# Science in the News

## Current Antarctic Research Program Designed To Fill Gaps in IGY Study

Among the scientific projects now commencing at U.S. bases in Antarctica are a number of biological and geological studies that mark the start of an attempt on the part of the National Science Foundation, which supports antarctic research, to fill some of the gaps in the scientific study of the continent which were left at the end of the International Geophysical Year, in December 1958. The studies—some new and others continuations of earlier studies that are being resumed with the current antarctic summer—are in such areas as glaciology, geology, biology, and oceanography. New traverses and aerial mapping operations are planned, as well as studies of animal and insect life and studies of psychological stress in those who work under antarctic conditions.

The element common to many of these studies is that the study can be carried out by one man or a group of men working independently in a relatively small area of investigation. The psychological study, for example, is being conducted by one man accompanying a traverse party. The worldwide network of stations established during the IGY is no longer in operation, and there is, therefore, no need to limit scientific work to fields such as meteorology, seismology, and ionospheric physics that provide data of particular value when simultaneous readings can be taken at many points of the earth. Much of the work, however, still requires constant readings and the keeping of records throughout the year.

Both the National Science Foundation and the Navy, which send approximately the same number of men to "winter over" at the four major U.S. stations, are currently implementing the new policy. The Navy provides logistic support for the scientific program. The foundation is encouraging investigators, from the station leaders down to the technicians who take the thousands of readings during the year, to go down to "the ice" as the continent is known locally, with well-defined plans for personal research projects. Some of these projects, especially those of the technicians, are necessarily modest because of the demands of their primary jobs. The Navy is making a similar effort, concentrating on the doctors who are in charge of the military personnel at most of the isolated bases. One study conducted with Navy help is "Operation Snuffles," which is concerned with ailments of the upper respiratory tract.

Two NSF-supported projects representative of the many that have been undertaken are those of Edward Zeller, of the University of Kansas, and John Dearborn, of Stanford University. Zeller is continuing a project designed to determine how long low-temperature conditions have existed in the Antarctic. With one assistant, he collects samples of various carbonate rocks from the exposed, snow-free, dry valley areas west of the Naval Air Station on McMurdo Sound. By comparing the thermoluminescence of these samples under antarctic and normal conditions, Zeller will be able to make a determination of the length of time the rocks have been subjected to low temperatures.

Dearborn, who is a field assistant to Donald E. Wohlschlag, associate professor in the department of biological sciences at Stanford, is studying under-ice plankton and detritus at the air station on McMurdo Sound. He is also investigating the comparative ecology of under-ice fauna. Dearborn and his associates at McMurdo have an advantage over most scientific workers in Antarctica because a large biological laboratory has been established at the naval base.

### Programs of Other Nations

There are, in all, 12 countries now doing research in Antarctica. The programs of the other 11 are undergoing the same general shift in emphasis that can be seen in the U.S. program. Certain commitments left over from the IGY are being met, but the trend is toward local studies. The New Zealanders are conducting a number of small programs that are reported to be excellent in conception and execution. At their main base, Scott Station, which is about 3 miles from the U.S. base on McMurdo Sound, they are engaged in studies of upper-atmosphere physics, including work on auroras and "whistlers," and in geological and mapping activities. An American, Mark Gordon, will participate in the study of auroras at Scott Station during the next winter season.

The French program, according to observers, has been in abeyance since the closing of the Charcot Station in Wilkes Land. A Polish station is reported to be carrying out projects in glaciology, geology, and gravimetry. Australia has a well-rounded program, in which the emphasis is on glaciology, geology, mapping, and upper-atmosphere work. The Japanese program is limited, according to reports, to on-site studies and involves no traverses, no oceanographic investigations, and only minor work in glaciology. The Belgian station located in Queen Maud Land, is conducting work in glaciology, mapping, and geology and is planning a number of traverses. A Norwegian station, also located in Queen Maud Land, is reported to be reducing its effort, possibly with the intention of ending operations in the near future. Work at stations established by the United Kingdom is said to be limited to surveys and mapping on the Palmer Peninsula, and no traverses are planned. At its own stations and at Ellsworth Station, which it has leased from the United States, Argentina is conducting meteorological and glaciological studies. According to reports, many of the Argentine stations are primarily land-holding establishments, set up with an eye toward future territorial claims. With the signing of the treaty on Antarctica this month in Washington, Argentina may give up some of her 11 stations. The treaty, in effect, freezes all past territorial claims and prohibits the making of any new ones for the period it is in force.

