

# ARKTIS

VIERTELJAHRSSCHRIFT DER INTERNATIONALEN GESELLSCHAFT ZUR ERFORSCHUNG DER ARKTIS MIT LUFTFAHRZEUGEN

UNTER MITWIRKUNG VON LOUIS A. BAUER-WASHINGTON, LEONID BREITFUSS-BERLIN, E. VON DRYGALSKI-MÜNCHEN, E. VAN EVERDINGEN-UTRECHT, L. GAIN-PARIS, P. S. MERCANTON-LAUSANNE, HUGH R. MILL-LONDON, O. NORDENSKJÖLD-GÖTEBORG†, R. SAMOILOVITCH-LENINGRAD, VILHJALMUR STEFANSSON-NEW YORK, H. U. SVERDRUP-BERGEN, I. TOLMACHOFF-PITTSBURGH (PA.), A. WEGENER-GRAZ

HERAUSGEGEBEN VON

FRIDTJOF NANSEN

1. JAHRGANG / 1928



48897

JUSTUS PERTHES  
G O T H A

Printed in Germany

1928  
BUREAU  
P  
A 721 1/2  
v. 1

1928

# EXPLORATIONS IN NOVAYA ZEMLYA AND THE BARENTS SEA EXECUTED BY THE INSTITUTE FOR THE EXPLORATION OF THE NORTH

By R. SAMOILOVITCH-Leningrad

With 1 Map and 4 Photos (Tafel 1-3)

Since its very foundation in 1920 the Institute for Exploration of the North devoted a considerable part of its scientific forces and pecuniary means to the exploration of the double island of Novaya Zemlya. The first expedition, under the leadership of the author and Prof. P. Wittenburg and organized by the Institute, took place in 1921 on board the motorsailship „Charlotte“. The expedition composed of 23 members, visited all the populated places of the west coast of Novaya Zemlya from the *Belushya Bay* in the south to *North Sulmeneva Bay*, north of the *Krestovaya Bay*, the investigation of the western coast having been its purpose. That expedition was mainly a reconnaissance; it studied the geology of the west coast and at the same time the problem of the economical state of local trades, having in view the improvement of colonisation methods in Novaya Zemlya. The expedition brought back rich geological collections now partly studied. Pedological and botanical research was also carried out.

In the district of *Maly Karmakuly* there is no soil in the usual meaning of the word. On the elevated part of the relief, a small zone, or, rather, sphere of fine-grained humus is formed around the roots of plants. Lowlands represent marshy areas covered with sphagnum and scarce reed-grass, the level of the frozen soil lying 78 cm below the surface. In the *Puchovy island*, the scenery is a distinct highland-tundra with well marked naked saucer-shaped swellings and wide areas covered with fine rubble. In the *Puchovy island*, at the entrance into the gulf, there is a huge rookery. At the southern cape of the island remains of perfectly preserved peat were found, 45-50 cm thick.

Sailing through *Matotchkin Shar* to the Kara Sea proved to be impossible because of abundant ice at that place.

The investigations in the *Krestovaya Bay* have shown that its coasts are constituted of grits, strongly developed limestones and crystalline schists of palaeozoic age. Rich jurassic and tertiary fauna was discovered in boulders.

At numerous points of the north and south coast traces of coal were observed in river- and brook-valleys, in postpliocene clays, sandstones and on the surface of the quaternary terrace. In the

South Sulmenev Bay too, fragments of coal were found at the lateral moraine on the low plateau of the east coast. To judge by the evidence obtained, the coal is of no practical value.

On the south shore of the Krestovaya Bay the frozen ground in moraine subclays is lying 80 cm below the surface. Roots of the creeping willow reach as deep as 72 cm, i. e. almost to the above level.

In the valley opposite to the *Pomorskaya Bay* about a kilometer from settlement *Olghino*, a buried glacier and a buried peatbog were discovered. The former presents a perfectly pure rock ice of blue colour, upon which a moraine subclay with 80—85 cm thickness and a humus layer 34—36 cm thick are formed. As to the profile of the peatbog it is interesting to note that to begin with 85—90 cm depth the ground is frozen — it is a frozen finely titrated moraine clay containing remains of fully decomposed plants. That profile could be dug up to the depth of 250 cm, but even at such depth preserved roots of buried plants were found.

In the Sulmenev Bay and south of it rich carboniferous fauna was discovered. Palaeozoic fauna was also found in the *Rogatchev Bay*.

Photographic and cinematographic records of the expedition were also secured.

In 1923 the Institute disposed of no convenient ship. Therefore it pursued but the aim to investigate a comparatively small area between Maly Karmakuly and Matotchkin Shar. The party consisted of 4 explorers only. The party disposed of a small boat provided with sailer gear. As far as Maly Karmakuly the party was brought by a steamer, whence they proceeded in the small boat to the *Nameless (Bezimyannaya) Bay*. The next purpose was a trip to the central part of Novaya Zemlya. After having carried out the topographical survey of the bay and determined the astronomical point at its south shore, the party moved northeastward. Mountain ranges composed of sandstones and clayey schists trend in northwest direction. 8 klm from the mouth of the Bezimyannaya (Nameless) river, fossil fauna, seemingly of the devonian age, was found in clayey schists. 30 klm from the west coast glaciers were seen which received the name of Prof. *Penck*. The trip lasted 8 days. At the terminal moraine of the glacier an astronomical point was determined and the whole track surveyed.

North of Bezimyannaya Bay the relief of Novaya Zemlya becomes more complicated and changes into high ranges in the Matotchkin Shar region. A visit to Gribov Bay enabled the party to establish the occurrence, in that district, namely on the north side of the bay, of buried glaciers. The winding shore line of the Gribov Bay appears to depend upon the diversity of the rocks which constitute the coast and are unequally resistant against the marine erosion. Grits and a thick complex of limestones form here a syncline with axis directed northward. Basic rocks are overlain by quaternary alluvions in which quaternary shells were found 10 m above sea level. On the surface of the same alluvions the occurrence of large slabs of yellowish-grey limestone was established with numerous prints of apparently jurassic plants.

