



V. A. Obruchev, 1863-1956

Soviet Geologist, Geographer, Traveller, and Pioneer in Permafrost Research
(see p. 285)

Commentary

THE ARCTIC AND ANTARCTIC SCIENTIFIC RESEARCH INSTITUTE, LENINGRAD

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The institute is housed in a palace formerly belonging to the wealthy Count Sheremetev and situated on the embankment of one of Leningrad's canals. The building is classed as an architectural monument and work is in progress to restore the exterior to its original condition. Inside there appears to have been little conversion and the ornate ceilings and staircases, although faded and begrimed, retain some of their former glory.

I visited the institute in February 1963 and was warmly received by the Director, Professor A. F. Threshnikov who, with some of the senior staff, explained the organization and functions of the institute.

Organization and functions

The institute is under the direction of the Northern Sea Route Board (GUSMP), which is itself part of the ministry of the Marine Fleet of the U.S.S.R. The institute undertakes: the scientific planning of polar expeditions; the processing of scientific data received from polar stations; basic research on ice; research on weather and ice forecasting (the institute administers the Weather Bureaux situated at various points along the coast of northern Siberia such as at Amderma and also the Arctic Scientific Research Observatories such as those at Dikson, Pevek, and Tiksi); and the preparation of polar maps and atlases.

The various departments of the institute are as follows: Geophysics; Geography (with sections on History and Geomorphology); Ice Research; Computing Laboratory (with Technical and Programming Sections); Meteorology and Weather Forecasting (with a section on Climatology); Oceanography, Ice Forecasting and River Mouths; Library; and Archives.

The ice-research laboratory is particularly interesting. It consists of a number of "cold rooms" where ice is formed at various temperatures down to about -60°C . Experiments are then conducted to measure the breaking strength of ice blocks and the relative advantages of methods of sawing and cutting ice. This research has direct practical applications such as the building of roads across ice and the design of icebreakers.

The computing laboratory has a technical and engineering section with the task of maintaining and perfecting the computing equipment and a programming section headed by a mathematician, K. E. Chernin. The vast mass of data collected by polar expeditions and automatic polar stations is

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processed on a Ural-2 electronic computer installed in 1960 and used 14 hours a day. The computer is also used for the analysis of hydro-meteorological problems unconnected with polar research.

The library and reading room are situated in rather dark cramped conditions on the ground floor of the main building. The library contains about 100,000 volumes including some interesting old books on polar exploration. Dr. V. M. Pasetskii showed me English books entitled "Coxe's Russian Discoveries" (1803) and "Captain Vancouver's Voyage of Discovery" (1798). Other books on exploration date back to 1705.

Mme. Byzova, in charge of the library, told me that all relevant English journals were taken. Some, like *Nature*, were in the original English form, others, like *Shipbuilding*, were distributed to the library in translated form. The institute itself issues three journals: *Transactions of the Institute* (irregularly), *Problems of the Arctic and Antarctic* (four times a year) and *Information Bulletins of Soviet Expeditions* (7 to 8 times a year).

Museum

The Arctic and Antarctic Museum, founded in 1937, is housed in a former church some distance from the institute by whom it is administered. The present director of the museum is I. K. Yakimovich. The exhibits are well displayed in a not very convenient building and cover all periods, from the early attempts by Siberian fishermen to explore the Northern Sea Route to the use of the atomic icebreaker *Lenin* and the setting up of automatic weather stations. All aspects of polar exploration are shown and flora and fauna are well represented.

Arctic and antarctic expeditions

The Director stated that the division of research effort was roughly 70 per cent for the Arctic and 30 per cent for the Antarctic. There are good reasons for this. At present research in the Antarctic, although important, is of a purely scientific nature. On the other hand, arctic research is of considerable economic and strategic importance to the Soviet Union: the Northern Sea Route is increasingly used during the summer months; possibilities are being investigated of developing North Siberia agriculturally and industrially; extensive mineral deposits are to be found in the Soviet Arctic; and arctic weather stations provide important meteorological data. The Arctic has also the advantage of being much nearer and expeditions can be mounted from Soviet bases without the need for a preliminary long sea voyage. Aircraft on skis (of type AN-2) and helicopters (MI-4) were particularly useful and these means of transport are being rapidly developed to transport personnel and freight to and within the polar regions.

Arctic research

During the last 25 years Soviet research efforts in the Arctic have been based on scientific stations established on the drifting ice. The first of these, SP-1 (or North Pole-1), was set up in May 1937, and the four members were withdrawn in February 1938. Further expeditions have been mounted

since 1950, the latest being SP-11, which was set up in April 1962. Some of the drifting stations are maintained for one year only, others for 3 to 4 years, and in these the members are relieved after 12 months. The average number of people in a drifting station is 20, consisting of 12 to 15 scientists (including a doctor), wireless operators, a cook, and a mechanic. In addition the stations are used as bases for further short-term expeditions from universities, the Academy of Sciences, and other institutes studying a variety of scientific problems. More than 400 persons have now had long-term experience in the drifting stations and a further 200 have been associated with them for shorter periods.

