

METEOROLOGY

Weather Changing Vital

A national research and development program for studying modification of weather and climate has been recommended by the National Academy of Sciences—By Ann Ewing

► **CHANGING THE WEATHER** and climate should be investigated on a large scale, starting now, a panel of the National Academy of Sciences urged in Washington, D.C.

Weather modification is already a reality, although many of the changes caused by human intervention are accidental. Man's ability to deliberately produce desired, beneficial changes is "still very limited and uncertain, but it is no longer either economically or politically trivial."

These are among the conclusions reached by the Academy panel, after a two-year review of the present status of weather and climate modification. Dr. Gordon J. F. MacDonald of the University of California's Institute of Geophysics and Planetary Physics, Los Angeles, is panel chairman.

The panel recommended a new national research and development program for weather and climate modification. To accomplish this program, the panel urged that the Government increase its level of research support from the five million dollars spent in 1965 to at least \$30 million a year by 1970.

Simultaneously, the National Science Foundation's Special Commission on Weather Modification urged that the United States Government should start investigating now the possible effects of changing the weather and climate, including not only the scientific aspects, but also the effects on human beings, legal and legislative aspects, economic problems and implications for international relations.

The NSF Commission proposed assigning special responsibilities in these various fields within the Government. Its report stressed the need for a concerted effort by a single agency to develop the technology of climate and weather modification—a sector in which the Commission charged "a conspicuous gap is becoming evident."

The Foundation group worked closely with the Academy panel, using the latter's scientific studies as a basis for its more encompassing look at and recommendations concerning weather modification.

The Commission called for strengthening support of fundamental research in the atmospheric sciences and the beginning of complementary research in the biological and social sciences. It also urged adoption of a national policy by the United States to pursue its efforts on weather and climate modification for constructive improvement of the condition of human life throughout the world.

"So pervasive are the elements of weather in the mind and works of man that an alteration in one of them, even over a small area, may provoke intricate social changes," the Commission warned. Dr. A. R. Chamberlain, vice president of Colorado State

University, headed the broadly based, 11-man NSF Commission.

The Commission found that three main problems now threaten man's future. These are large-scale catastrophic warfare, providing sustenance for the rapidly increasing population, and waste disposal and environmental change accompanying the discharge of matter into the atmosphere, open waters and subterranean spaces.

Recent evaluations have shown that rainfall can be increased, under certain conditions, by as much as 10% by seeding clouds with such chemicals as silver iodide. The two recommendations for greatly stepping up research on weather modification is based not only on these evaluations but also on continued improvements in ways of learning about the atmosphere.

These improvements include high-speed computers and observations from satellites. However, much more needs to be learned about how earth's atmosphere reacts to either accidental or planned processes of changing it before any attempts are made to trigger large-scale reactions.

Unintentional alteration of the atmosphere by man today is a minor problem compared with 25 or 50 years from now. Among today's man-made changes are the increase of carbon dioxide in the atmosphere due to burning fuels, air pollution, both near the surface and high in the atmosphere from rockets, and large-scale city building that alters the air flow pattern near earth's surface.

Only one aspect of weather modification can now be considered operational—the dissipation of low-temperature fogs over such small regions as airports or orchards. Although modification of hurricanes has reached the stage of preliminary experiments in the field, the results so far are inconclusive.

Experiments in lightning suppression, however, are beginning to show some promise.

The U.S. Weather Bureau is making plans to begin cloud-seeding experiments somewhere in the East, hopefully in the drought-stricken Northeast, to test whether or not it is possible to increase rainfall. The project would be a first step in the national research program recommended by the two groups.

The experiment would be the first the Weather Bureau has conducted in the rain-making field for at least five years. The study would not be aimed at extending, nor is it expected to hold out, any promise of breaking the drought, according to Dr. Robert M. White, head of the Weather Bureau's parent agency, the Environmental Science Services Administration.

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NASA

TESTING FOR MOONSHOT — Saturn V ground test booster for testing Apollo spacecraft is being placed into the 360-foot tall test stand at the National Aeronautics and Space Administration Marshall Space Flight Center in Huntsville, Ala. The 138-foot long 300,000-pound booster was built by Boeing Aircraft.

EDUCATION

15 New Centers Urged For Advanced Study

► **NEW CENTERS** for advanced study and research should be established by The Organization for Economic Cooperation and Development.

Fifteen to 20 such centers would be first established in Europe and patterned after the Institute for Advanced Study, Princeton, N.J., at which many of the world's top scholars in all fields have done their research.

Each center would concentrate in one field only and it would be established at the university showing the highest achievement in that field.

The 21 nations belonging to the Organizations for Economic Cooperation and development are Austria, Belgium, Canada, Denmark, France, the Federal Republic of Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

At a meeting of OECD, representatives of the 21 countries were told that such centers would result in the highest possible level of scholarship throughout OECD countries.

Since success of the centers would depend mainly on providing funds to outstanding researchers, the advisory group also recommended establishment of international fellowships.

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