From here the party moved towards Pankov Land, a typical strandflat. Under that name a wide area of the west coast of the southern island of Novaya Zemlya is known, directly adjoining Matotchkin Shar. In the east it is bordered by two mountain ridges trending northeast. The basic rocks of Pankov Land are palaeozoic limestones and clayey schists overlain by quaternary alluvions. The country is crossed by several rivers falling into the Barents Sea. At the largest of the latter, the Gregory (Pankov) river, the coast of Pankov Land gradually begins to rise, reaching 20—30 m above sea level in average. In many places fragments of coal, as well as boulders including jurassic fossils, were found in fluvial alluvium. The topographical survey and the determination of the astronomical point have shown the coast of Pankov Land to be 6 klm farther west than on the maps. On the way to Matotchkin Shar palaeozoic fauna was discovered in limestones at the *Pomorskaya Bay*. The second party with *G. Gorbunov* and *S. Mittelman* of the same expedition worked in the Puchovy Bay, mainly engaged in ornithology and in the biology of *Salmo alpinus*.

The problem of the Institute in 1924 was the investigation of the east coast of the south island of Novaya Zemlya, to which purpose it disposed of a small open boat 28 ft. long, 6 ft. wide, 2 ft. draught, provided with a 5 HP Bolinder motor. The second party continued to work under Prof. *Deryugin* in the *Puchovy Bay*.

The eastern party, which in addition to the head, consisted of an astronomer, a radio-telegraphist and a sailor, left on the 12<sup>th</sup> of August the *Belushya Bay* and sailed through the *Meshdusharsky Strait* towards the south extremity of the bay. The whole area presents an undulating upland, single points of which do not exceed 120 m above sea level. The expedition safely reached the *Kamenka Bay*, once wintering place of the *Pachtussov* expedition. This time too ice was so abundant in the Kara Strait that the party was unable to move for 9 days, surrounded by heavy pack-ice. They had to return to *Nikolsky Shar* which proved to be a wide gulf. The latter was named after *A. Karpinsky*, President of the scientific Board of the Institute. Later on, profiting by a strong west wind, which drove the ice away from the east coast, the party sailed to *Cape Menshikov*, at the time free from ice, and reached the *Kazakov River*. The area in the south island of Novaya Zemlya, adjacent to *Petuchovsky Shar* and stretching farther eastward, shows an abraded surface 5 to 15 m above sea level. In the region of *Petuchovsky Shar* there are rocky hills and abrupt rocks of rectangular shape constituted of limestones and resembling the bastions of a fortress. The next station of the party was in the *Savin Bay*, extremely difficult to make out from the sea. The bay is accessible to but very small ships. The shore bears the character of a lowland, some 20–30 m above sea level, stretching bow-like from one cape to another, the latter two projecting far into the sea 2–3 miles from each other. The shore is constituted of dark grey sandstones. Sailing farther to the *Abrossimov Bay* the party found but one *Yeshov Island* instead of the two, as marked on the map. The *Abrossimov Bay*, where the party anchored, is a wide gulf, though very shallow at its summit on account of alluvions of the large *Abrossimov* river flowing into it from the west. The north side consists of a hard solid variety of grit, light to dark grey in colour. North of *Cape Yershov* the central part of Novaya Zemlya is notably rising, reaching 100–120 m, then lowering towards *Cape Hessen*. North of the latter the surface of Novaya Zemlya becomes more furrowed. Mountain ridges form a range trending northwest. One of the wide bays of the east coast slopes abruptly towards the sea from a height of 50 m above sea level. In that bay, as well as in others, there is plenty of drift-wood, deposited usually on the south shore of each bay. Further northward the party investigated a large bay which was named after Prof. *Knipovitch*, then the *Schubert Bay* was reached. The shores of the latter are composed of dark grey clayey schists, whereas the bay is very rich in sea beast. *Salmo alpinus* dwells there in abundance in the *Savin*, as well as in the *Abrossimov Bays*. The mountains in the *Schubert Bay* reach a height of 200–300 m. The last place of the works of the party was the *Klokov Bay* into which a very powerful river is flowing, making its way through sandstones and quartzites. In general, the rivers of the southern island might be divided into two groups. Rivers of the first group flow directly into the ocean without forming bays; they are of the canyon type. The second group are rivers falling into wide bays. Some of the latter group, as the *Bezimyannaya* and *Abrossimov*, form wide lagunes at the bays.

The *Polar Geophysical Observatory at Matotchkin Shar* was reached on the 13<sup>th</sup> of August. The whole track around the south island of Novaya Zemlya was thus covered in 31 days. The party stationed then at cape *Morshevoy* in *Matotchkin Shar* till the end of September, in order to finish the work of that year. The hydrographic description of the coast was carried out and 5 astronomical points determined, namely in *Petuchovsky Shar*, in the bays *Kamenka*, *Savin*, *Abrossimov* and *Schubert*. In order to determine the astronomical points rhythmic time signals from *Nauen* and *Moscow* were received.

In 1925 the expedition undertook a voyage round Novaya Zemlya having mainly in view the investigation of the east coast of the northern island of Novaya Zemlya. To that purpose a ship

was bought in Norway in spring 1925. The dimensions of the ship named „Elding“, now „Zarnitza“, are as follows: length 64 ft., width 17 ft., draught in full cargo 10 ft., displacement 50 tons brutto. The ship is of particularly solid construction, with full ribs in the forepart and 2-inch oak waling, provided with a naphtha motor „Avance“. Moreover, she is fitted out with sails, being a type of Norwegian cutter. In order to secure rhythmic time signals a  $\frac{1}{4}$  kilowatt wireless plant was established. Fuel was taken as calculated for 5000 miles sailing, victuals for 12 months. The number of participants was 13, among them the head of the party; *G. Gorbunov*, Zoologist; *V. Timonov*, Hydrologist; *M. Yermolayev*, Assistant-Geologist; *N. Malkin*, Astronomer, and crew.

