

THE HISTORY OF THE ARCTIC RESEARCH LABORATORY

(UNDER CONTRACT WITH OFFICE OF NAVAL RESEARCH)

POINT BARROW, ALASKA

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THE Arctic Research Laboratory under contract with Office of Naval Research, Point Barrow, Alaska, is a frontier field establishment for basic scientific investigations of physical and biological phenomena related to the arctic environment (1) (2).

The story of the Arctic Research Laboratory (ARL), opens on August 13, 1946 when Vice-Admiral Harold G. Bowen, USN (Ret), Chief, Naval Research, addressed a letter to all bureaus and offices in the U.S. Navy Department. In this letter he invited comment regarding the proposed establishment of a research laboratory in the arctic, at Point Barrow, Alaska, where civilian scientists from Universities, research institutions and government departments could conduct basic studies on arctic problems. Enthusiastic support for the proposal was expressed in all the replies received.

In conformity with the usual policy of the Office of Naval Research the advice of scientists and arctic specialists was then sought. Comments by Sir Hubert Wilkins included: "The information that the Office of Naval Research is effecting research and development in various fields of basic science by contractual agreements with various civilian agencies as well as within Naval Laboratories is most encouraging and will certainly lead to results of high value the initiation of a service laboratory and field research should not be delayed, since there are specific service problems in physiology, environmental protection and geophysics which must be solved as early as possible"

The Executive Director of the Arctic Institute of North America, Dr. Lincoln Washburn, wrote:

"Your letter of September 24th outlines work of the greatest value to arctic research and I am pleased indeed to have this opportunity to follow your suggestion and comment on the proposed program. An arctic field laboratory for the pursuit of basic scientific research is one of the best ways to facilitate the acquirement of new information. It affords a base of operations for scientists, encourages cooperative observations in different fields of science, and is the only means of effecting some types of research requiring frequent observations at fixed points over a period of years The Arctic Institute is keenly interested in all fields of endeavor outlined in your letter and will be glad to cooperate in every way it can."

Among other scientists whose opinion was solicited and who expressed keen interest in the proposal to establish an Arctic research laboratory, were Dr. Harald U. Sverdrup, polar explorer, formerly Director of Scripps Oceanographic Institution, Dr. Paul Siple, Geographer, U.S. War Department General Staff (now Department of the Army), Dr. Laurence Gould, President, Carleton College and Geologist to the Byrd Antarctic Expedition, and Dr. H. B. Collins, Jr., Ethnographer, Smithsonian Institution.

It may be worthwhile to state here the principles which govern the relationship of the research program of O.N.R. to civilian institutions and Navy laboratories. The main principle is that research contracts should be "partnership agreements" with scientists, to give them the maximum freedom in carrying out their work.

"Certain basic principles have evolved from the study of the research program during the period which has elapsed since establishment of this Office. The principles are:

"*Diversification and competition* make a more varied attack, stimulate research as well as industry and produce better results. Unintentional duplication is inexcusable, diverse and even parallel work has proved wise and economical provided that those doing the parallel research are aware of each other's work.

"*Freedom from security classification* in fundamental research is essential to its quality and progress. As soon as fundamental work points to applications that should be classified, these lines may be detached from the main body and dealt with under appropriate security rules, but it should be remembered that secret work is costly in time and money and is often of secondary quality.

"*The stimulation of research within navy laboratories* is a basic 'must' in research establishments under the administrative supervision of the Office of Naval Research and is constantly advocated in all naval research activities under the control of other agencies.

"*Collaboration with civilian scientists* is desired. This office is negotiating contracts with industry, private research institutions, and universities, for basic research and for consulting services. Research contracts are in the

Newly modified two-storey laboratory building at Point Barrow photographed in July 1948.

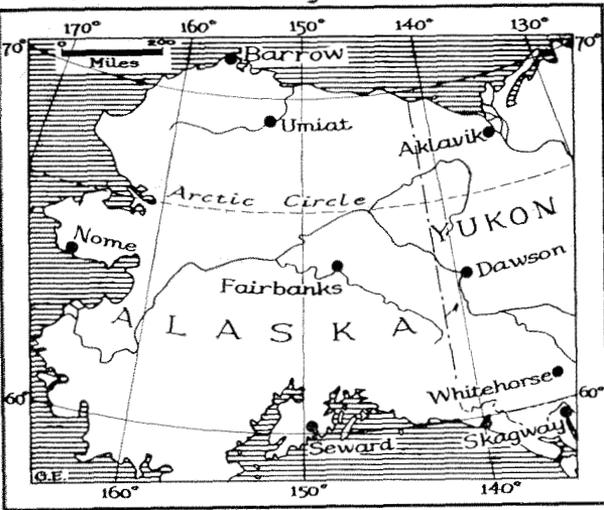


Prof. John Field of the Department of Physiology, Stanford University, presenting the first seminar at the Arctic Research Laboratory.



