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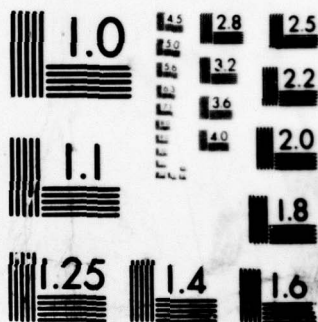
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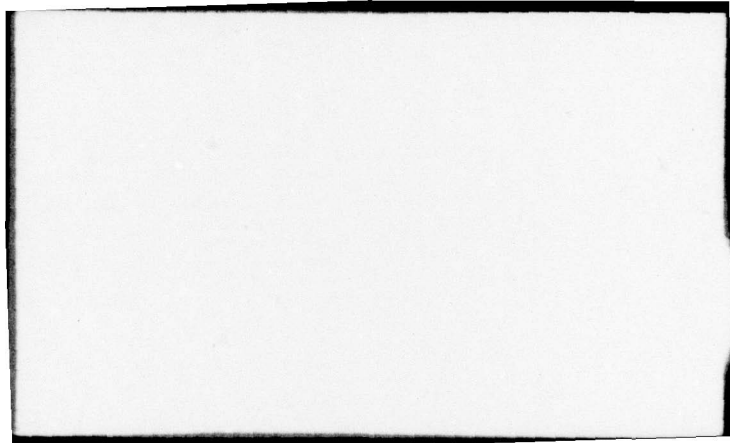
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6 Report on the Oceanographic Program at Pt. Barrow, Alaska February - March 1949

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# REPORT ON THE OCEANOGRAPHIC PROGRAM AT PT. BARROW, ALASKA

February - March 1949

William G. Metcalf and John F. Holmes

## Introduction

Throughout the summer and fall of 1948, the Hydrographic Office, in conjunction with the Woods Hole Oceanographic Institution, Scripps Institution of Oceanography and the Naval Electronics Laboratory discussed proposals for providing support for an oceanographic group at the Arctic Research Laboratory at Point Barrow, Alaska. In the fall of 1948, it was decided to carry out a year around program at Pt. Barrow and at the same time train as many oceanographers in arctic work as possible by means of a two or three months' rotational system for personnel.

Consequently, <sup>↓</sup> near the end of January 1949, William G. Metcalf and John F. Holmes of Woods Hole departed for a two months' stay in Alaska, at the end of which they were relieved by a team of oceanographers from N.E.L. This first pair of oceanographers at Pt. Barrow considered their main job to be three fold: a) to investigate the facilities for carrying out oceanographic research at and from Pt. Barrow with a view towards establishing a long range program, b) to test

standard oceanographic equipment and suggest modifications for more efficient arctic work, and c) to carry out such oceanographic studies, especially of sea ice, that might be possible.

### Point Barrow

Upon arriving at the Arctic Research Laboratory on 6 February 1949, the oceanographers were impressed with the excellent facilities of the laboratory. The laboratory itself was large and well equipped, the housing facilities were good, and the station at Pt. Barrow was pleasant and comfortable. Because of the local ice conditions, however, it was impossible for the oceanographic party to travel out over the ice for more than about a mile and a half. A mile off shore in approximately fifty feet of water, a pressure ridge had formed where the arctic pack met and overrode the shorefast ice. On the inshore side of this ridge the ice was stable and comparatively smooth making an excellent platform for testing oceanographic equipment and techniques. Due to the shallowness of the water, very little knowledge of the oceanography of the arctic basin itself could be obtained.

A narrow platform adhered to the offshore side of the pressure ridge. The width of this platform varied from day to day and was rarely more than a half-mile wide. At the offshore edge of this platform, a "flaw" in the ice marked the

edge of the shorefast ice. At times a lead anywhere from a few yards to several miles in width was found. At other times the arctic pack crowded in very close to the shorefast ice and moved along the coast, usually in a north-easterly direction. At these times, no water would show between the pack and the shore ice. At still other times, the arctic pack was motionless and frozen to the shorefast ice allowing one to travel offshore for a considerable distance.