Besides the geological investigations, the party intended to perform biological and hydrological studies in the White and Barents Sea, as well as observations over streams in the Kara Strait.

The Party left Archangel on July 26<sup>th</sup>.

In accordance with the plan proposed by the hydrologist of the expedition a hydrological section of the White Sea Channel was performed which confirmed professor *Deryugin's* supposition of the presence in the Strait of two permanent currents compensating one another, the one flowing from the Ocean into the White Sea along the Tersky Coast, and the other joining its waters with the permanent current flowing along the Zimny Coast to the Intzy and mixing with the surface waters in the southern part of the channel.

A longitudinal section of the channel along the *Tersky Coast* was then made up to Cape Kanin, and further on to the isle Kolguyev.

Bad weather forced the party to sail beyond the north shore of the Belushya Bay and anchor at the *Cape Lillier*. The latter descends towards the sea in steep recesses, reaching at the highest point 50 m above sea level. The coast consists of dark grey limestone interbedded with quartz and calcite. The next station was at the *Gorbovy Islands*. The geological party worked in the Berg island, whereas stream elements were determined during one day's halt 15 miles from the latter. The adjacent islands, *Bolshoy Zayachy* and *Lichutin*, are constituted of hard grey sandstone and conglomerate, whereas limestones present the basic rock with distinctly expressed uppercarboniferous fauna. After having visited the *Archangelskaya Bay*, where a wide rookery was investigated by the zoologist, the expedition sailed to *Pankratyev Peninsula*. However, a short distance from the glacier, beyond the *Gorbovy Islands*, the ship ran against a rock and could not move but 12 hours later, fortunately undamaged. The party soon reached the *Pankratyev Peninsula*. The surface of the latter is a typical moraine scenery — glacial boulders are spread in great number over the abraded surface, reaching sometimes a man's height. In the south portion of the island, a thick complex of limestones was observed, containing abundant upper-carboniferous fauna. The limestones contain smooth plate-shaped inclusions with crystals of pyrite in the centre. From here the expedition sailed to the Cape of Desire. At 25 miles distance the ship met the first ice-field stretching north to northeast. Soon afterwards the north coast of Novaya Zemlya appeared and the ship sailed towards the *Islands of Orange*. They are two, plateau-shaped, with coasts 30 m above sea level.

10 klm inland from the coast of Novaya Zemlya there is a gradually rising plateau stretching northwest as far as the branches of the *Lomonossov Range*. The whole of the northern part of Novaya Zemlya is free from glaciers. The *Cape of Shelanie (Desire)*, constituted of fine- and coarse-grained sandstones of a light grey colour and conglomerates trending west to east with a gentle dip northward, is a typical arctic waste. The rocks are strongly weathered and have rounded outlines. It is worth mentioning that fresh traces of reindeer were seen here.

On August 22<sup>nd</sup> the expedition left the Cape of Desire and sailed along the east coast southward. The Whitney Bay does not reach deep into the coast and is open to any wind, save to the western ones. A well marked sandstone complex carrying fossil prints (*Lepertitia?*) and containing inclusions of coal fragments prevails on that coast which was briefly investigated by the party. An ice shelf was seen all along the coast, and a big polar bear was shot on the ice.

Fairly good weather allowed us to make a hydrological section to the east of Whitney Bay in order to confirm the presence of the warmer tide discovered by *Wiese* in 1921. Our hydrologist was able to establish it in the form of a tongueshaped stream of warm water wedged in at a depth of 15 to 20 m between two water layers with lower temperatures. According to his opinion a lower tension of the intersected current was to be observed, as compared with that of 1921, when no ice was to be found within a distance of 50 miles. We met with a border of floating ice within 16 miles from the shore and were obliged to turn back to Novaya Zemlya.

South of Whitney Bay the huge *Nordeskjöld Glacier* is stretching out for no less than 50 miles. Icebergs and small ice-fields of local origin are continually holding near that glacier. The margin of ice is running 16 miles from the Whitney Bay.

On August 25<sup>th</sup> the *Blagopoluchia (Comfort) Bay* was entered. Basic rocks constituting its coasts are grits, limestones and schists trending northeast. The lower complex consists of sandstones conformably overlain by limestones and clayey schists with quartz veins. The complex is cut through by a rapid mountain stream taking its origin in the inland ice, 10 km from the shore. In the lower part of the river there is a saline lake. To judge by the remains of a moraine, the glacier is retreating. The astronomer of the party determined here an astronomical point.

To the east of Blagopolutchye (Comfort) Strait we established 4 hydrological stations at a distance of 20 miles from the shore. On the 29<sup>th</sup> the party sailed southward along the coast, and in the evening of the same day a gulf not shown on the maps was discovered beyond the Distant cape, and the ship anchored in one of the comfortable bays of the gulf. The northern side of the latter is constituted of clayey schists, bordered in the south by graphitic slates. The coast is 10–12 m high above sea level, gently rising north- and westward and reaching a height of 200–300 m. A relict lake found here is of great interest. The bay was named after *V. Russanov*. A powerful glacier falling into one of the bays of that gulf received the name of *Fridtjof Nansen*.

The coast of the gulf consists of dark grey limestones of considerable thickness.

A bear was shot in each of the bays.

The bay south of the aforesaid was named after a seaman well known in Russia, *Neupokoyev*.

Beyond the southern cape of the *Neupokoyev Bay* another bay, not mapped, was found, remarkable for its four splendidly developed terraces. The prevailing rocks here are limestones and grits.

From the *Sedor Bay* (thus named by the party) the ship sailed southward, to Pachtussov island, with a station in the Bassov (Krashennnikoff) Bay. A characteristic feature for the bays of the east coast are submerged dikes joining the two coasts of the bay at relatively small depth, 20 to 30 fathoms. The coast here is not high, 20 to 30 m above sea level, though summits of 200 to 300 m high are to be seen 5–6 km from the shore. Basic rocks are grits and limestones, the latter with distinctly marked bryozoan bed. Proofs of the upheaval of the coast line, sandbanks and old drift-wood along the ancient flood-line, are everywhere observed. The orographic elements south of Bassov Bay change abruptly. The relief becomes more complicate, plateaus, gradually rising northwards, give way to mountain ranges with sharp-pointed peaks, which in their turn lower south of the Schubert Bay form again a table-shaped plateau gradually changing into lowland towards cape Menshikov.

