METEOROLOGY

Rain-Making Ineffective

Extensive nine-month program of tests revealed that dry-ice seeding will not produce enough precipitation to be economically significant.

➤ NO ONE yet has done anything about the weather. Newest scientific support for this comes in the report of scientists who conducted an extensive nine-month program of tests to find out if the highly publicized dry-ice seeding could be used to make clouds rain or snow. Scientists of the U. S. Weather Bureau have concluded that this system will not produce enough precipitation to be useful.

To give the plan a thorough test, the Weather Bureau and the U. S. Air Force set up a 160-square-mile testing ground near the Clinton County Air Force Base, Wilmington, Ohio. Five Air Force planes, 55 ground weather stations and extensive radar equipment were used in the cloud-seeding operations in Ohio.

After nearly nine months of experiments, the Weather Bureau scientists concluded:

1. Not enough precipitation is produced to be economically significant.
2. Very little rain was produced unless there was natural rain within 30 miles.
3. No rain was produced except when there was natural rain falling within 40 to 60 miles.

Heading the scientific phases of the Cloud Physics Project was Dr. Ross Gunn of the physical research division of the Weather Bureau. The partial scientific report of the project was prepared by Dr. Gunn, Richard D. Coons and Earl L. Jones. Air Force operations were conducted by the All-Weather Flying Division, with Capt. Homer C. Boles in charge.

Not only did the experiments fail to produce significant amounts of rain, but the experiments showed that the seeded portions of billowy cumulus clouds might be dissipated by the seeding. This was observed in 10 of the 79 tests conducted.

Radar equipment aided in control of aircraft movements and in determining in what area rain actually fell and whether the rain was natural or induced by the seedings.

In addition to the best known dry ice method, water and chemical agents such as lead oxide and silver iodide were used.

Two series of experiments were made. In the first, winter layer clouds were seeded between Jan. 9 and May 1. A total of 38 operations failed to produce any precipitation unless rain was falling within 30 miles.

A series of 79 full-scale tests on cumulus clouds, conducted between March 18 and Sept. 8, produced rain in 18 clouds. But only five of the clouds produced rain when there was no natural rain within 30 miles. In all of these five cases, natural rain was present within 40 to 60 miles.

The total of 117 experiments indicated that appreciable amounts of snow or rain are produced only when large masses of moist air are brought into an area by systems of winds that somehow produced large-scale cooling. This is the way natural precipitation is produced. Cloud seeding techniques, the study indicates, will provide no useful short cuts for relieving droughts, fighting forest fires or any of the other proposals suggested in the past two years.

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ENGINEERING

Tiny Cracks Grow to Large Splits When Metals Break

➤ WHEN METALS break, the fractures begin with extremely small cracks, investigations by General Electric scientists show. The break does not occur instantaneously throughout the sample, as usually assumed. The tiny cracks are the nuclei which grow into a large split when enough tension is applied.

Bubbles that break a column of water have much in common with the tiny cracks in metal. Therefore, the metal studies began with research into how a column of a fluid breaks. The giant redwoods of California give a good example of how much tension a fluid can stand without breaking, the GE scientists said.

The larger redwoods pull columns of water in their trunks as high as 300 feet above the ground, under a tension of about 130 pounds per square inch. Water under such low pressure would be expected to boil. If this were to occur in a tree, the column of sap would be broken, and the tree would die. The redwoods survive because there are no nuclei of the critical size for the 130-pound tension exerted on the sap. Before the boiling process in fluids or the breaking process in metals can take place, there must be nuclei, the scientists stated.

The smaller the nucleus in a fluid column or in a metal, the bigger the force needed to expand it into a break. For every tension there is a critical bubble or crack size. If, when a certain tension is applied, there are nuclei of the critical size or larger, they will grow rapidly, causing the sample to break.

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MODEL IRON CRYSTAL—It is along the boundaries of such grains as shown in the model that tiny nuclei cracking spaces occur.