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RECENT DEVELOPMENTS IN THE SOVIET ARCTIC

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FOREWORD

The recent unprecedented aerial activity in Northeastern Siberia has focused an increasing amount of attention upon the Soviet Arctic. On 25 May 1954, a briefing was presented in the OCI Situation Room, which was designed to provide background information on the Soviet Far North and an assessment of current activities in the area. In the belief that this briefing will be of general interest to the intelligence community, ORR is publishing it as an Intelligence Memorandum.

Since 21 July 1954 it has been confirmed that the Directorate of Special Construction has been transferred from the Chief Directorate of the Northern Sea Route to GUPR (expansion unknown), a new chief directorate subordinate to the Ministry of the Maritime and River Fleet. The Directorate of Special Construction is continuing to work for the Chief Directorate of the Northern Sea Route. The significance of this transfer has not yet been determined.

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RECENT DEVELOPMENTS IN THE SOVIET ARCTIC*

Summary and Conclusions

The USSR long has recognized the peculiar role of the Arctic from both the economic and the strategic points of view and has created two major organizations, the Chief Directorate of the Northern Sea Route (Glavsevmorput**) and the Chief Directorate of Far Northern Construction (Dal'stroy), for the purpose of studying, exploiting, and developing the Soviet Arctic.

Among the current activities*** within the Soviet Arctic are the following: shipping, construction, polar aviation, meteorological reporting, and the operations of Dal'stroy.

A significant increase in Northern Sea Route shipping has taken place during the past few years. Approximately 200 to 220 vessels per season now operate upon the Route, as compared with 95 vessels in 1947 and 65 in 1948. The supplies necessary for the maintenance of the various Arctic settlements and activities are the major imports, while the primary exports consist of timber, furs, and raw materials. River shipping plays an important role in the Arctic economy, and river shipping agencies are in operation on many of the rivers within the Arctic.

The major recent construction project in the Soviet Arctic, has been identified as concrete runway construction. The Directorate of Special Construction of Glavsevmorput' is the major construction organization operating in the Arctic and has an as-yet-undetermined connection with the military.

* The estimates and conclusions contained in this report represent the best judgment of the responsible analyst as of 21 July 1954.

** For a glossary of abbreviations used in this report, see Appendix B.

*** For the locations of activities considered in this report, see Appendix A.

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The Directorate of Polar Aviation is the air arm of Glavsevmorput', serving the territory along the northern coast of the USSR. It also provides such specialized services as ice reconnaissance in support of shipping.

The Directorate of Polar Stations and Scientific Institutions, Glavsevmorput', operates approximately 110 polar stations located along the Northern Sea Route. These stations perform the basic function of keeping a meteorological and ice log, and some of them do additional specialized scientific research.

The primary function of Dal'stroy, under the Ministry of Non-ferrous Metallurgy, is the exploitation of the mineral resources of Northeastern Siberia. These resources include not only gold, tin, and tungsten, which are mined by eight regional Directorates, but also uranium and possibly other radioactive ores which are mined by the First Directorate for the Soviet Atomic Energy program. Facilities for ore concentration are available in the Dal'stroy area.

An extensive program of Arctic studies was undertaken by the Soviets in the early 1930's as an essential accompaniment to the work of construction and development. This program includes work in several fields of science, including hydrography, hydrology, meteorology, terrestrial magnetism, gravity, actinometry, the study of permafrost, the ionosphere, and the propagation of radio waves. The development of the science of ice forecasting was especially important to Glavsevmorput' as an aid to shipping on the Northern Sea Route.

The USSR has sent many expeditions into the Arctic, especially since the creation of Glavsevmorput' in 1932. Four expeditions which took place between 1935 and 1941 were particularly important. One of these provided data relative to the behavior of the sea and ice in the waters to the immediate north of the traffic lanes, while the other three obtained information on meteorology and the behavior of the ice pack in the Central Polar Basin.

Very little information is available on Soviet Arctic expeditions during and immediately following the Second World War. In 1947

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an important flight was made to the North Pole which "opened up wide prospects for the further thorough study of the Arctic with the object of finally mastering the Northern Sea Route." The report of the 1947 flight provides the continuity between the expeditions of the 1930's and early 1940's and those of today.

On 29 April 1954, Izvestiya reported that expeditions had been active in the Central Polar Basin since 1948, and stated that new research work in the high latitudes was to be undertaken this year.

the establishment of 2 drifting stations which have personnel and of at least 4 automatic radio meteorological stations in the Central Polar Basin.