From the latter place the party proceeded to the Kara Straits in order to carry out hydrographical work.

Our work in the Kara Straits may be summed up as follows: in accordance with the plan worked out by our hydrologist the following observations were made: 1) the elements of the water currents by means of a Merz rotator, at three horizons — 5, 25 and 50, or 5, 35 and 80 metres, every 60 to 70 minutes on each horizon; 2) as far as possible every 2 to 3 hours a bathometric series was taken, at first in detail, and afterwards at the same three horizons; at the same time samples of the water were areometred for immediate guidance; 3) during daylight the velocity of the currents was establi-

shed by means of Mitchell floats immersed at a depth of 6 ft.; 4) from 2 to 4 times in every 24 hours at different moments of the phases of the currents a vertical plankton capture through each layer was carried out.

Good weather enabled us to make a cross section through the Kara Straits beginning from Loginov island near Novaya Zemlya and up to Tchirachy Island on the northern coast of Vaigatch. At this point 3 complete 26 hours' stations were made — one in the middle and two nearer to the shore.

As an illustration of the results of our works I shall here cite in full the preliminary communication of *V. Timonov*, the hydrologist of the expedition:

The ebb and flow shifts of the currents have been established in general at all depths of all the stations. In all places they are of a rotatory nature not distinguished by great regularity, especially at the northern station on the Novaya Zemlya coast. The velocity of the observed currents is not great, at most  $1\frac{1}{2}$  knots, that of the currents in the middle and at the Vaigatch Coast seem to be greater than those of Novaya Zemlya. A proof of no great velocity is also the maintenance of the same temperature stratification, so characteristic a feature of straits considerably levelled in comparison with slowly moving waters, yet it is far from reaching the *homothermness* and *homohalinness* which is produced for example in the channel of the White Sea with 4 and 5 knot currents. Fluctuations of the specific gravity and temperature during the flow phase are to be noticed and frequently within considerable limits, but their connection with the shiftings of the directions of the currents is as yet not quite clear, also their very nature is not very regular. The distribution of the specific gravity throughout the cross section of the strait undoubtedly points to the lesser saltness of the upper layers from Novaya Zemlya to Vaigatch; this must be owing to the influx of the adjacent waters of the Barents Sea, already diluted by the fresh waters of the Petchora. In the deeper layers the saltness is much more uniform.

It is impossible to arrive at any conclusions regarding the direction of the permanent currents in the Kara Straits before the collected material has been thoroughly studied; but it is interesting to remark that at the northern station during 24 hours the current showed an almost uninterrupted general direction *into* the Kara Sea, that is to say, a contrary one to the hitherto accepted view that the permanent current flows along the Novaya Zemlya coast *out* of the Kara Sea.

Thus the ring round Novaya Zemlya was closed; it covered over 3000 miles. On the 27<sup>th</sup> of September the ship was back at Murmansk.

The programme of the works of the Institute's Expedition for the Exploration of the North in 1927 contained hydrological studies, geological explorations, zoological work and topographical surveys. The range of the works covered not only Novaya Zemlya and the North Arctic Sea, but the mountain ridges of North Timan and the Kara Straits as well.

The expedition party was composed of 16 members: The author of the article, as chief, *G. B. Gorbunov*, Deputy-Chief of the Expedition and zoologist; *V. V. Timonov*, Hydrologist; *P. V. Ushakov*, Hydrobiologist; *A. F. Larionov*, Hydrochemist; *M. M. Ermolayev*, Geodesist and Assistant Geologist; *E. S. Hefter*, Physician; *N. N. Hacken*, Captain of the ship; *P. A. Palissadov*, Pilot — and a crew of 7 men.

The victuals taken, such as sugar, flour, butter and oil, were calculated to last ten months. Fuel was provided for a voyage of 4000 miles.

For the coasting party we had a motor-boat, 18 ft. long, 6 ft. wide, with a 5 HP motor engine.

As the geological party had to work first of all on the *North Timan Coast*, the route of the expedition was divided into two parts. The first was to bring the party to the eastern coast of Tchesskaya Bay, to the mouth of the *Indiga*, and the second to move on afterwards to Novaya Zemlya.

On July 17<sup>th</sup> we left *Archangel* under favourable weather and reached *Tchesskaya Bay* on the 21<sup>st</sup>.

The task of the geological party at North Timan was the study of the geological structure of the Svetlaya River region in connection with old rumours that coal was to be found there. They were also to carry out supplementary geological explorations at Cape Roumianitchny, where in 1926 *M. Ermolaiev* had discovered interesting alkaline rock species.

While these works were being carried out on the coast, the „Zarnitza“ was working in the *Kara Straits* and *Tehornaya Bay*.

August 14<sup>th</sup> the ship reached *Tchesskaya Bay*, where the coasting party boarded it August 16<sup>th</sup>. Furthermore there was geological research to be carried out in the north-western part of Novaya Zemlya and bihydrological works between Novaya Zemlya and *Franz Joseph Land* in accordance with the Russian-German agreement.

The expedition called on the Polar Geophysical Observatory at Matotchkin Shar for provisions and fuel and then moved on to the north-western part of Novaya Zemlya.

The ship cast anchor at the western extremity of *Barents Islands*. The two Barents Islands are divided from the north western coast of Novaya Zemlya by a small strait about 2 miles wide. The basic rocks of this coast are steeply falling limestones, alternating with compact fine-grained sandstone. Organic remains found here, corals, brachiopodes and paleoflora also give indications of the carboniferous age of these layers.

