

the Arctic Ocean and the main channels between the islands. The project, known as the Polar Continental Shelf Project, is also being handled by the Department of Mines and Technical Surveys.

The original Joint Committee on Oceanography came into formal existence in April 1946, to continue the co-operative work on the oceans carried on between agencies of the federal government during World War II. Reorganization of the committee as the Canadian Committee on Oceanography, with national status, is indicative of the marked broadening of Canadian interest in oceanography both at home and abroad.

Academy Report Stresses Need for Scientific Experimentation in Quest of Weather Control

If we are ever to succeed in our efforts at weather modification we must first change our methods of experimentation, states a report issued recently by the National Academy of Sciences-National Research Council. The report observes that many scientists regard the atmosphere as a natural resource of great magnitude. But, the report continues, present efforts to gain the basic knowledge needed to exploit this resource are small compared to the benefits to be gained from such use.

In stressing the need for fundamental understanding of atmospheric processes, the report distinguishes between experiments designed to produce basic data and experiments designed to produce rainfall. Acknowledging that cloud-seeding efforts during the past decade have contributed to our knowledge of weather phenomena, the report notes that they have also led to many "false starts" and that "the economic value of obtaining even a small degree of control over rainfall has created undesirable pressures which have tended to dilute the scientific quality of some weather-modification experiments."

The meeting on which the report is based was "The Skyline Conference on the Design and Conduct of Experiments in Weather Modification," organized by the Academy-Research Council's Division of Mathematics, which is under the chairmanship of Samuel S. Wilks, professor of mathematics, Princeton University. Thirty-one meteorologists and statisticians from the

United States, Canada, and Australia attended the conference 1-3 May 1959, at Big Meadows Lodge, Shenandoah National Park, Va. The conference was initially suggested by Earl G. Droessler, director of the National Science Foundation's Atmospheric Sciences Program, which provided financial support.

The conferees found strong scientific reasons, apart from considerations of immediate economic gain, for concentrating initial research along the lines of precipitation control. These reasons include the possibility that in such research might be found the key to an understanding of energy balance in weather systems. Such a key would provide man with the ability to control not only rain and snow but also hail, lightning, and violent storms.

Other Problems

In addition to its comments on cloud-seeding and the inclusion of a compendium of the best known and most important weather-modification experiments undertaken in the last decade, the report makes the following points.

1) Laboratory and field studies should be carried out by individual researchers or small groups of scientists. Although such projects will be largely of an exploratory nature, the results, if promising, can be subjected to large-scale experimentation and statistical analysis. There is need for experiments to determine, for example, the relation between lightning and cloud-top temperature or to determine easily measured cloud parameters in various types of clouds, need for cloud-modification programs involving small geographical areas or individual clouds.

2) Statisticians must be enlisted to work with meteorologists as collaborative weathermen. In his foreword to the report, Wilks says: "The degree of success so far achieved by various research programs in weather modification is, in large measure, due to detailed and skilled analysis of the data which combines sound statistical technique and enlightened meteorological insight."

3) Where effective cooperation exists between meteorologists and statisticians, in universities and research institutions, it should be strengthened. Where only one group exists or is effective, the other should be created or bolstered. Fellowship programs should be established to encourage young scientists to enter these areas. Summer study groups, summer institutes, conferences, and

seminars are needed for meteorologists, statisticians, and other scientists interested in weather modification.

4) Very few experiments thus far conducted in the United States have been carried out over a long enough time span. None, for example, can match the Australian Snowy Mountain project that began in 1955 and is still continuing. Most field experiments must be operated for several years if they are to yield enough information to be conclusive. At the same time, they should be conducted to yield information on a number of questions.

5) Experiments must be repeated in space as well as in time. Related to this requirement is the need for improved measurements, improved instrumentation, and standardized terminology. Meteorological categories such as "storm," "cloud suitable for seeding," and "day suitable for seeding," for example, must be objectively defined.

6) Basic research programs in atmospheric physics, chemistry, and electricity should be considerably augmented. Laboratory studies should extend into such areas as solid-state physics, crystallography, surface chemistry, and electron microscopy. Basic studies should also be conducted on specific weather systems, such as shower clouds, clouds influenced by mountains, hailstorms, lightning storms, and cyclonic systems.

Grants, Fellowships, and Awards

Anthropology. Two resident research fellowships, to be known as the Ogden Mills fellowships, are to be awarded annually by the department of anthropology of the American Museum of Natural History, New York City. The fellowships are intended for anthropologists who might benefit from a year at the museum, through having access to the anthropological collections, the library, and other facilities of the museum and through working in conjunction with members of the curatorial staff. There is no specific limitation on the kind of anthropological research that may be done under these fellowships, but preference will be given to those applicants who can make use of the museum's collections and archives (unpublished field notes, films, sound recordings, and so forth) either in the elaboration of special studies or in connection with research that they, or members of the curatorial staff, may