While the exact purpose of this activity has not yet been determined, it is probably a polar research expedition similar to those of the past, although on a much larger scale. There are in the Arctic now 16 very high-ranking polar research personalities who describe themselves as members of the "High Latitude Expedition of Drift Stations," and who probably are conducting work in astronomy, meteorology, hydrology and hydrography, terrestrial magnetism, biology, zoology, and navigation. The Yakutsk Cosmic Ray Station also may be connected with the expedition.

The implications of this activity are several: first, there should be an immediate improvement in the USSR meteorological reporting; second, the research will be of interest to the Long Range Air Force and the Air Defense Organization (PVO) from both the operational and navigational viewpoints; third, the effect of arctic conditions, especially with reference to terrestrial magnetism, upon inertially and magnetically guided missiles must be understood before such missiles can be fired from or over the Polar regions; and fourth, the current research should result in a more efficiently operating organization of shipping upon the Northern Sea Route.

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I. Introduction.

Since the war, a new phrase has been added to our vocabulary -- the polar concept. This concept is based upon the following facts: all continents in the Northern Hemisphere meet at the ice-covered beaches of the Arctic Ocean; nearly all of the most important industrial and military concentrations are situated well north of 35° North latitude; and the shortest routes -- the great circle courses -- between the industrial and military centers of the US and the USSR cross the polar regions, some of them quite close to the North Pole.

Because of these facts and the development of long range aviation, the Arctic has emerged as an area of special importance, one deserving of close study.

The USSR long has recognized the peculiar role of the Arctic, from both the strategic and the economic points of view. It has created two major organizations for the purpose of studying, exploiting, and developing the Soviet Arctic. These organizations are the Chief Directorate of the Northern Sea Route (Glavsevmorput') and the Chief Directorate of Far Northern Construction (Dal'stroy).

Glavsevmorput' was established on 17 December 1932 and given the task of "conclusively developing the Northern Sea Route from the White Sea to the Bering Strait, of equipping this route, keeping it in good order, and securing the safety of shipping along it."*

Having been given jurisdiction over all territory north of 62° N and east of the Urals, ** the organization expanded rapidly and successfully until a disastrous 1937 navigation season when 26 ships were trapped in the ice at the end of the summer and freight and construction plans were hopelessly underfulfilled. During the next 3 years Glavsevmorput' was purged and reorganized until, in 1941, the present basic structure emerged.

** This territorial jurisdiction was abolished in 1938.

At the present time Glavsevmorput' is organized into several functional directorates which assist in the general exploitation of the Soviet Arctic. Among these directorates are those concerned with Arctic sea and river shipping, polar aviation, supply, trade and agriculture, polar stations and scientific institutions, and construction.

Dal'stroy was organized in the early 1930's for the purpose of exploiting the Kolyma gold deposits of Northeastern Siberia. Its mining activities have been expanded to include other metals, principally tin, tungsten, and uranium. Subordinate to Dal'stroy are nine known mining directorates which are responsible for the exploitation of these raw materials. All other Dal'stroy activities are centered around the requirements of these mining directorates.

II. A Survey of Current Developments in the Soviet-Arctic.

A survey of the current status of the several activities taking place within the Soviet Arctic includes: shipping, both ocean-going and river; construction, polar aviation, meteorological reporting; and the operations of Dal'stroy.

A. Shipping.

In 1947 there were about 95 ships and in 1948 approximately 65 ships which operated on the Northern Sea Route. At the present time probably between 200 and 220 vessels are in operation per season, certainly a significant increase, and one which provides a measure of the success of the intensive work done in the 1930's. These ships operate primarily from each end of the Route, in toward the center, and out again. Only about 10 to 15 cargo vessels make a complete crossing of the Route each year, most of them going from west to east.

Cargo carried by the vessels entering the Route consists of supplies necessary for the maintenance of the various arctic settlements and activities. The primary exports are timber, furs, and raw materials, including Pechora coal from Nar'yan Mar, fluorspar from Amderma, nickel from Noril'sk, and ores from the Dal'stroy port of Pevek.

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Ships often travel in convoy, especially at the beginning and end of the navigation season. Icebreaker assistance frequently is required. Last year there were approximately 10 icebreakers on the route. For purposes of control, shipping is organized into two sectors, with headquarters located at Dikson and Pevek.

The Lena River is a major Siberian transportation artery. It is used for ships carrying cargoes into and out of the Arctic, and is one of the more important Dal'stroy supply routes. Tiksi, at the mouth of the Lena, is a major trans-shipment base.

There are two river shipping organizations operating on the Lena River. The major agency is the Lena Steamship Agency, subordinate to Glavsevmorput', with headquarters at Yakutsk, and the other is the Lena Gold Fleet.