The Soviet Union plans extensive work in Antarctica during the current summer. A traverse, which, if completed, will be one of the longest ever made, is now under way. Starting from

the coastal base of Mirny in Wilkes Land, the traverse party will go to the interior base of Vostok, will proceed from there to the U.S. station at the South Pole, and will continue to the Point of Inaccessibility and on into an unexplored mountainous area in Queen Maud Land. The traverse is expected to cover 3600 miles. In addition, Soviet scientists are engaged in studies in the fields of meteorology, geomagnetism, geology, and glaciology and are prospecting for minerals. Reports also indicate that the Soviets are placing great stress on mapping.

Chile is reported to have only a modest program under way on the continent of Antarctica. Its concern, according to reports, is much like Argentina's—to carry out a land-holding operation for political reasons. As in the case of Argentina, this effort may be suspended with the ratification of the treaty on Antarctica.

Tractor train led by a U.S. Navy weasel on the 647-mile trail from Byrd Station to Little America Station in Antarctica. D-8 tractors with raised plows pull supply sleds and 20-ton wanigans—mobile structures with messing and sleeping facilities. [Official U.S. Navy photo]

### Selection of Programs

In its program in support of antarctic activities, the National Science Foundation makes no attempt to dictate the direction that scientific work on the continent shall take. Instead of calling for proposals in certain fields, the foundation limits itself to making a selection from the proposals it receives from individual scientists, governmental agencies, and private organizations such as the Arctic Institute of North America.

As proposals come in from scientists and organizations throughout the United States, NSF personnel evaluate them on the basis of the following criteria: Is there enough money to support a project in the particular field of science that the proposal deals with? Is the proposal scientifically promising? Can personnel be found to carry out the program? Is the proposal such that it can be carried out with the support facilities currently available in the Antarctic? In answering these questions, the administrators of the antarctic program, working under T. O. Jones, seek the services and advice of other scientific and governmental organizations. On the question of feasibility of a proposal, the Navy has an important voice. On the question of scientific promise, opinions are sought from personnel of the foundation, from the Committee on Polar Research of the National Academy of Sciences–National Research Council, and from the government's Interdepartmental Committee on Antarctic Research. When a proposal has been approved on all four counts, the field investigators and their equipment are sent by military plane or transport to New Zealand and then to the continent of Antarctica. Most of the individual research projects are carried out during the antarctic summer, which lasts from October to March. Temperatures during this period are high enough to allow extended outdoor work, and the sun never sets. The air base at McMurdo Sound provides helicopter and other air transportation to inland and coastal stations.

### Administrative Concepts

Although help in administering this country's antarctic program may be given by other agencies, the main burden of the job rests with Jones' office in the National Science Foundation. With the end of the IGY, basic policy had to be formulated for the continua-

Glacier tip with melt streams and melt lake in a dry valley area in Antarctica. Such areas remain snow-free during most of the summer months—October through March. The continental ice cap may be seen in the far background. [Official U.S. Navy photo]

tion of a scientific program on the continent of Antarctica. Two basic administrative concepts are used by Jones and his staff (which is composed largely of former IGY personnel): that scientific personnel at the various stations should be free of housekeeping duties during their stay, and that a dual command structure should be established, with a Navy doctor in charge of the service personnel who maintain the bases and a scientist in charge of the scientific party. This set-up has worked well, and differences between the military and the parties of scientists have been rare. The general attitude is one of cooperation, and many of the Navy personnel take considerable interest in the work of the scientists.

The National Science Foundation administrators have developed a familiarity with naval practices and procedures that is of value to them in their conduct of the program. When it has been determined that a certain action is needed, Jones makes a request to Rear Admiral David M. Tyree, commander of the Antarctic Support Force, who in turn issues an order to the relevant unit under his command. A parallel procedure is followed by representatives of the scientific parties at the various stations on the continent.