Dr. Laurence Irving, Scientific Director Arctic Research Laboratory, and Dr. Walter Flagg of Swarthmore College, carrying on research at Point Barrow, Alaska.





nature of partnership agreements, and offer the scientist freedom to initiate, explore, teach, and publish in carrying out basic research for the Navy under the contract. It is believed that this procedure is one mutually beneficial to the civilian scientific fraternity and to the Navy, encouraging the scientist to conduct research in an atmosphere of scientific freedom and at the same time assuring the Navy that new knowledge is being created

from which developments may later come to strengthen Naval power.”³

Thus, the basic charter and the guiding principles of the Office of Naval Research afford one of the keys to the role of ONR initiative in the Arctic Research Laboratory. A second key, the U.S. Navy's historic interest in Arctic exploration has been discussed by various writers (4) (5). A third key is related to the present status of field research, especially in the Arctic. Information gathered in the past century was chiefly by the toil of individuals or small expeditions which were limited in both logistic support and finances. Today, due to advances in the technology of modern scientific research, full financial and logistic support are needed if the highly specialized techniques are to achieve the greatest benefits. Moreover, the accumulation of systematically collected data requires long-term studies at fixed or semi-fixed bases. (6)

Returning to the immediate history of the ARL, the matter of site and physical (logistic) support of the station presents itself. The choice of Point Barrow, Alaska, was based on many considerations: it is the most northerly United States settlement in North America; a typical arctic coastal region; the historic role of Point Barrow in American arctic exploration both scientific and commercial and the existence of Naval Petroleum Reserve No. 4.

Naval Petroleum Reserve No. 4 is a 35,000 square mile area in northern Alaska set aside by President Harding in 1923. It extends from Icy Cape on the west to the mouth of the Colville River on the east. South and east it is bounded by the Colville to where it is joined by the Etiluk, then due southward about thirty miles. The boundary then runs westward to approximately 160° 45' Long. then due north to Icy Cape.

In 1944 plans were made to carry on petroleum exploration. The job was given to the "Seabees" (Construction Battalions) of the Bureau of Yards and Docks, U.S.N. and work was underway at Point Barrow by January, 1945. After V-J day, the task was turned over to the Director of Naval Petroleum Reserves, Commo. W. G. Greenman, USN. Two

recent series of articles (7) (8) describing the remarkable activities of this group, are highly recommended to students of the Arctic.

Plans for a science laboratory at Point Barrow were discussed with Commo. Greenman early in the fall of 1946. His enthusiastic support and that of Cdr. P. W. Roberts (CEC) USN, at that time civil engineer in charge of construction at the Reserve greatly eased the problems of laboratory housing, boarding and housing of personnel, and local travel. The continuing interest and support of Naval authorities at Point Barrow has contributed to whatever success the arctic research program may have achieved.

During February 1947, the writer, representing the Chief of Naval Research, made a reconnaissance visit to Point Barrow to study the feasibility of the proposed program. The highly mechanized nature of Point Barrow Camp, the technical activities going on there and the interest of the petroleum personnel in research combined with their successful operational experience increased the planners' enthusiasm.

The second stage in development of the project began on August 6, 1947, when a scientific party of five men from Swarthmore College, under the leadership of Prof. Laurence Irving, with two men from Cornell University, arrived to begin a one year program of metabolic studies in arctic climates. (9)

Although no laboratory was yet ready for use, since part of the group's purpose was to establish the necessary facilities, research had begun within a fortnight. A 20' x 40' quonset hut was remodeled as a physiological laboratory. The addition of equipment, supplies, animal quarters and temperature control chambers made a small but satisfactory working quarters.

In view of the great amount of research in Arctic problems waiting to be done (10) (11) (12), and the opportunities available at Point Barrow, plans were undertaken in the fall of 1947 to expand the laboratory accommodation the following year.