At the present time approximately 100 towing vessels and 650 barges are operated by the Lena Steamship Agency. Dal'stroy leases a varying number of the barges for transporting supplies into the Dal'stroy area. The Agency has shipyards subordinate to it where towing vessels and barges are constructed for its own use. Self-propelled river vessels constructed in the European portion of the USSR are sailed across the Route and up the river to Yakutsk. Last year the Agency transported approximately 500,000 tons of dry cargo.

Similar fleets, most of which are not subordinate to Glavsevmorput', are in operation on the Ob', the Yenisey, and other rivers which reach into the Arctic. Dal'stroy controls the river shipping on the rivers within its area of operation -- the Kolyma, the Indigirka, and the Yana.

B. Construction.

The following three construction organizations work for Glavsevmorput': the Department of Capital Construction (OKS); the Arctic Construction Trust (Arktikstroy); and the Directorate of Special Construction (Spetsstroy). The Department of Capital Construction plans and supervises the work of the other two organizations.

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The major recent construction project in the Soviet Arctic was started at 8 locations* in 1949 and completed in 1950. It has been identified as runway construction and is at least 80,000 square meters in size. This area, if rectangular in shape, could measure approximately 150 by 5,200 feet. Identified as concrete runway construction is under construction at the present time and is located at several locations except Kosistyy. Whether it is an extension or an entirely new runway is unknown.

Arktikstroy formerly was the major Arctic construction organization. It handled all Glavsevmorput' construction requirements, and began construction in 1949. Since that time it gradually has become less important and today it is doing minor construction work at smaller Arctic locations.

With the decline of Arktikstroy, Spetsstroy has emerged as the most important Glavsevmorput' construction organization. It did the major work in 1949, and at the present time is building in addition to other objects for Glavsevmorput' at the larger Arctic locations.

Spetsstroy is connected with the military, although the exact nature of the connection is unknown.

One interesting recent development is the appearance of the former chief of the Shmidta Spetsstroy Office at Petropavlovsk, Kamchatka. His function has not yet been determined, but indications are that he will undertake construction of an airfield. This is the first appearance of Glavsevmorput' personnel on the Kamchatka Peninsula, and it is most unusual.

Arctic construction activities in the Chukotsk area, other than those for Glavsevmorput', include the construction of airfields by the Central Directorate of Capital Airfield Construction, probably for the 10th Air Army, unidentified construction by the Chief Directorate of Special Construction of the Ministry of Defense at Ugol'naya, and a general expansion of communication facilities.

* See the map, which follows p. 8.

Railroad construction activities included surveys for a Yakutsk-Magadan railroad and possible construction work on a Vorkuta-Igarka railroad. Work on both of these projects apparently has been abandoned.

C. Polar Aviation.

The Directorate of Polar Aviation (UPA) is the air arm of Glavsevmorput'. It is the air transportation organization which serves the territory extending from Arkhangel'sk to Ugol'naya along the Stalin Route, as the route along the Northern coast is known. The Directorate also provides such specialized services as ice reconnaissance in support of shipping.

UPA is organized into three air groups; the Moscow Air Group, which controls the area between Arkhangel'sk and Chelyuskin; the Igarka Air Group, for the south central area from the Tag River to the Lena River; and the Chukotsk Air Group, which controls the area east of the Lena River. UPA has approximately 45 airfields and 70 to 100 aircraft subordinate to it.

D. Meteorological Reporting.

The Directorate of Polar Stations and Scientific Institutions (UPSINU), Glavsevmorput', is responsible for the operation of approximately 110 permanent and seasonal polar stations. It is these stations which provide the essential background information necessary for the success of shipping seasons and expeditions.

Most of the stations are within a few miles of the shipping lanes, and are organized into the following three regional directorates; the Eastern, headquarters at Pevek; the Central, headquarters at Tiksi; and the Western, headquarters at Dikson.

A variety of work is done at these stations. All perform the basic functions of keeping a meteorological and ice log. In addition to this, many of them study the upper atmosphere, and some do work in magnetism and actinometry. There is an indication that work related to sunspot observations is done at Dikson.

The Yakutsk Cosmic Ray Station is doing work at the present time at Bukhta Tikhaya, on Franz Josef Land.

E. Dal'stroy.

Dal'stroy, the Chief Directorate of Far Northern Construction, was subordinate to the Ministry of Internal Affairs until March 1953. Transferred to the Ministry of Metallurgy at that time, it remained within that Ministry until February 1954, when the Ministry of Metallurgy was reorganized into a Ministry of Ferrous Metallurgy and a Ministry of Nonferrous Metallurgy. Dal'stroy then was transferred to the Ministry of Nonferrous Metallurgy. Some recent information concerning a dispute carried on since January between Kruglov, Minister of Internal Affairs, and Tevoysyan, former Minister of Metallurgy, over control of Dal'stroy indicates that Dal'stroy will remain within the Ministry of Nonferrous Metallurgy.

