METEOROLOGY

Dust Devils Produced

The heat of the desert and the force of a gentle breeze are simulated by scientists studying the occurrence of small cyclones of gas and dust

➤ MINIATURE "dust devils" are being produced in a laboratory in Cambridge, Mass., in an attempt to learn more about how these small cyclones of twisting gas and dust occur naturally.

To make the synthetic dust devils, Dr. Albert Barcilon of Harvard University uses a device consisting of a circular platform and a tall cylinder of screening that revolves slowly around the platform.

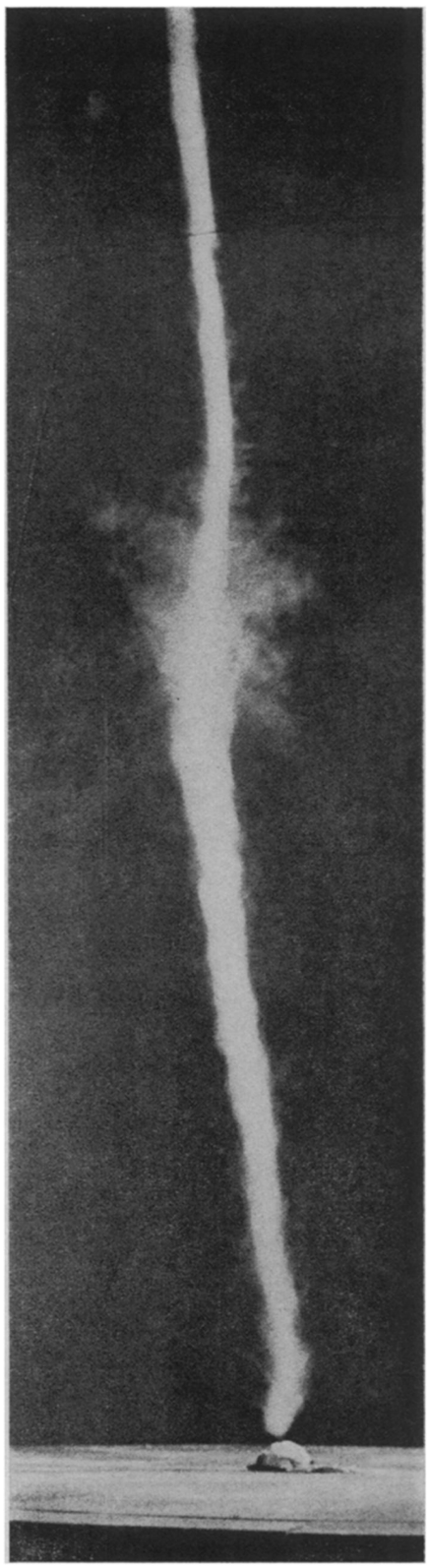
Two conditions are necessary to produce a dust devil in nature: a hot surface, such as a desert, that heats the air just above it to temperatures greater than that of air higher up, and a gentle breeze of two to five miles an hour having a velocity that varies horizontally. The resulting natural whirlwind can be anywhere from 20 to 200 feet in diameter and from a few feet to about 2,500 feet in height.

The dust devils Dr. Barcilon makes are a few inches in diameter and about 10 feet high. Instead of desert dust, they carry a dense white smoke produced by heating a small pile of ammonium chloride.

The heated circular platform, about six feet in diameter, takes the place of the hot desert ground. The twist is provided by the slowly revolving screen cylinder, which is some 10 feet high.

Before the screen column is set in motion, the heated ammonium chloride gives off a white smoke that slowly whirls and curls upward. Soon after the screen begins to revolve, the white smoke becomes a tight, rapidly twisting whirlwind, superficially resembling a miniature tornado.

Although dust devils are innocuous, the results of the model studies may shed some light on the workings of larger scale twisting phenomena, such as tornadoes and hurricanes.



Harvard University

TWISTER—A rapidly-twisting column of smoke is produced in a rotating cylinder cage above a stationary heated plate in the engineering sciences laboratory at Harvard University. Miniature "dust devils" are made synthetically in an effort to learn how such small cyclones occur in nature.

ASTRONOMY

'Rubble' Orbits Earth

➤ THERE is photographic proof that two clouds of cosmic "rubble" are orbiting the earth in the same path as the moon.

The "rubble" may have come from all over the universe and could offer clues to the earth's origin, solar winds, and even the possibility of life somewhere in space.

"Because the clouds are so faint," said J. Wesley Simpson, Lockheed Missiles and Space Company engineer, "they are difficult enough to see, much less photograph, but on Feb. 13 I was able to photograph the L-5 lunar libration cloud.

That's the cloud that trails the moon in its orbit by about 60 degrees."

Mr. Simpson, who is now defining astronomical experiments as a member of Lockheed's Saturn-Apollo applications payload integration study team, stated that while his photographic images are too faint to be reproduced on paper, they are visible on the negatives. They are also visible when the negatives are projected onto a smooth, white surface.

"Unfortunately," he said "the visibility of these clouds seems to be a function of the extent to which the observer's eyes are trained. Professional photographers, film analysts and photo interpretation experts see the clouds right away, but people unfamiliar with careful photographic examination usually have to study the negatives for a while before they can see the clouds' images."

To insure that the experts who studied the negatives could not be mistaken, Simpson subjected the negatives to a series of tests. A microscopic examination of the negatives' emulsion was made to detect any chemical stains or defects. The negatives were also examined under 800-power magnification to study the grain size and distribution. These tests showed the negatives to be without defects.

The negatives were then given photodensitometry tests, which measure the density of the emulsions. Upon the completion of these tests, contoured outlines were drawn from the data obtained, and the outlines agreed in general size and shape with the cloud images observed by the experts.

The final step in the analysis of the cloud negatives was to take "control negatives" of the same area in the sky where the clouds had been photographed, but on a night when they would not be visible in that area.

The control negatives showed no cloud images, thereby proving along with the other tests that the observers and the camera were not "seeing things."