In February 1948, the Chief of Naval Research appointed Dr. Laurence Irving as Scientific Director of the Arctic Research Laboratory in addition to his duties as principal investigator on the Swarthmore College research contract. He was to be responsible for co-ordinating the various projects assigned to the laboratory. To provide advice and guidance to the scientific officer responsible and to the Scientific Director Rear Admiral Lee invited a group of leading scientists to form the Arctic Research Laboratory Advisory Board (ARLAB). The first meeting of this group was held on 15 March 1948. The members are:—

Commo. W. G. Greenman (USN), Director Naval Petroleum Reserves

Laurence Irving, Scientific Director Arctic Research Laboratory

Ellis A. Johnson, Johns Hopkins University
 Remington Kellog, United States National Museum
 Roger Revelle, Scripps Oceanographic Institution
 J. Frank Schairer, Carnegie Institution of Washington
 Alexander Wetmore, Smithsonian Institution
 John Reed, United States Geological Survey (Chairman)
 M. C. Shelesnyak, Office of Naval Research (Executive Secretary)
 Mrs. Yvonne Reamy (Administrative Assistant to the Executive Secretary)

Following the second meeting of the Board recommendations regarding the Board itself, the policy and program of the Arctic Research Laboratory, and the duties of the Scientific Director were made to the Chief of Naval Research and were approved by him.

They included the following:—

“The Advisory Board recognizes as its principal function the stimulation and promotion of basic scientific research under the auspices of the Arctic Research Laboratory (under contract with ONR) at Point Barrow, Alaska, in the interests of national security, and the recommendation of programs to the Chief of Naval Research: furthermore, the Board will study and advise the Chief of Naval Research on such scientific problems as he may present to it.”

Furthermore, in reference to ARLAB duties and functions, the following has been considered and accepted:

A. *Duties*

- (1) Individually and collectively to make available to appropriate persons or institutions, including Federal agencies, information as to the facilities of the ARL and methods by which projects can be proposed and approved;
- (2) To study and appraise the value and relative priority of programs for scientific research projects submitted to it for consideration as projects to be carried out at the ARL;
- (3) To keep itself informed of the progress of approved research projects and of their accomplishment in terms of the original project;
- (4) To facilitate the critical examination and appraisal of reports growing out of research projects and to make recommendations regarding subsequent publication and classification; and
- (5) To review and advise on the policies and practices of the ARL of the Office of Naval Research at Point Barrow, Alaska.



Staff of the Arctic Research Laboratory, Point Barrow, Alaska, photographed in July, 1948.

B. *Procedure*

It is anticipated that proposals for research activities at the ARL will be made to the ONR. After general review by the ONR as to appropriateness and necessary details and after the Scientific Director of ARL, having received copies of the proposals, has had an opportunity to comment, the proposals will be referred to the ARLAB. The ARLAB will consider such proposals and advise as to their intrinsic worth as well as to their priority in relation to other proposals. The ARLAB will then promptly submit to the ONR a recommendation for approval or disapproval of the project. When these recommendations are forwarded to the ONR, a copy will simultaneously be sent to the Scientific Director of the ARL so that his comments may be received by the ONR before final decision. The appraisal of the practicability of all projects will be by joint agreement between the Scientific Director of the ARL and of the Officer in charge of Construction NOy-13360, Fairbanks, Alaska.

In view of the unique conditions at the ARL, it is further anticipated that many of the projects as originally submitted will not contain sufficient detail as to cost, timing, equipment needs and other items that will be necessary before final recommendation is made; therefore, the ARLAB proposes to draft a list of the various informational items that should be supplied before detailed consideration is given any proposed project.

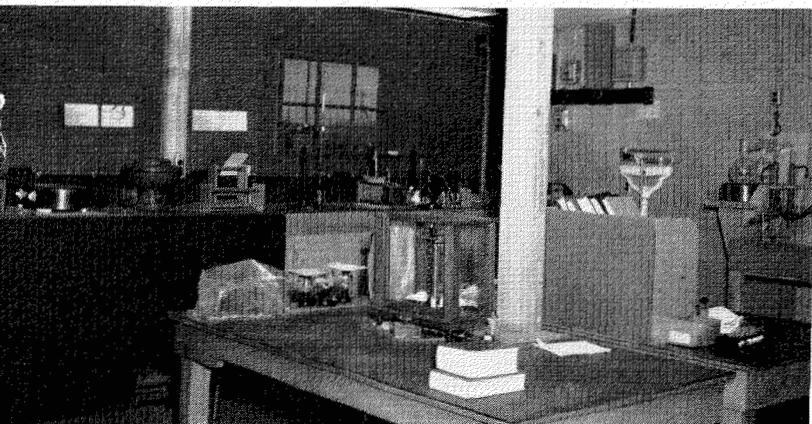
The basic policy of the ARL was reviewed and restated as:

- A. To provide facilities at Point Barrow for fundamental research in all appropriate scientific fields related to the arctic environment and
- B. To afford facilities within the laboratory and also facilities as a base for field studies in arctic Alaska.