The primary function of Dal'stroy is the exploitation of the mineral resources of northeast Siberia. Its area extends roughly east of 132 degrees and north of 59 degrees, excluding the Kamchatka Peninsula. Headquarters of Dal'stroy is at Magadan.

Subordinate to Dal'stroy are eight regional mining directorates, each of which is responsible for the mines in its area. Headquarters of these directorates are located at Yagodnyy, Susman, Nizhniy Seymchan, Ust'-Omchuk, Ust'-Nera, Omsukchan, Pevek, and Ege Khaya. Gold, tin, and tungsten are the principal ores mined by these regional directorates. There are facilities for ore concentration at the headquarters of the directorates.

In addition to these mining organizations there is the First Directorate, which is administered by Dal'stroy but is engaged in the production of uranium and possibly other radioactive ores for the First Chief Directorate and Second Chief Directorate, attached to the Council of Ministers, the organizations responsible for the Soviet atomic energy program. This directorate, organized in 1949, operates throughout the Dal'stroy area; Pevek and Ust'-Omchuk are the locations of its major activity.

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All other Dal'stroy activities -- construction, industrial, transport -- center around the requirements of these nine mining directorates.

Transport facilities within Dal'stroy include a road system running from Magadan north to the mining centers in the interior; the Yana River and Kolyma-Indigirka River Steamship Agencies, operating on the inland waterways; and a small air fleet. Ocean shipping is carried out for the most part between Vanino or Nakhodka and Nagayevo, the port for Magadan.

III. Soviet Study of the Arctic.

At the time of the organization of Glavsevmorput' in 1932, an extensive program of Arctic studies was undertaken as an essential accompaniment to the work of construction and development. Hydrography, hydrology, and meteorology were the principal fields of study related to the sea route, followed by terrestrial magnetism, gravity, actinometry, and the study of permafrost, the ionosphere, and the propagation of radio waves. The hydrological and meteorological observations and the study of the sea ice led to the development of the very important science of ice forecasting. A discussion of a few of the more important fields of study follows.

A. Hydrography and Hydrology.

Hydrography is the branch of science most closely concerned with the safety of shipping, and, as such, is of extreme importance to Glavsevmorput'. Hydrographic work generally is performed by parties sailing in small ships belonging to the Hydrographic Directorate of Glavsevmorput'. During the summer they chart offshore waters and erect navigational aids. Occasionally ships winter along the route to study winter conditions. Land-based parties chart the Arctic Rivers.

Hydrology is complementary to hydrography, and during each shipping season numerous hydrologic parties are operating.

The basic achievements of this work have been the establishment of the general direction of the route and its main variants,

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and the determination of the character of those parts of it which are most difficult to navigate.

B. Meteorology.

As stated earlier, meteorological records are maintained by all polar stations. Their work is supplemented by the regular USSR weather reporting service, which maintains many inland Arctic meteorological stations. In addition, automatic radio meteorological stations have been used since the war.

The data collected by the Polar stations is used not only for forecasting, but also for making detailed climatic studies. A number of such studies, issued by the Arctic Scientific Research Institute (ANII), are available.

C. Ice and Ice Forecasting.

The behavior of the sea ice is of particular concern to Glavsevmorput', and continuing studies are made of it. Based on these studies, the science of ice forecasting has been developed. There are 2 types of forecasts -- the short- and the long-term. Long-term forecasts are made four times a year; they are a rough forecast in December, a refined forecast in February, a May forecast to provide a basis for the detailed planning of shipping during the navigation season, and an August forecast to predict the end of the season.

Short-term forecasts are designed to assist shipping by predicting a few days in advance and in some detail the state of the ice in a given area.

D. Terrestrial Magnetism.

In high latitudes the magnetic compass tends to become unreliable as a result of the proximity of the magnetic pole and the frequency of magnetic storms. Glavsevmorput' has recognized the necessity for studying this problem and has established permanently functioning magnetic observatories at certain polar stations. The results obtained thus far have been quite useful for navigation, but much work remains to be done.

E. Permafrost.

Permafrost, or permanently frozen ground, is an important problem in Arctic operations. The Institute of Permafrost Studies, Academy of Sciences, USSR, is concerned with the exploitation of areas composed of frozen soils and subsoils, and the investigation of these areas for development and expansion. To achieve this purpose, the Institute has established permanent permafrost stations at several locations in the Arctic. These are staffed with geologists, biologists, zoologists, and other technical personnel.

Among other places, stations are located at Anadyr', Igarka, Tiksi, Vorkuta, and Yakutsk.

