

## METEOROLOGY

# Weather Modification

Efforts to modify the weather can be expected to be hampered by the many problems involved, including scientific, political and economic ones.

► THE PROBLEMS involved in weather modification are many, very difficult to solve and not likely to be solved soon.

This conclusion of Dr. Jule G. Charney of Massachusetts Institute of Technology on the highly speculative subject of man's changing the weather was reported to the American Meteorological Society meeting in Chicago.

He said the problems involved in weather modification were, on a much larger scale, exactly like those involved in seeding clouds with chemicals to try to wring rain from them: What would have happened if the clouds had been allowed to progress naturally?

For many cases of cloud seeding, a relatively small scale effect, the answer can be found statistically. This is not the case when the effects are widespread, as they would be if weather could be modified, because not enough is known about the atmosphere.

Dr. Charney said the problems of predicting the effects produced by interfering with natural processes are political, economic and moral ones. He predicted that no country would attempt an experiment aimed at changing the weather if there were much chance that the effects would be bad for its own population.

Dr. Harry Wexler, the Weather Bureau's director of meteorological research, said the "cure" of weather modification may be "worse than the ailment." He urged that no attempts at making large-scale weather changes should be made until all possible effects have been evaluated, using objective methods involving realistic models of the general circulation.

A qualitative study by Dr. Wexler showed that making an artificial ice cloud over the Arctic Ocean to raise the temperature around the North Pole would give persons living in the latitudes from 50 degrees to 65 degrees north winters with heavier than normal precipitation. In North America, the heavy snows would blanket an area roughly from the Canadian border north nearly to the Arctic circle. They would also fall on most of northern Europe and virtually all of Russia.

Persons living in latitudes from 35 to 50 degrees north, on the other hand, would likely have less winter precipitation than normal. Since such regions as southern California and the Mediterranean derive most of their annual precipitation during the winter, the climate there might become more arid if winters were milder.

Dr. Wexler emphasized that he does not consider it very practical at this time to make and maintain a widespread artificial ice cloud over the Arctic.

The Russians keep secret some of their

research concerned with weather modification, scientists at the Meteorological Society meeting learned.

Dr. Louis J. Battan of the University of Arizona's Institute of Atmospheric Physics said his survey of Russian reports dealing with cloud physics showed "some Russian work in cloud seeding has been, and continues to be, classified."

He reported research in the field of radar meteorology (studying clouds and storms by bouncing radar waves from them) is probably also classified.

"In the field of cloud seeding and weather modification," Dr. Battan said, "the number of Russian reports dealing with Russian work has been quite small considering the importance of the subject."

Dr. Battan presented his views as one of a panel of five experts, each of whom discussed one aspect of meteorology in the Soviet Union. This new method of programming all reports at an American Meteorological Society meeting was termed very successful by weathermen attending the Chicago meeting where it was tried for the first time.

Dr. J. Robert Stinson of Saint Louis University, St. Louis, Mo., a panel member, said there was a growing realization that scientific superiority may be necessary for United States survival. This requires evaluating the current and future status of Russian and American meteorological research.

Dr. Stinson said he is convinced that the American and Western World weather research is, over-all, now superior to that of Russia. However, if present programs of both countries continue unchanged into the future, Russia will "catch up and eventually pass us in research potential."

He called for a more effective program for recruiting, training, supporting and rewarding weather researchers.

Science News Letter, April 11, 1959

## METEOROLOGY

## Weather Bureau Will Fly Airplanes Into Hurricanes

► THE WEATHER Bureau will use two leased airplanes to fly into hurricanes this summer to learn more about the structure, growth and paths of these storms.

Dr. F. W. Reichelderfer, Weather Bureau chief, said two Douglas DC-6's will be equipped with especially designed meteorological instrumentation to measure and record dozens of kinds of weather information while the planes are in the storm area.

Besides the two leased planes, which will be used for atmospheric research at middle and low flight levels, the Weather Bureau will use a B-57 light bomber to carry out investigations at all higher levels up to

50,000 feet. The B-57 will be loaned by the Air Force, which will also provide considerable highly specialized navigation equipment for installation on all three aircraft.

The planes will be based at Miami International Airport during the coming hurricane season, which normally covers the period June 15 to Nov. 15.

The Weather Bureau's National Hurricane Research Project was started in 1956 in collaboration with many other interested agencies. Its aim is to conduct extensive research into the formation, development, movement and death of destructive tropical storms. This research will also make possible evaluation of various proposals for modifying or controlling hurricanes that approach coastal areas.

Dr. Reichelderfer said the three flying weather laboratories will give the U. S. the most completely equipped atmospheric research aircraft in the world.

Besides the three civil hurricane research aircraft to be operated by the Weather Bureau during the 1959 season, the famous "hurricane hunter" planes of the Navy and Air Force will continue their storm location and tracking flights whenever a tropical storm is brewing in the south Atlantic Ocean, Caribbean Sea or Gulf of Mexico.

Science News Letter, April 11, 1959

## ASTRONAUTICS

## Gun Developed to Control Weightless Travel

► STUDIES are underway to develop a propulsion gun that would enable a spaceman in a weightless condition to control his movements, the Air Research and Development Command has reported.

The slightest effort or motion would propel the weightless space voyager in the direction opposite to the motion. By using a propulsion gun, it is believed he would gain control of his movements simply by "firing" the gun to start, stop or change direction.

Studies on this so-called "reactor gun" are being made at ARDC's Wright Air Development Center in Dayton, Ohio, during the 12 to 15 seconds of weightlessness experienced in a C-131B airplane flying a kaplerian trajectory (an arc flown to produce weightlessness).

In this procedure, the plane dives from 12,000 feet at a ten-degree angle until it reaches a speed of 250 miles per hour. After a two-and-a-half g pull-out, it coasts in an arc, during which it and its contents become weightless for 12 to 15 seconds.

The present propulsion gun consists of a package of high-pressure air bottles, a short length of hose, a nozzle, and valves for controlling the amount and direction of the air discharged.

The weightless man, either within his cabin or outside the space ship making repairs, would hold the nozzle in his hand, aim it directly away from the point to which he wishes to go, and press the handle.

The reaction of the high-pressure air rushing out of the nozzle would provide sufficient force to propel the man from one point to another.

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