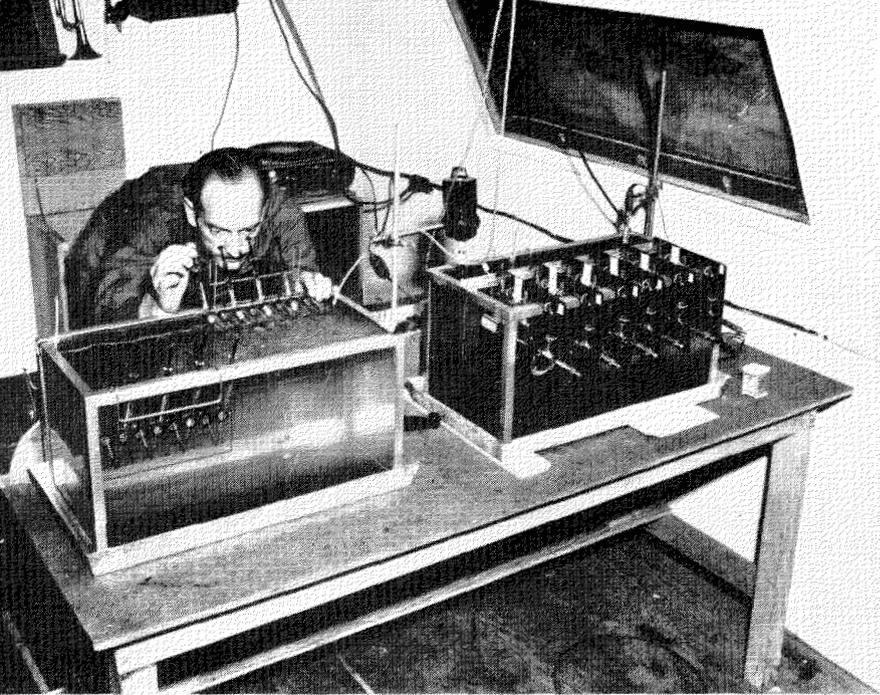
It is expected that the programs will be largely initiated by competent groups in and out of the Government and that some will be supported by the ONR and some by others.

In preparation for an expanding program, the plans for enlarged quarters initiated in the fall of 1947 were achieved late in the spring of 1948 and a second building was ready by July, 1948. A two-story 40' x 100' quonset hut, with laboratories and workshop on the ground floor, and library, storeroom, seminar room and office on the second floor is now (August 1948) in operation. In addition, the original small building is in use by the Swarthmore group. By mid-summer 1948, about thirty scientists and technicians were engaged at the ARL in research related to the Arctic.

The research work carried on under ARL contract between ONR



This laboratory at Point Barrow is used for studying native food as part of the office of Naval Research project.



Dr. Reidar Wennesland of Swarthmore College making metabolic measurements of some local marine fauna at Point Barrow, Alaska.

and various universities includes the following:

Swarthmore College studies, under direction of Prof. Laurence Irving, with a staff including Drs. Per F. Scholander, Reidar Wennesland, Harold Eriksen, Gyrd Eriksen, W. Flagg, Eminger Steward, V. Walters and John Andrews are concerned with metabolic activity of arctic life. Field surveys in search of animals for experiments have been carried on by this group.

Drs. Donald Griffin, Raymond Hock, F. Johnson, and M. Karplus of Cornell University have done research on the physiology of bird navigation and migration. The Point Barrow region is, of course, an exceptionally good place to study the movement of birds such as Golden Plover, King Eider and others.

A study of marine fauna in the Point Barrow area is being carried out by Dr. George MacGinitie, Director of the Kerchoff Biological Laboratories, California Institute of Technology. He is being assisted by Nettie MacGinitie and David McNutt. Another group from California Institute of Technology under Prof. Dan Campbell is planning studies of immunochemical aspects of arctic animals.

Prof. John Field, from the Department of Physiology, Stanford University, assisted by Dr. Clarence Peiss, is studying tissue metabolism of arctic animals.