F. The Yakutsk Cosmic Ray Station.

The Yakutsk Cosmic Ray Station has been connected with the Bukhta Tikhaya Polar Station for at least the past two years. In addition to this, the Chief of the Yakutsk Cosmic Ray Station has made several trips to the Arctic, including one in August 1952 to Shmidta. The exact nature of the work of the Yakutsk Cosmic Ray Station personnel in the Arctic is undetermined.

G. Soviet Expeditions to the Arctic.

Prior to the creation of Glavsevmorput' in 1932, small teams occasionally were put onto icebreakers and sent to otherwise inaccessible places. These expeditions, however, were erratic, and, generally, on a very small scale. The creation of Glavsevmorput' changed all this, and from 1933 onwards, these expeditions assumed a routine character.

There were, however, four expeditions which deserve special mention. The first of these was a series of three "high latitude" expeditions by the icebreaker Sadko. The first two took place in 1935 and 1936 in the area between Franz Josef Land and Severnaya Zemlya, and the third in 1937 in the northern part of the Laptev Sea and north of the New Siberian Islands. From the Sadko expeditions a considerable amount of knowledge relative to the behavior of the sea and ice in the waters north of the traffic lanes was obtained.

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Information necessary to Northern Sea Route shipping on meteorology and the character of the ice pack in the Central Polar Basin was almost totally lacking in the middle 1930's. The three remaining expeditions provided data on these subjects.

The first of these was the North Pole Drifting Expedition led by I. D. Papanin. In May 1937, 4 men were flown to the North Pole, established a camp, and drifted during the next 9 months to a point opposite Scoresbysund, Greenland. A full program of observations was carried out, and an invaluable contribution was made to the study of meteorology and ice drift in the central Arctic.

Another expedition was that of the Sedov. In 1937 this ship was trapped in the ice and drifted across the Central Polar Basin for the next 3 years. Again, valuable information was obtained on the drift of ice.

The last expedition was a series of flights in April 1941, under the leadership of I. I. Cherevichny, to the region of the Pole of Inaccessibility.* Landings were made on the ice at three places in the general area of 80° N - 180° E, and the party remained for several days at each location. Observations were made in hydrology, meteorology, terrestrial magnetism, and the drift of sea ice.

During the Second World War, expeditions continued to be sent into the Arctic, but little information is available on them, and they probably were on a very small scale.

In 1945 one flight was made from Chelyuskin to Chokurdakh via the Pole. In 1946 a series of flights was made north of Rudolfa and between Spitzburgen and Greenland.

On 9 June 1947, the Soviets published a decree which placed all Arctic information on the State Secret list.

* The Pole of Inaccessibility is the geographic center of the general area north of 75° N, and between 155° E and 140° W, the Zone of Relative Inaccessibility. The Zone received this name because it lies within a line connecting points 500 miles north of the farthest penetration by ship, and, hence, is relatively inaccessible except by aircraft.

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In August 1947, a very important flight to the Pole was made by Buynitskiy, who was Chief of the Arctic Scientific Research Institute of Glavsevmorput'. In his report to the Chief of Glavsevmorput', Buynitskiy outlined his route from Pevek to Kosistyy via the Pole of Inaccessibility and the North Pole, and stated that "the first exploration was made of an enormous area of the Polar Basin never previously visited."*

The information on the state of the ice-covering of the Central Arctic collected on this flight was sufficiently important to "provide a new conception of the science of ice fields." In particular, "a completely unexpected and powerful movement of ice over an enormous expanse around the Pole ... and a permanent barrier of blocks of pack ice" were noted.

The flight also provided data on aerial navigation, including radio navigation, and the work of aviation instruments in the high latitudes, especially the behavior of the magnetic compass. The "national aircraft IL-12 was thorough tested." The "supposed second magnetic Pole," in the area of the Pole of Inaccessibility, was referred to twice.

The most significant portion of the report, however, is the statement that the flight "opened up wide prospects for the further thorough study of the Arctic, with the object of finally mastering the Northern Sea Route." This provides the continuity between the expeditions of the 1930's and early 1940's and those of today.

For the next few years there was very little indication, other than an occasional flight over the Central Polar Basin, that work in the high latitudes was being carried out, and that Buynitskiy's report was being implemented.

On 29 April of this year, Izvestiya carried an account of a report made by the Arctic Scientific Research Institute to the Presidium of the Academy of Sciences of the USSR, on Soviet research and discoveries in the Central Arctic during the postwar

* It is interesting to note that the route of this flight passed through major areas which had not been explored prior to 1 January 1946. See the map, which follows p. 8, above.