August 30<sup>th</sup>, taking advantage of the fair weather, I sailed for the *Russian Harbour (Russkaya Gavan)* on our motor boat, arriving there after a sail of six hours. The coast between the *Barents Islands* and *Cape Nassau* is a rather high line of rocks with a steep dip into the sea. Beyond it are seen ridges of mountains attaining a height of about 2000 to 3000 feet. Cape Nassau has a flatly sloping coast beyond which is a considerable gulf, apparently a convenient place for anchoring. *Cape Loushkin* shown on Sedov's map<sup>1)</sup> is in reality a small rocky island with a small gulf beyond it. The coast between Cape Loushkin and *Russkaya Gavan* is quite inaccessible.

*Russkaya Gavan* is a broad bay entering deeply into the coast of Novaya Zemlya. A geological study of the north-eastern part of the bay showed that this region is worthy of attention. A well-represented fauna gives indications of the age of the rocks forming it. The *Shokalsky Glacier* intersects some older layers consisting of green and greyish-lilac coloured limestones. These are followed by younger formations of upper-devonian and carbonic limestones, intersected by quartzites.

Similar layers are to be seen on the western coast of the bay, specially characterised by silicious limestones.

An old bent wooden cross was discovered on the island near the southeastern coast of the bay, with a scarcely legible inscription witnessing that this place had been visited in 1843 by Russian fishers.

September 2<sup>nd</sup> we had bad weather and all was covered with a two-inch coating of snow. September 4<sup>th</sup> the weather was finer with a temperature of + 5° C. This enabled us to complete the geological explorations on Barents island and on the coast of Novaya Zemlya.

September 8<sup>th</sup> we saw on the horizon at the entrance to Barents Strait our ship anchoring there peacefully.

During the time of our sojourn on Barents Isles and *Russkaya Gavan* the other members of the expedition completed successfully a hydrological section from the Barents Isles to Cape Barents on *Franz Joseph Land*.

September 9<sup>th</sup> and 10<sup>th</sup> we continued our work on Barents Islands. September 13<sup>th</sup> we reached *Cape Medvejiy* and *Inostranzeff Bay* and on the same day in the evening we sailed for *Melkaya Bay*, reaching it on the 16<sup>th</sup>. Here we studied the geological construction of the southern coast of the bay.

The whole region of *Melkaya Bay* consists of limestones. The limestones from light to dark grey contain brachiopod fauna (*Spiriferidae* and *Productidae*) from middle to upper carbonic age.

<sup>1)</sup> *L. Breitfuß: Notes on hydrography (Sapiski po gidrografii I (XLII), Petrograd 1918 (russ.).*

From there we sailed on to the Pomorskaya Bay, where we stopped to receive our mail and revictualise. We left it on September 17<sup>th</sup> arriving September 22<sup>nd</sup> at the *Portchnikha Bay*, on the Murman coast, where we cast anchor opposite to the Scientific-Station of the Institute in Portchnikha Bay.

In summing up the works of the expedition 1927 it is necessary to point out the following results obtained.

*In geological respects* an immense region in North Timan was explored. The alkaline rock formations at Cape Roumianitchny were thoroughly studied and the unfoundedness of the supposition regarding the presence of coal in these regions was completely established, thus effectually putting an end to all talk on the subject on the part of local organisations. Furthermore, as seen from the report, the explorations were transferred to the hardly accessible north-western part of Novaya Zemlya. Most interesting in scientific respects are the rocks of carboniferous formation which cast a new light on the geological structure of Novaya Zemlya. The so-called Russian Harbour and Inostranzev Gulf were explored where no geologist has ever been before. We have brought home extensive geological and paleontological collections containing up to 1000 samples.

According to the report of the hydrologist of the expedition V. Timonov the hydrological works have given most interesting material which for the first time has established an idea of the ebb and flow currents in the Kara Straits, so very important in navigation respects. The juxtaposition of the observations concerning the currents, and the hydrological and temperature material obtained, promises to give concrete indications as to the distribution of the *permanent currents*, which in a great degree influence the climatic conditions and particularly the ice conditions of this region. This will be of primary importance for the success of navigation to the mouths of rivers Ob and Enissei.

The complete dependence of the Kara Strait regime upon the hydrological conditions of the adjacent seas induced us, naturally, to explore simultaneously as much as possible the nearest open parts of the Petchora and Kara Seas.

This we managed to achieve. The section we made between Cape Russky Zavorot (near the mouth of the Petchora) and Cape Tchorny on the southern coast of Novaya Zemlya consisted of 9 stations.

*The works in the region between Novaya Zemlya and Franz Joseph Land* entrusted to the Institute of the North, as part of the united Russian-German explorations of the Barents Sea, demanded special attention on the part of the expedition.

Their object was to supplement the united explorations, embracing the whole of Barents Sea, by hydrological observations and plankton collections in the most difficult of access north-eastern parts of the sea, immediately bordering the Great Polar Basin.

The exceptionally favourable ice conditions of the year permitted the expedition to intersect by means of a detailed section the entire region lying between Novaya Zemlya (Barents Islands) and Franz Joseph Land (Cape Barents), by means of 12 stations.

A counter section undertaken, as proposed, slightly to the south-west of the first one, consisted of 7 stations.

As to the subject of the observations the expedition endeavoured as far as possible to carry out all the measurements and analyses foreseen by the German programme. Thus it was possible to establish observations of the temperatures, definitions on the concentration of hydrogen ions (p H), analysis of oxygen contents, and to take samples for ulterior analyses of the general saltness and alkaline reserve.

The collected material is naturally of exclusive value, on the one hand, on account of the scarcity of explorations of the region, and on the other on account of the simultaneity of the observations carried out by the expedition together with the greatly developed action on the part of the remaining members of the united Russian-German explorations.