Because of the great variety of conditions and the speed with which they changed, the Navy Commanding Officer of the region found it advisable to prohibit any extensive travel over the ice from Pt. Barrow. No military aircraft were available to the oceanographers, and the local bush pilots in their single-engined planes were unwilling to fly out over the ice even for reconnaissance purposes. Hence, the oceanographers were limited to the first mile or mile and a half from shore for conducting their tests.

#### Testing Equipment

Using the shorefast ice for a working platform, the oceanographers were able to test in less than fifty feet of water the equipment they had brought with them. Generally it was found that the standard oceanographic instruments could be used in the cold weather encountered. The tests were, for the most part, carried out at temperatures ranging from  $-10^{\circ}$  to  $-35^{\circ}$

Fahrenheit. Holes were dug in the ice with chisels and blown with such explosives as were borrowed from the station; Nansen bottles, bathythermographs, bottom samplers, current meters and other oceanographic equipment were tested; and large blocks of ice were cut out and hauled back to the laboratory for study.

In this latter work, Metcalf and Holmes joined William Dichtel and George Lundquist of the Naval Ordnance Laboratory who were already at Pt. Barrow upon the oceanographers' arrival and engaged in various ice studies. The oceanographers assisted these two men in their program, the results of which will be shown in a report prepared by the Naval Ordnance Laboratory.

For transportation on the inshore ice, tracked vehicles were available. It had originally been hoped that either dog sledges or mechanized transportation could be used to get the oceanographers out onto the arctic pack and over deep water. For the reasons previously mentioned, this proved to be impossible. As a result, the oceanographers turned their attention to trying to establish a program using fairly large aircraft to transport a scientific party and their equipment out onto the pack some distance from the shore for their studies. The proposal is receiving attention from both the Navy and the Air Force at this time, and it is hoped that during the 1949-50 winter season some sort of "airlift oceanographic program" can get underway.

In the meantime, various reports, letters and memoranda have been submitted to the Division of Oceanography, Hydrographic Office, describing in detail the particular tests performed along with recommendations for a future oceanographic program.

While the oceanographers were at Pt. Barrow, tests were carried out on units of an "ice mechanics kit" developed for the Hydrographic Office by the Frost Effects Laboratory, Corps of Engineers, U. S. Army. The whole kit was not completed when Metcalf and Holmes were at Pt. Barrow, but those items which were finished were tested. Reports on these tests were sent to the Frost Effects Laboratory and the Hydrographic Office.

#### Polar Flight

During the course of their stay in Alaska, Holmes and Metcalf were able to participate in one of the trans-polar "Ptarmigan" weather observation flights carried out by the 375th Reconnaissance Squadron (VLR) Weather of the U. S. Air Force. On this flight, the oceanographers were able to get an excellent view of the conditions of the arctic pack. The flight was of very great value in that it gave the oceanographers experience on which to base their study of the possibilities of carrying out an oceanographic program from the ice in the Arctic Ocean. A report on the flight including recommendations on the subject of ice observing has been submitted to the Hydrographic Office.

### Recommendations

Although most standard oceanographic equipment can be used in the arctic, much of it operates with such reduced efficiency under the adverse conditions that specially designed instruments emphasizing smallness, lightness in weight and simplicity of operation are highly desirable. The problem of portability of the equipment must be solved and the successful design of suitable power winches must be achieved.

The Navy and Air Force should study ways and means of setting up and supporting a program involving large airplanes suitable for carrying several tons of equipment and personnel which can land on the ice and serve as a heated laboratory and living space for the party while it is on the ice.

It is believed that arctic oceanography can be performed under conditions of reasonable comfort and safety. However, the present facilities are not adequate for any extensive program to be carried out far from shore in the arctic basin. The airplane, in the opinion of the writers, offers the only practical solution at the present time to the transportation problem. Such a program would be an expensive undertaking requiring many personnel and much equipment. Obviously such a program could not be carried out without strong support from the Navy and/or the Air Force.

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