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period. According to this article, expeditions have been operating since 1948 on the ice pack in, among other areas, previously unvisited areas of the Central Polar Basin. Work in the several fields of Arctic study was carried out. It is interesting to note that "it has been established that there is no second magnetic Pole in the Arctic." This represents a change in thinking since the 1947 flight, when the site of the "supposed second magnetic Pole" was mentioned.

The report concluded by stating "The presidium of the Academy of Sciences approved the plan of further research work in the Central Arctic and made it incumbent upon several institutes of the USSR Academy of Sciences to extend their research in the Arctic. This year the Chief Directorate of the Northern Sea Route of the Ministry of the Merchant Marine and River Fleet is going to undertake new research work in the Central Arctic. Research stations of the Arctic Institute will be set out on drifting ice. They will carry out research according to a wide program. A further systematic research into the high latitude regions of the Arctic Ocean is very important for weather forecasts and for statements on ice condition along the Northern Sea Route."

This airlift,
resulted in the establishment of two drifting
stations with personnel in the Central Polar Basin which, on 15 July
1954 were located on ice islands at $88^{\circ}02' N - 151^{\circ}40' W$ and at

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77°22' N - 174°20' E.

In addition to these stations, there are indications that at least four automatic radio meteorological stations are located in the general area north of Severnaya Zemlya and Wrangel Island.

While the exact purpose of this activity has not yet been determined, it is probable that it is a polar research expedition similar to those of the past, although on a much larger scale. At Dikson, Ostrov Domashniy, and Ostrov Sredniy** there are 16 very high-ranking polar research personalities,*** who described themselves as members of the "High Latitude Expedition of Drift Stations." These 16 personalities included V. F. Burkhanov, Chief of Glavsevmorput', V. V. Frolov, Chief of ANII, E. I. Tolstikov, Chief of UPSINU, and important members of expeditions of the 1930's and early 1940's.

It is probable that these individuals and others are conducting work in astronomy, meteorology, hydrography and hydrology, terrestrial magnetism, biology, zoology, and navigation. There also is a suggestion that the Yakutsk Cosmic Ray Station may be connected with the expedition.

H. Implications of Current Expeditions.

The implications of the current activity in the Central Polar Basin are several. First, it should result in an immediate improvement in the Soviet meteorological reporting, not only for the Arctic, but also for the USSR as a whole and for the Pacific.

Second, the activity certainly will be of interest to the Long Range Air Force and the PVO from both the operational and navigational viewpoints.

The North Pole Station is referred to as Severnyy Polyus (SP)-3, and is known as Severnyy Polyus (SP)-4

** Sredniy is the take-off point of the plane which reconnoitered the US Meteorological Station on T-3 ice island on 5 May 1954.

*** For information on these personalities, see Appendix C.

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Third, it will be necessary to understand the effect of Arctic conditions, particularly with reference to terrestrial magnetism, upon inertially and magnetically guided missiles before they can be fired over or from the polar regions.

Fourth, it should be possible, as a result of this research, to effect a more efficiently operating organization of shipping upon the Northern Sea Route which will result, in the words of the message reporting the 1947 flight, in the final mastering of the Route. Thus, in coming years, there probably will be a more efficient and highly organized operation of even greater numbers of vessels along the Soviet northern coast.

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APPENDIX A

LOCATIONS OF SOVIET ACTIVITIES MENTIONED
IN THIS REPORT

<u>Place</u>	<u>Coordinates</u>
Amderma	69°44' N - 61°38' E
Anadyr	64°45' N - 177°35' E
Archangel	64°34' N - 40°32' E
Chelyuskin, Mys	77°45' N - 104°30' E
Chokurdakh	70°09' N - 147°53' E
Dikson	73°30' N - 80°24' E
Domashniy, Ostrov	79°30' N - 91°00' E
Ege-Khaya	67°24' N - 134°15' E
Franz Josef Land	81°00' N - 55°00' E
Igarka	67°30' N - 86°35' E
Indigirka (River)	70°48' N - 149°00' E
Khatanga	71°58' N - 102°30' E
Kolyma (River)	69°30' N - 161°12' E
Kosistyy	73°38' N - 109°49' E
Kresty Kolymsk (Nizhniye Kresty)	68°45' N - 161°18' E
Lena (River)	72°00' N - 127°00' E
Magadan	59°34' N - 150°48' E
Nagayevo	59°33' N - 150°47' E
Nakhodka	42°49' N - 132°53' E
New Siberian Islands (Novosibirskiye Ostrova)	75°00' N - 142°00' E
Nizhniy Seymchan	62°54' N - 152°23' E
Noril'sk	69°20' N - 88°06' E
Omsukchan	62°31' N - 155°49' E
Petropavlovsk	53°01' N - 158°39' E
Pevek	69°42' N - 170°17' E
Rudol'fa, Ostrov	81°45' N - 58°30' E
Scoresbysund, Greenland	70°28' N - 21°58' W
Severnaya Zemlya	79°30' N - 98°00' E
Shmidta, Mys	68°55' N - 179°24' W
Spitsbergen	78°00' N - 20°00' E