Lastly according to the report of the hydrologist:

The third group of hydrological works consisted of research work at Tchornaya Bay (southern part of Novaya Zemlya). These researches were carried out by request of the State Hydrological Institute. An expedition detailed by the latter in 1925 discovered lakes which by their hydrological regime are literally „wonders of nature“. Sufficient to say, that owing to quite exceptional conditions calling forth an accumulation of the sun's warmth at the bottom of these lakes, the temperature of their lower layers attains + 21° and more. This in connection with the cold climate cannot but appear paradoxical. No less singular is the chemical regime of these lakes which has demanded repeated observations successfully carried out by the expedition. The collected material will evidently fully confirm and even probably supplement all the data obtained by former explorations of these wonderful lakes.

The collected hydrological material is shown on the following table drawn up by the hydrologist of the expedition in 1927.

	On sections N. Zemlya — Fr. Jos. Land	On the Pet- chora section	Kara Channel	Tchornaya Bay	Coast region	TOTAL
Hydrological stations . . . . .	19	9	7 <sup>1)</sup>	5	5	48
Lake observations . . . . .	—	—	—	4	—	4
Oxygen analyses . . . . .	92	55	4	38	4	193
Concentrations of hydr. Ions defined	111	54	—	39	3	207
Temperature measurements . . . . .	168	55	221	67	24	535
Aerometric definitions . . . . .	—	—	92	—	—	92
Samples taken:						
Chlorine . . . . .	170	55	221	54	24	524
Alkaline reserve . . . . .	170	55	221	40	6	492
Complete analysis . . . . .	—	—	—	4	—	4

<sup>1)</sup> whereof 3 in 24 hrs.

The zoological works in 1927 were a continuation of the works of the Novaya Zemlya expeditions in 1923, 1924 and 1925. According to the report of the zoologist of the expedition G. Gorbunov a daily, and when the ship was moving an hourly, record of all vertebrates met was held, as well as biological observations of the same (nesting, moulting, migration etc.). By inquiries among the fishers the expedition was enabled to establish a record of the conditions of the fishing industry, of dangerous methods of fishing, conditions for the sale of products. As usual, all information was carefully compared and collated, thus permitting to establish the veracity of such or other facts communicated by separate individuals.

Thus the object of the zoological research works was not only the solution of purely scientific zoogeographic problems, but also of no less important purely practical ones.

All these observations thus produced very interesting results which have greatly added to the material already at the disposal of the Institute.

In purely scientific respects the greatest interest was awakened by the discovery on Novaya Zemlya of a new species of bird, a genus of barnacle-goose, which has hitherto only hypothetically been considered as belonging to the fauna of Novaya Zemlya, the collection of considerable information on grey geese, which will allow to unravel the muddle in the systematization of these birds, and a whole number of other biological observations.

As to the industrial side much valuable information was obtained from the fishers regarding the movements and resting places of the walrus, the use of strychnine as a means of capture of arctic foxes, the state of the eider-down industry and lastly the participation of foreigners in the trade and hunting of Novaya Zemlya.

Limnological works, being a continuation of three years' explorations of Novaya Zemlya, have not only enabled the expedition to add to the latter by collections of an earlier period but they have

also enlarged their range in the two most interesting directions, namely: towards the south (Tchornaya Bay) and towards the north (*Barents Island, Inostranzev Bay*). These collections partly fill up the gap existing between island *Vaigatch* and *Belushya Bay*, and *Pankratyev* peninsular and *Cape Shelanye*. The collections on island Barents are interesting also in so far as the nature of *Barents Islands* reminds one of Whitney Bay. About 50 samples were collected by the expedition.

Besides all this along with the hydrological works serial captures of the plankton were carried out by means of a quantity plankton net with gauze No. 25, and at the same time wherever possible a quality plankton net No. 20. Moreover, at the daily stations in the Kara Straits, as well as on the sections at Novaya Zemlya and Franz Joseph Land vertical and sometimes also horizontal samples were taken by means of the Kori net, with a miller's sieve inserted into the summit of the cone. In all 250 samples of both kinds were taken.

According to the report of *P. Ushakov* in *hydro-biological respects* along the sections Russky Zavorot-Tchornaya Bay 7 trawling stations were taken at a depth of 18 to 200 m. On this section a well-expressed gradual change of biocenoses is seen, beginning with sandy coastal groupings and ending with a rich grouping of deep-water slime. The cross section was continued directly into *Tchornaya Bay*, where three more hydrological and trawling stations were taken.

Five trawling stations were taken on the section to Franz Joseph Land, chiefly on banks. A very rich and variegated fauna was found at all these stations.

At Matotchkin Shar places were explored which have never been touched hitherto, owing to their great depth, namely: the hole opposite Tretiakov Glacier, the region slightly to the east of it, and the 200 m depth opposite the radio-station.

On the northern island of Novaya Zemlya the bays *Melkaya, Arehangel'skaya*, the *Gorbev islands, Barents Islands* and *Inostranzev Bay* were partly explored. In all these places the littoral zone was carefully studied and series of dredgings and trawlings were carried out in the upper levels and down to depths of 50—90 m.

On the southern island a station was taken in the *Loginov Bay*, and for comparison with *Vaigatch* a dredging was taken at island *Tchirachyev*. All the dredging and trawling works near the coasts were as far as possible accompanied by hydrological stations.

Over and above this *topographical* surveys were carried out by *M. Jermolayev* on the north-western coast of Novaya Zemlya and a marine survey at island Barents and in the Russian Harbour. For the first time the maps will show a correct sketch of this coast, and the discovery of two splendid anchoring places at island Barents and *Russkaya Gavan* will lead to the realisation of the proposed construction of a radio station at *Cape Shelanie (Desire)* of Novaya Zemlya as well as in general facilitate navigation along these coasts.

The author of this preliminary report took part in all the above expeditions as their leader.