Scientific investigations are principally concerned with meteorology, oceanography, geophysics, geology, ice, hydrology, microbiology, and hydrochemistry. The use of automatic scientific apparatus has greatly extended the scope of polar research. Echo-sounding apparatus is extensively used for determining depths.

The dangers resulting from the ice breaking up, it being compressed or "hummocked" have forced drifting stations to shift the site of their camp either partly or totally no less than 57 times. Only once, however, (SP-9, March 1961) has it been necessary to evacuate a station completely.

A comprehensive survey of the scientific achievements of Soviet drifting stations from 1937 to 1962 has been published in *Problemy Arktiki i Antarktiki*, No. 11. This paper also includes an extensive list of Soviet literature on the subject during the last 25 years.

Antarctic research

In 1956 Dr. Somov led the first Soviet Antarctic Expedition, which set up the principal centre of Soviet research activity in the Antarctic — Mirnii Observatory ($66^{\circ}33'S$. $93^{\circ}01'E$). Two other stations were established in that year, and subsequent Soviet expeditions have constructed and equipped about a dozen stations in all. All these expeditions have been split into a continental group based on land stations and a maritime group working in ships equipped with special laboratories.

A wide range of scientific research has been carried out. Emphasis has been placed on Geophysics, Geology, Meteorology and Synoptics, Aerology, Actinometry, Glaciology, Geography and Mapping, Geomagnetism, Hydrology, and Oceanography. Work has also been undertaken in Ionospheric Physics, Seismology, Aurora, Earth Currents, Cosmic Rays, Gravimetry, Medicine, and Biology. Aerial photography has been of great assistance with regard to mapping.

The second Antarctic Expedition in 1957 was for the most part engaged in work associated with the International Geophysical Year. Several over-land trecks were organized then and subsequently.

In 1960 radio communication was established between the Mirnii Observatory and artificial earth satellites.

A full account of Soviet antarctic research in the period from 1956 to 1960, covering the first five expeditions is given in the Information Bulletin

of the Soviet Antarctic Expedition No. 34 (1962), published by the Arctic and Antarctic Institute.

Staff

Many members of the staff at the institute have first-hand knowledge of polar conditions and senior members are often chosen as leaders of Soviet polar expeditions. The Director, Professor Treshnikov, led the third arctic drift station expedition, SP-3, in 1954 and the Second Antarctic Expedition in 1957, which set up three new stations (Vostok-1, Vostok, and Komso-molskaya) in the interior of the antarctic continent. Apart from various scientific papers he has written two books, "On the New Siberian Islands" and "Chained to the ice", describing the difficulties and dangers that face all polar explorers and including an account of an incident when the vehicle in which he was travelling fell into a crevasse. He visited Liverpool and Cambridge in 1956 and has now been Director for nearly 3 years.

Dr. Somov is Deputy Director of the institute with special responsibility for Antarctica. He led the First Antarctic Expedition in 1956 and was head of another antarctic expedition, which returned to the U.S.S.R. in the spring of 1963.

The Fifth Antarctic Expedition in 1960 was led by Professor Korotkevich who is now back at the institute and in charge of a team producing a comprehensive atlas of Antarctica. When complete it will include no fewer than 1,500 maps showing land relief, ice formations, meteorological and atmospheric conditions, the geology, oceanography, and history of the area. Expeditions of many nationalities are helping to provide information for this immense project.

My guide, Mme. Inyutkina, has been given the task of keeping track of Commonwealth and American developments in the field of polar expeditions. Before this she spent about 10 years in the library and is well acquainted with English and American publications in this field.

Everyone I met recalled with much pleasure the visit of Drs. T. E. Armstrong and B. B. Roberts to the institute some years ago. There was strong desire that the spirit of co-operation that exists between expeditions of different nationalities in the polar regions should be extended to cover as far as possible all polar research. Apart from broadening further the exchange of information, which already takes place, an exchange of polar scientists could produce much of mutual interest and benefit.

In addition to those mentioned above the following are members of the staff of the institute: M. E. Ostrekin, Deputy Director; L. L. Balakshin, Head of the Department of Oceanography, Ice Forecasting, and River Mouths; Dr. V. M. Pasetskii, Permanent Historical Scientific Secretary. The addresses are as follows: Arctic and Antarctic Scientific Research Institute, Fontanka 34, Leningrad D-104; Arctic and Antarctic Museum, Ul. Marata 24-a, Leningrad; Northern Sea Route Board (GUSMP), Ul. Razina 9, Moscow.