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<u>Place</u>	<u>Coordinates</u>
Sredniy, Ostrov	79°25' N - 92°20' E
Susman	62°47' N - 148°10' E
T-3	84°00' N - 86°00' W
Tikhaya, Bukhta	80°20' N - 52°50' E
Tiksi	71°36' N - 129°57' E
Ugol'naya	62°58' N - 179°17' E
Ust'-Nera	64°06' N - 143°15' E
Ust'-Omchuk	61°09' N - 149°38' E
Vanino	49°02' N - 140°16' E
Vorkuta	67°30' N - 64°01' E
Wrangel Island	71°00' N - 180°00' E
Yagodnyy	62°33' N - 149°40' E
Yakutsk	62°00' N - 129°40' E
Yana (River)	71°25' N - 136°00' E
	Established at 75°48' N - 175°25' W
	Located on 15 July 1954 at 77°22' N - 174°20' E
North Pole Station	Established at 86°00' N - 175°45' W
	Located on 15 July 1954 at 88°02' N - 151°40' W

APPENDIX B

GLOSSARY OF ABBREVIATIONS

ANII:	Arctic Scientific Research Institute, Glavsevmorput'.
Arktikstroy:	Arctic Construction Trust, Glavsevmorput'.
Dal'stroy:	Chief Directorate of Far Northern Construction, Ministry of Nonferrous Metallurgy.
Glavsevmorput':	Chief Directorate of the Northern Sea Route, Ministry of the Merchant and River Fleets.
OKS:	Department of Capital Construction, Glavsevmorput'.
PVO:	Air Defense Organization.
Spetsstroy:	Directorate of Special Construction, Glavsevmorput'.
UPA:	Directorate of Polar Aviation, Glavsevmorput'.
UPSINU:	Directorate of Polar Stations and Scientific Institutions, Glavsevmorput'.

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APPENDIX C

PERSONALITIES CONNECTED
WITH THE "HIGH LATITUDE EXPEDITION
OF DRIFT STATIONS"

Papanin, Ivan Dmitrevich.

Chief of Glavsevmorput', 1939-46.
Leader of the 1937 North Pole Drifting Expedition.
Rear Admiral.
Doctor of Geographical Science.
Hero of the Soviet Union.
Member USSR Academy of Sciences.

Shmidt, Dr. Otto Yulyevich.

The dean of Soviet Arctic science and exploration.
Member of Gosplan, 1918-30.
First Chief of Glavsevmorput', 1932-39.
Chief Editor, Bol'shaya Sovetskaya Entsiklopediya 1926
to the present.
Hero of the Soviet Union.
Member of the Academy of Sciences, American Geographical
Society, Explorers Club of New York.

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Ushakov, Georgiy Alekseevich.

Polar explorer of the 1920's and 1930's.
Leader of the first Soviet colony on Wrangel Island, 1926-29.
Leader of the Sadko expedition.
Former Chief of the Chief Directorate of the Hydro-
meteorological Service, pre-1939.
Doctor of Geographic Sciences.

Zubov, Nikolay Nikolaevich.

Polar explorer of the 1920's and 1930's.
Leader of the first party (1932) to circumnavigate Franz
Josef Land.
Chief of the Sadko expedition's scientific program.
Chief of the State Oceanographic Institute, Chief Directorate
of the Hydrometeorological Service, 1943-48.
Vice Admiral.
Doctor of Geographic Sciences.
Member of the Moscow Branch, All Union Geographic Society.

Akkuratov, Valentin Ivanovich.

Polar navigator.
Probably Chief of the Navigation Service of U.P.A.
Navigator on the following flights:

The 1941 Cherevichny expedition to the "Pole
of Inaccessibility."

The 1945 North Pole Flight.

The 1946 flights North of Franz Josef Land
and between Greenland and Spitzbergen.

Author of: Aerial Navigation in High Latitudes, 1946,
and At High Latitudes: Notes Concerning the Flights
of 1936-1946, 1947

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(Continued).

Burkhanov, Vasiliy Fedotovitch.

Chief of Glavsevmorput', 1953 to the present.
Deputy Chief of Glavsevmorput', 1948-53.
Career naval officer before 1948.
Rear Admiral.

Cherevichny, Ivan Ivanovich.