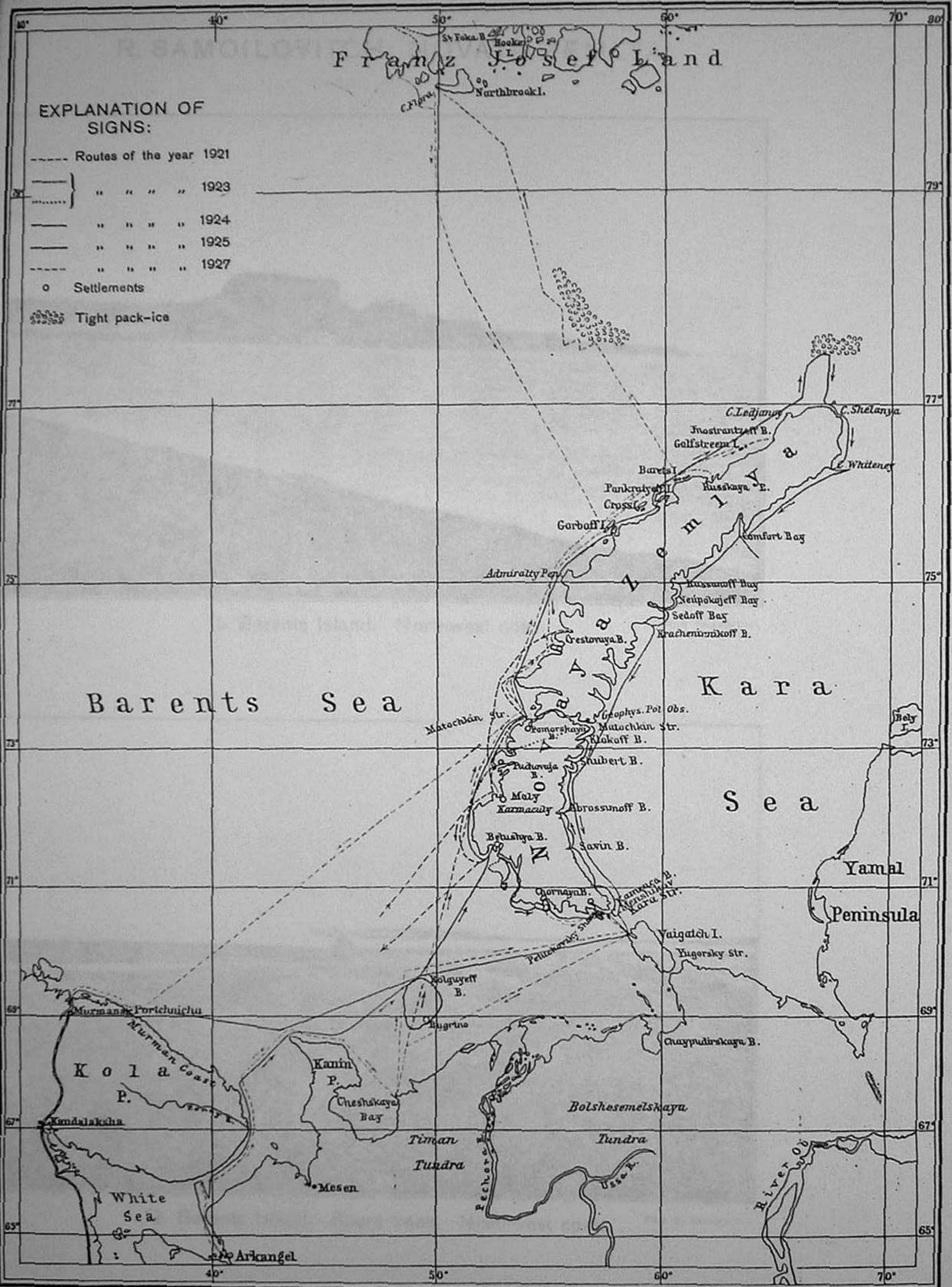
# MAP OF THE BARENTS SEA AND NOVAYA ZEMLYA

constructed from the measurements of the Expeditions of the Institute for the Exploration of the North

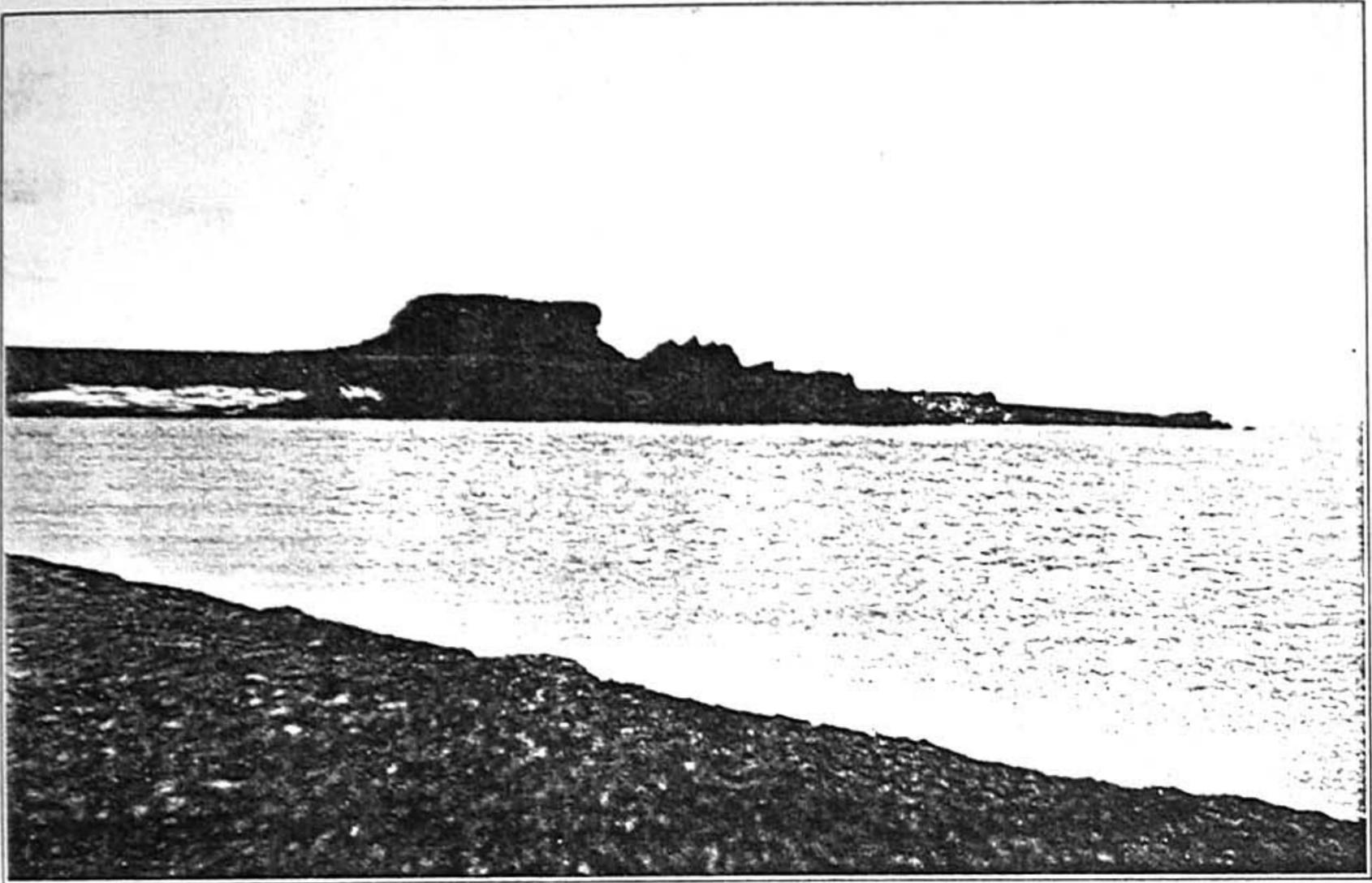
With the routes of the Expedition by R. L. SAMOILOVITCH