Jones, who had been acting head of NSF's Office of Scientific Information Services before taking on his current job, expects that the antarctic program will continue indefinitely. Behind the program and the new direction that it is taking lies a great deal of his thinking. In a recent interview in Christchurch, New Zealand, he explained his position on the continuation of the program: "In order to sustain and keep a research program virile over a long time, I believe it is essential to shift away from the wholly-planned program, carried on in the field by hired technicians and analyzed by scientists or machines at home, to support of the individual in a research program in which he is deeply interested, while at the same time maintaining a reasonable balance of subject areas."

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## Chemistry Teaching Method Being Tested

A new method for teaching beginning chemistry, one that teaches students "to think like chemists," is now being tested in nine United States high schools, according to Laurence Strong, professor of chemistry at Earlham College and director of the project that developed the method. The present test, financed by a $90,000 National Science Foundation grant, is the culmination of approximately 3 years of work by a number of college and high-school chemistry teachers. The program, which has been made possible by financial contributions from various foundations, has had the support of the Division of Chemical Education of the American Chemical Society.

The initial conference leading to the new course was held at Reed College in the summer of 1957, under the direction of Arthur Scott and Harry Lewis. The meeting was financed by the Crown Zellerbach Foundation. A year later the group met again, at Wesleyan University, this time supported by the National Science Foundation. A writing conference was held last summer, at Reed College, devoted to the actual construction of the new course and the writing of the textbook. This work, also financed by NSF, was directed by Strong and by Arthur H. Livermore, professor of chemistry at Reed.

### The Idea for the Method

The idea for the new teaching method grew out of the conviction of Strong and others that the conventional beginning-chemistry course dealt with isolated facts and technology which students were required to memorize, rather than with the logical pattern of chemistry. As Strong explains:

"Until now the emphasis in beginning chemistry has been on the factual material of chemistry, but not on what lies behind the facts. No basis for understanding the basic ideas of chemistry has been given. The new course will present the facts against a background of ideas. It is our hope that tests will show that students can take these ideas and work out the answers to new problems for themselves."

Called the "Chemical Bond Approach Project," the new method is based on the idea that atoms are tied together by bonds and that the manner in which they are tied together is an important factor in determining the chemical makeup of a substance. Strong says that if students understand this basic factor, "they can gain an initial insight into the possibilities of predicting the properties of yet-to-be-made compounds. By such a procedure the student . . . is able to focus on some of the most dramatic aspects of chemistry. There are great possibilities in this new approach of enlisting the interest of students at every level of ability."

High schools which are participating in the present test are Central High School, Phoenix, Ariz.; Leonia High School, Leonia, N.J.; Chester High School, Chester, Pa.; Los Angeles High School, Los Angeles, Calif.; Shortridge High School, Indianapolis, Ind.; Grant High School, Portland, Ore.; Lawrenceville School, Lawrenceville, N.J.; University of Illinois High School, Urbana, Ill.; and Sunset High School, Beaverton, Ore. The teachers who are using the experimental course were all participants in last summer's conference at Reed.

Collaborating with Strong in the direction of the project are Livermore; H. A. Neidig, professor of chemistry at Lebanon Valley College (Annville, Pa.); and M. Kent Wilson, professor of chemistry at Tufts University. Periodic tests are given students who are taking the new course in order to determine their progress. The course will probably be revised at the end of the experiment and then released in final form.

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## Bureau for Research on Sources of Poverty Urged; Committee Formed for Social Action

Some problems in American society and some new approaches to their solution were discussed last month in Washington at the closing session of the biennial round-table conference of the American Public Welfare Association. Agnes E. Meyer, widow of the former chairman of the board of the Washington *Post and Times Herald*, addressing the group, called for a federal research bureau to study the causes of poverty. Such a study, she said, offers the only way of "breaking the vicious circle whereby dependency, disease, and crime are handed down from generation to generation. . . ." Later in her speech she disclosed that a committee of natural and social scientists has been formed to "narrow the gap between knowledge and action" in meeting the nation's pressing social needs.

Mrs. Meyer suggested that a bureau to study the sources of poverty could properly be set up in the Department of Health, Education, and Welfare. State offices working with the department now have research staffs that