Arctic pilot.
Leader of the 1941 Expedition to the "Pole of Inaccessibility."
Author of "Aerial Reconnaissance in High Latitudes along
the Northern Sea Route," Soviet Arctic, 1939, No. 12,
pp. 49-51.

Fedorov, Evgeniy Konstantinovich.

Astronomer and magnetician.
Member of the 1937 North Pole Drifting Expedition.
Chief, Red Army Hydrometeorological Service
during World War II.
Director of the Chief Geophysical Laboratory, in Leningrad,
December 1949.
Author of several technical publications.
Lieutenant General.
Member of the Academy of Sciences.

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Frolov, Vyacheslav Vasil'evich.

Chief of the Arctic Scientific Research Institute,
Glavsevmorput' since at least 1 February 1951.
Author of "Work of the Weather Station on Dikson Island,"
Soviet Arctic, 1940, No. 3, pp. 26-31.

Gakkel, Yakov Yakovlevich.

Oceanographer.
Member of the Chelyuskin Expedition, in 1933.
Leader of the Akademik Shokal'skiy hydrologic expedition,
in 1938.
Author of numerous technical publications.

Kozlov, M. P.

Arctic meteorologist.
Author of several technical publications.

Mazuruk, I. P.

Arctic pilot.
One of the pilots who flew the North Pole Drifting Expedition
to the Pole in 1937.
Second in command of the Northern Siberia-Chukotsk airline
which connected the USA and the USSR via Alaska during
World War II.
Chief of the Directorate of Polar Aviation, Glavsevmorput',
between at least 1940 and 1946.

Major-General of Aviation.
Hero of the Soviet Union.

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Ostrekin, Mikhail E.

Astronomer and magnetician
Member of the Cherevichny Expedition to the "Pole of Inaccessibility" in 1941.
Author of numerous technical publications.

Tolstikov, E. I.

Chief of the Directorate of Polar Stations and Scientific Institutions, Glavsevmorput' since at least 1949.
Leader of the drifting station located at 001.
An official of the Shmidta weather station, 1937-39.
Author of Weather Service on Cape Shmidt, Moscow, Glavsevmorput', in 1940.
Master of Science in Geography.

Treshnikov, A. F.

Meteorologist.
Leader of the drifting station located near the North Pole.
At the Arctic Scientific Research Institute since at least October 1940.
Master of Science in Geography.
Hero of Socialist Labor.

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(Continued).

Vodop'yanov, Mikhail Vasil'evich.

One of the most famous of the Arctic pilots.
Made many important Arctic flights during the 1930's,
including the following:

Pilot of the first plane to reach Franz Josef Land,
in 1936.

Chief pilot of the North Pole Drifting Expedition,
in 1937.

Author of several popular and technical publications about
Arctic flying.

Hero of the Soviet Union.

Appendix D. Bibliography

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APPENDIX D

BIBLIOGRAPHY

This bibliography of background material, upon which the major portion of the talk was based, is provided for the general interest of the reader. It is not to be considered exhaustive. Many references have been omitted,

References to specific items mentioned in the text are available upon request.

Particular attention is called to two unclassified sources: Armstrong and Vize. Armstrong's The Northern Sea Route is the best English language account of the development and usefulness of the Northern Sea Route, while Vize's Morya Sovetskoy Arktiki is an excellent detailed popular scientific survey of Arctic explorations, especially in the seas bordering the USSR.

T. E. Armstrong, The Northern Sea Route, Scott Polar Research Institute Special Publication Number 1, Cambridge University Press, Cambridge, 1952. U.

Ekspeditsiya Na Samolete "SSSR-N-169" v Rayon "Polyusa Nedostupnosti," Nauchnye Rezul'taty (Expedition in the Airplane USSR-N-169 to the Region of the Pole of Inaccessibility, Scientific Results), Moscow-Leningrad, Glavsevmorput', 1946. U.

V. Stefansson, "The Region of Maximum Inaccessibility in the Arctic," Geographical Review, September 1920, Vol. 9, pp. 167-72. U.

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Trudy Dreyfuyushchey Stantsii "Severnyy Polyus"; Nauchnye Otchety i Rezul'taty Nablyudeniya Dreyfuyushchey Ekspeditsii Glavsevmorputi, 1937-1938 gg. (Transactions of the Drifting Station "North Pole"; Scientific Reports and Results of the Drifting Expedition of the Chief Directorate of the Northern Sea Route, 1937-1938), Moscow-Leningrad, Glavsevmorput' 1940-45, 2 vol. U.

V. Yu. Vize, Morya Sovetskoy Arktiki: Ocherki po Istorii Issledovaniya. (Seas of the Soviet Arctic: Historical Outline of Their Exploration), Moscow, Glavsevmorput', Third Edition, 1948. U.

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