11,114	13,314	24,428
1928	8	17,107	12,271	29,378
1929	26	58,697	13,148	71,843
1930	46			158,505
1931	16	48,936	14,582	63,518
1932	28	80,105	7,003	87,108
1933	30	99,384	3,000	102,284
1934	28	104,562		104,562
1935	37			127,460
1936	36			172,000

Source: Soviet press abstract of foreign press release.

Coastal trade between the ports of Siberia and European Russia is not included in the above table.

The exported goods consist chiefly of lumber coming from the Yenisei and its branches: Lower Tunguska, the Angara, etc....

Igarka port had the following exports:

68,000 meters of lumber in 1929-1929

264,000 meters of lumber in 1929-1930

378,000 meters of lumber in 1930-1931

419,518 meters of lumber in 1931-1932

(c) The Lena Route

Encouraged by the success of the Kara expedition, the Administration of the Arctic Route has organized, since 1933, expeditions to the mouth of the Lena.

This expedition is much more difficult than the crossing of either the Kara or the Barents Seas. To reach the Lena, it is necessary to by-pass the Taimyr peninsula, round the Chelyuskin Cape passing the Vilkitsi strait, which even in the summer, is often closed by ice.

In 1933, a three ship convoy, consisting of a tug, a barge and the ice-breaker "Krassin" had arrived safely at the mouth of the Lena, but after having unloaded 8,000 tons of merchandise, it had not been able to return to Murmansk during the same season.

In 1934, a convoy of the same importance, escorted by the "Iermak" made the round-trip in one season.

In 1935, five ships arrived safely at the mouth of the Lena and unloaded 13,000 tons of goods and 125 passengers.

In 1935 as in 1934, the "Iermak" had to blaze a trail through the thick ice at the Vilkitski straits.

In 1936, the situation was more unfavorable in western arctic regions; however there were no accidents, and no ship was forced to hibernate.

The Siberian coast, on the Laptev Sea, east of the Taimyr peninsula, is the coldest part of the globe. This region, which has no benefit from the currents of the Gulf Stream nor from the mild waters of the Ob, is cut off from the southern winds by high mountains. The temperature in mid-winter is 68 degrees centigrade below zero, which is colder that that of the North Pole.

There are very intense magnetic abnormalities in this region. The deviation of the compass and the fog which is rampant for long periods, make sailing conditions very dangerous.

(d) The Kolyma Route

The route from the Lena to Bering Straits is the most difficult one to cross, because of the violent storms which rage in this arctic section.

Since 1911, a ship has made the route annually from Vladisvostok to Kolyma via the Bering Straits. The ice masses, which cover the eastern Siberian Seas and the Chuckchee country, as well as the lack of equipmet for docking make this a very dangerous route. Here, in 1932, the ice-breaker "Sibiriakov" lost its propellor by breaking the main shaft, and finally reached Cape Dezhnev with the aid of its sails and a tug. In 1933, the ice-breaker "Chelyuskin" after being adrift for 983 miles, was crushed by ice. The equipment was saved on an ice-floe in 1934 by the heroic efforts of 20 Soviet aviators.

The mild waters of the Anadyr, the Kolyma, the Indighirka and the Khatanga reduce the ice pack along the coastal approaches, thus making the Siberian arctic sea more accessible in the summer season.

The very shallow depths that one finds between Wrangel Island and the New Siberian archipelago are probably caused by the mud and dust deposited by the thawing of the local stationary masses of ice.

Since 1933, several ships have penetrated each year in the Lena estuary. In 1934, seven ships unloaded 11,000 tons of merchandise, and in 1935 six ships arrived with 16,000 tons and 290 passengers. The ships used for this navigation become more and more important for tonnage purposes.

Despite these especially difficult conditions for navigation, ships arrive at the mouth of the Lena, within six miles of land. A naval and air base has been constructed at Kolymsk (Nizhni-Kolymsk) in 1937 on the river. The Kolyma has been adapted for navigation.

In 1937, the ice-breaker "Joseph Stalin" had completed a round-trip voyage in one season. This gave a new frontier to navigation by permitting a longer work season and consequently a reduction of tariff, thus a more reasonable exploitation of the route is foreseen.

The directors of Glavsevmorput believe that traffic to the Far-East, by the water route of the North, has passed the experimental stage and has become a commercial realization. Thus, in the near future, USSR can abandon the long route through the Indian Ocean to the Pacific. The exploitation of this new route will, in any case, reduce the traffic of the TransSiberian railroad.

(END)