Dr. Victor Levine, a veteran of arctic medical research, is leading a group from Creighton Medical School which is doing vitamin content assays of arctic flora and fauna, and health studies of the Point Barrow natives. Carl T. Henkelman, D.D.S., is a member of this group and is making a thorough dental study, including denture casts, of several hundred Eskimos.

Several scientists receiving grants-in-aid from the Arctic Institute of North America are doing their research at the ARL, or are working out of Point Barrow in the area north of the Brooks Range. The former include Prof. Charles Wilber and X. J. Musacchia of Fordham University who are analyzing blood and tissue of arctic animals for fat content, and Prof. Irwin Newell of University of Oregon who is making a comparative study of mite fauna. Dr. R. D. Hamilton, University of Michigan is carrying on a zoogeography of *Rana Sylvatica*, and Lloyd Spetzman, University of Minnesota is studying some ecologic aspects of lichens in the Umiat region.

Some preliminary research on geophysical problems of the area are being carried out by M. B. Dobrin and R. R. Van Zant of the Naval Ordnance Laboratory.

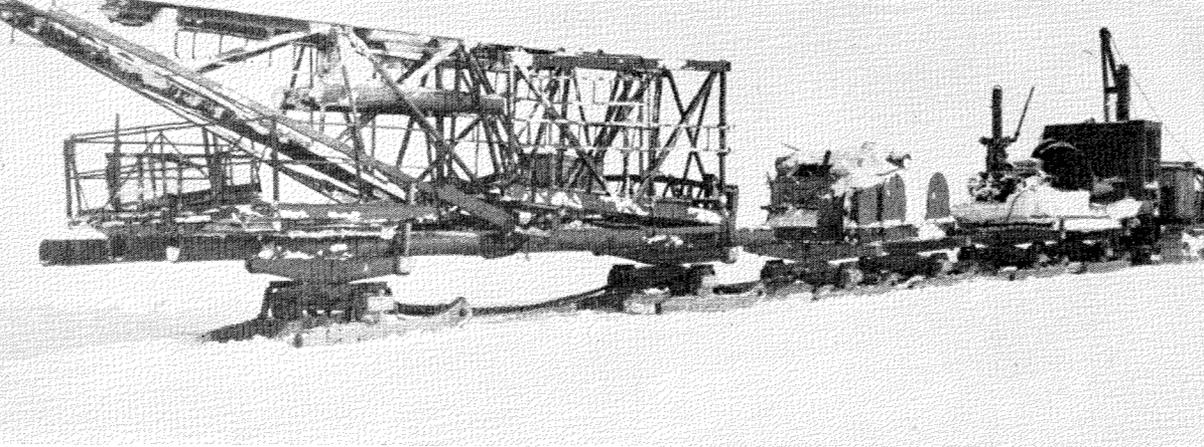
Plans are in hand for expansion of the research in physical and geophysical fields, including oceanography, meteorology and magnetic and cosmic radiation. It is intended that when the programme is complete about two thirds of it will cover research in physical problems and one third in biology.

During a recent visit to the laboratory by the writer, the first of a series of weekly seminars was held. Prof. John Field discussed "The analysis of metabolic adaptation to temperature in arctic Poikilotherms by means of dinitrophenol". A second seminar on "General problems among the Eskimos with special reference to the health situation" was presented to Dr. Victor E. Levine. By good fortune, the Captain of the U.S.C.G. icebreaker *Northwind* visited the laboratory and was kind enough to give the third seminar on "Ice conditions in northern polar waters". It is hoped that material presented at the seminars will be compiled and published.

One aspect of the Arctic Research Laboratory which warrants special



Small laboratory at the Arctic Research Laboratory, Point Barrow, during the 1947-48 winter.



Point Barrow, site of the Arctic Research Laboratory, is the base for supplying oil-exploring parties in the interior of Alaska. The equipment shown here was hauled 331 miles from Barrow to Umiat. (U.S. Navy photo)

comment is the library. The value of an adequate library to any laboratory is obvious but for a field research laboratory it is sheer necessity. To meet this need the largest part of the second floor of the new 40' x 100' building has been used. At present, most of the material consists of general scientific handbooks, guide books, basic texts and references. Plans include provision of an adequate arctic section, especially with reference to the local area. Friends and interested persons have already contributed liberally by giving books and journals, and further gifts will be most welcome.

It is hoped that the Arctic Research Laboratory will eventually become an outstanding centre for basic scientific research in the North American Arctic. The Office of Naval Research is well aware of the need of cooperation from scientists if this hope is to become a reality.

*The opinions expressed in this article are the author's and should not be construed as official Navy Department opinion.

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