

## METEOROLOGY

## Instrument Measures Vertical Wind Velocity

► AN INSTRUMENT that measures vertical wind velocity, the first devised with this capability, was described at the American Meteorological Society meeting in Chicago.

Present wind equipment measures only the horizontal wind, George Wehmann of the U. S. Weather Bureau, U. S. Atomic Energy Commission, Idaho Falls, Idaho, said. The new instrument is important in the study of atmospheric diffusion, including the dissipation of radioactive materials in the air, and in forecasting wind velocities.

Results are continuously recorded, giving instantaneous readings of vertical wind speed and direction, he reported.

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**HYPERSONIC SHOCK TUBE**—From the control room a technician can unleash speeds of 18,000 miles per hour and temperatures of 15,000 degrees Fahrenheit in this 100-foot-long shock tube built by Avco Manufacturing Corporation, Everett, Mass.

## METEOROLOGY

## Hope for Tornado Control

► THE WEATHER BUREAU hopes to find a way to control tornadoes, Dr. F. W. Reichelderfer, Bureau chief, told SCIENCE SERVICE.

He said the Weather Bureau and other meteorological organizations are conducting research to determine if it is possible to control or modify tornadoes so their paths could be changed or so they could be totally suppressed. The scientists are also looking for better methods of forecasting when and where tornadoes are likely to occur.

Dr. Reichelderfer's statements were made in answer to questions concerning the severe spring tornadoes in the Southwest and South, and the possibilities of preventing tornado development.

He said the Bureau's research projects and plans provide for "investigation of every practical approach for development of means to control severe storms." Such research also involves cloud seeding, Dr. Reichelderfer noted, and should yield more information concerning the limitations and possibilities of making rain by spraying clouds with chemicals.

Although not all the facts about weather modification and storm control are now known, Dr. Reichelderfer said "we intend to find out what they are."

The atmospheric conditions resulting in the April tornadoes are of "special interest" to meteorologists, Dr. Reichelderfer pointed out, because of the large number of severe storms generated and the persistence of the meteorological conditions causing them.

Although meteorologists have made progress in developing ways to predict these storms and warn the public in time to save lives, the catastrophic property damage is still beyond man's control.

Dr. Reichelderfer said several universities and research institutes were trying to find one or more unique features that precede

tornadoes and point the way to their earlier detection. Then the atmospheric instability resulting in tornado formation might be released by man before the destructive funnel clouds are formed.

Cloud seeding might accomplish this release. Other possible methods being discussed privately by meteorologists include the use of large oil fires or very mild explosions. Behind all of these is the idea of dissipating the storm's energy before it takes the form of a whirling funnel.

The chances of making this work for tornadoes is much higher than for hurricanes because of their much smaller scale. The average width of a tornado's destructive path is usually only a few hundred yards and its length is only about 15 miles. Tornadoes are often found embedded in a long line of thunderstorms, stretching for 100 miles or so and normally moving from west to east.

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## TECHNOLOGY

## Camera Takes Millions Of Pictures Per Second

► AN ULTRAHIGH SPEED CAMERA that can take pictures at a rate of 4,000,000 per second was reported by R. C. Maninger and R. W. Buntenbach of Precision Technology, Inc., Livermore, Calif., at the Institute of Radio Engineers meeting in New York.

An especially designed electronic tube called an "image converter" is the heart of the camera, which is used to study such high speed events as explosions and the split-second rise and fall of electrical discharges like lightning.

The image converter tube picks up light images by means of a photosensitive cathode

at one end. These images are then transferred electronically to a viewing screen at the other end, where the picture is recorded on film. By using extremely short electrical pulses, the tube can be turned on and off again almost instantaneously to capture fast moving events.

The tube and its accompanying electronic circuits act both as the camera's shutter and as a means for moving images across the face of the stationary recording film, the engineers reported.

As many as five exposures in sequence can be made on a single plate of film with exposure times as short as 20 millimicroseconds or less than one-fiftieth of a millionth of a second.

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## BIOCHEMISTRY

## Cellulose Made Outside A Living Cell

► CELLULOSE, hitherto a monopoly of living cells, has been produced for the first time in the laboratory in a cell-free enzyme system, Prof. Glenn A. Greathouse of the University of Florida reported to the American Chemical Society meeting in Miami.

Small, transparent membranes of cellulose, with radioactive atoms, were made with the aid of enzymes, naturally occurring agents that promote chemical processes in all living things. A complete synthesis or artificial production of the plentiful woody material was not claimed.

Prof. Greathouse began with glucose that had been labeled with radioactive carbon in a particular part of its molecule. After the cellulose had been made and then broken down into glucose again, 96.7% of the radioactive carbon was still in the same position. This was strong evidence that the enzymes built the glucose into the cellulose structure directly instead of breaking it down into simpler materials and rebuilding them into cellulose.

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