ARKTIS 1928

TAFEL 1



R. SAMOILOVITCH: NOVAYA ZEMLYA



1. Barents Island. Northwest coast

Phot. R. Samoilovitch



2. Barents Island. Shore lines. Northwest coast

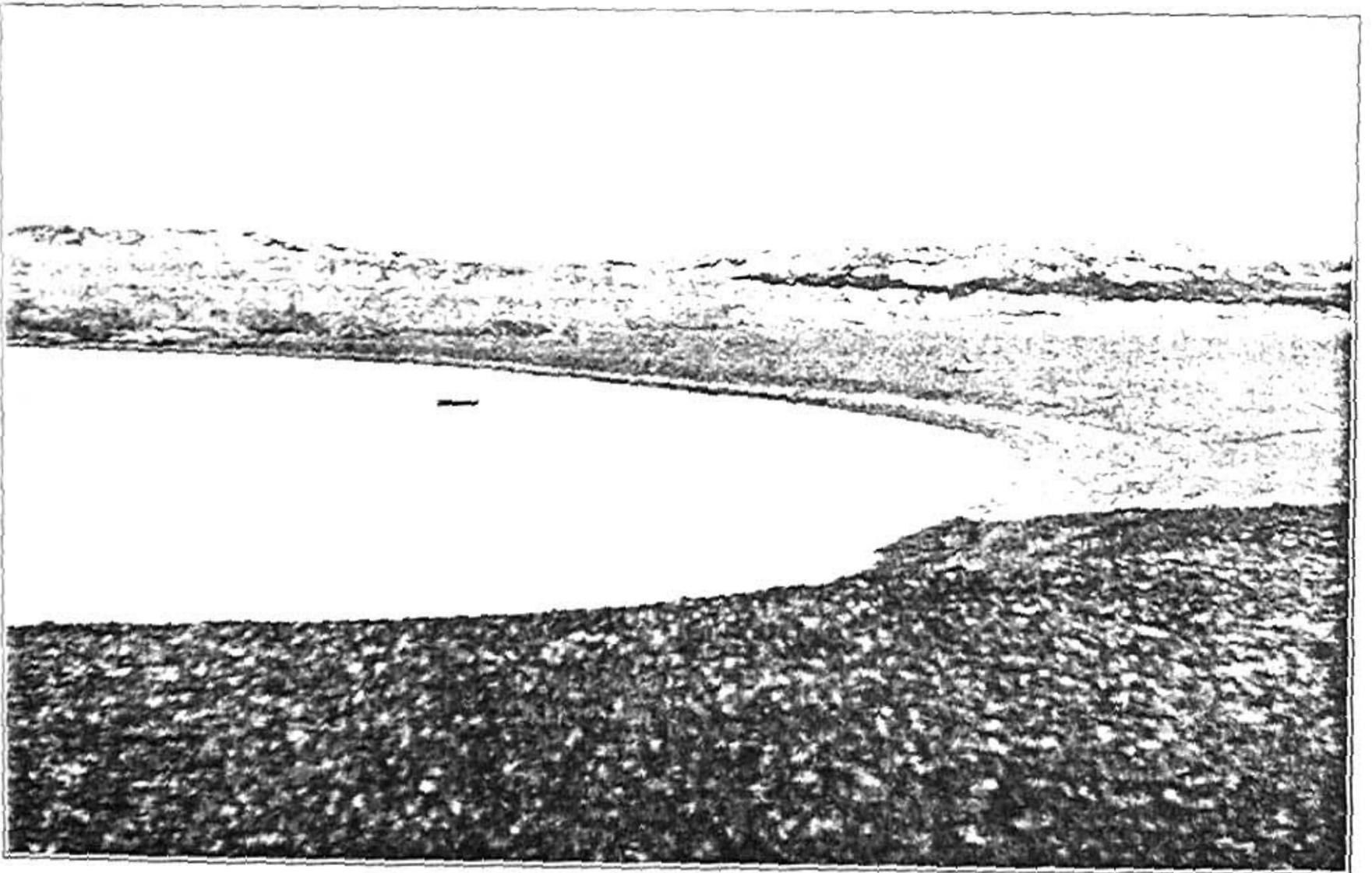
Phot. R. Samoilovitch

R. SAMOILOVITCH: NOVAYA ZEMLYA



3. Inostrantzeff Bay. Northwest coast

Phot. R. Samoilovitch



4. Russky (Russian) Bay. Northwest coast

Phot. R. Samoilovitch