

METEOROLOGY

Radar Spies on Tornadoes

Texans are equipping the Lone Star state with 16 radar eyes to keep constant vigilance for tornadoes. The experiment may explode into a national storm-warning project.

By ALLEN LONG

► TEXANS HAVE lit a fuse on a state-wide tornado-warning project that may explode into national proportions.

Led by Texas A. & M.'s vigorous president, Dr. M. T. Harrington, 16 sections of Texas are raising money to equip their local weather stations with radar sets to watch the skies for tornadoes.

The radars will give weathermen the information they need to issue exact, to-the-minute warnings when twisters run rampant through the Lone Star state. These warnings may give the Texan as much as five hours to prepare himself for an imminent disaster.

In the words of a U. S. Weather Bureau assistant chief, Delbert M. Little, the advance warnings should substantially reduce loss of life and limb.

They certainly should put Texans on guard against tornadoes such as the one that ripped through Waco on May 11, 1953, killing 114, injuring 500 and wreaking \$50,000,000 of havoc in the downtown area of that small Texas city. For with the new system, the exact path of the twister can be predicted after the whirling, dust-filled funnel reaches down to earth.

Sparked by Capt. Howard T. Orville, the Navy's World War II weather expert who gave the O.K. weatherwise for the full-scale invasion of North Africa, the idea of a statewide radar network caught the fancy of Dr. Harrington. The 52-year-old Texas A. & M. president called a conference with Capt. Orville, Robert Simpson of the Weather Bureau and representatives of Texas industry.

Together they worked out a plan for a radar network. They now have set March 1 as the date when it should go into operation.

The financially pressed Weather Bureau, which has longed for such a program on a nation wide basis, helped to implement the plan by chipping in with 16 outdated radar sets. These particular sets had been slated for the surplus market and were rescued for weather duty in the nick of one day.

Texas A. & M. engineers are modifying the sets, stepping up their power 30 times so the range can be extended from an obsolete 50 miles to a new 200 miles. Unless some financial difficulty arises, the radar network probably will go to work on schedule.

With all vacuum tubes humming and with the 16 radar beams scanning the skies, this is about how the system will work:

Weather Bureau forecasters will spot

areas that have the best conditions for thunderstorms. Those areas will be alerted, particularly if tornadoes are likely. Nearby radars will watch the area intently. When an extremely bright picture flashes on the radar screen, things will start to happen.

The weather observer will call long distance to find out what sort of a storm is going on in the troubled area. He must do this because he cannot actually see tornadoes on his radar set. His set tells him merely that a storm of great energy is sweeping the area.

If he cannot get the information by telephone, he may be able to receive it by radio from police in the vicinity.

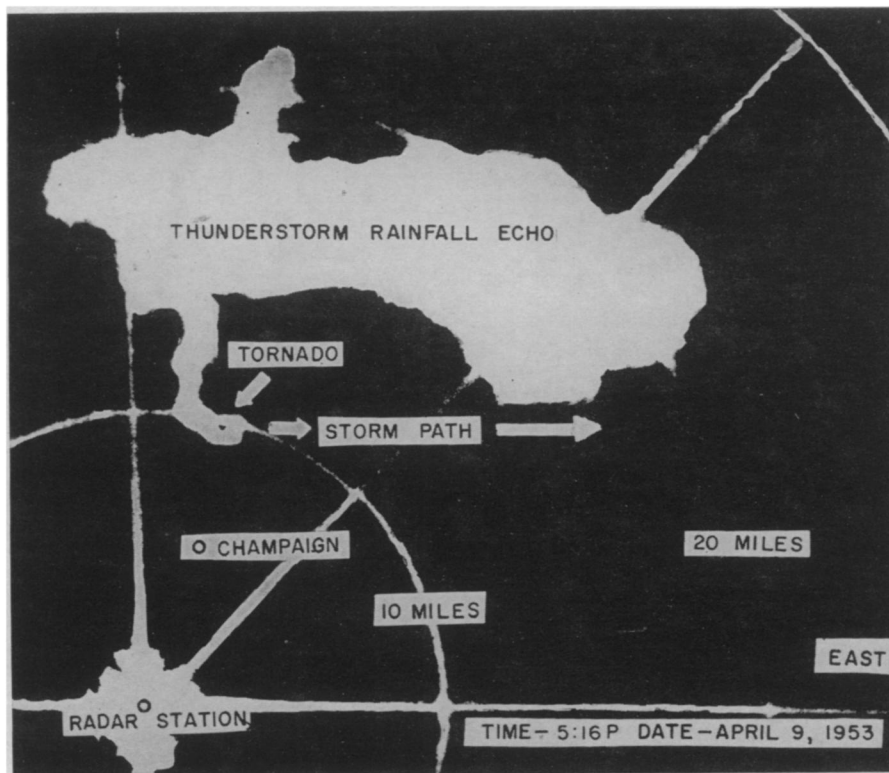
Knowing that a tornado does exist, the weatherman can plot the path it will follow. He can even tell residents of Junction Flats that the south side of their town is smack-dab in the middle of the tornado path.

The unblinking electronic eye will reveal the direction in which the storm is moving. It also will show the speed at which the twister is covering the ground. From this, the weatherman can figure the exact time when the big funnel will buzz through Junction Flats.

The advance warning should give residents in the tornado's path a chance to crawl into their basements or to hop into their cars and flee to safety. However, it remains to be seen whether these advance warnings can help to reduce property damage.

Tornadoes have swirling winds concentrated in a funnel-like shape. So far it has been impossible to measure the speeds of these winds. They snatch away the wind instruments. Engineering calculations showed the tornado that hit Worcester, Mass., on June 9, 1953, had spiral wind speeds of 300 miles an hour. Estimates for other tornadoes have run even higher. It is difficult to protect property from the fury of such winds.

When a thunderstorm develops in one part of the state and begins its march at, say, 25 miles an hour toward the northeast,



ELECTRONIC STORM PORTRAIT—This photograph of a radar screen shows a severe storm lashing the countryside 10 miles from Champaign-Urbana, Ill. Made April 9, 1953, by an Illinois Water Survey weatherman, the picture is from a strip of movie film that recorded for the first time the birth and death of a twister.

weathermen will plot its path and figure when it will hit an area of great atmospheric instability. It is in these areas that thunderstorms are most likely to give birth to terrible tornadoes.

Thus it may be as much as five hours before the thunderstorm reaches the danger zone. This amount of advance warning should help citizens prepare themselves better for possible tornadoes.

Thunderstorms Predictable

Thunderstorms themselves usually can be predicted 24 to 36 hours in advance. The Weather Bureau boasts an 85% accuracy in predicting them. They travel 20 to 40 miles an hour, averaging about 25. They have internal gusts of wind sometimes lashing the earth at speeds of 70 miles an hour or more. Although they can be predicted for an area, a single thunderstorm cannot be pinpointed. Furthermore, weathermen cannot tell which storm will, and which storm will not, spawn a tornado.

Tornado-spawning thunderstorms themselves are vicious creations. Amid their crackling flashes of lightning, their winds shriek through deserted streets sometimes at 90 miles an hour. Their rain overflows street sewers. Their golfball-sized hailstones clatter noisily upon metal automobile roofs. Even if no twister is born, forewarning of such a thunderstorm is welcome knowledge.

The sharp eyes of Texas' radar network, coupled with the professional skill of weathermen, should provide Texas and its citizens with an enviable windstorm insurance policy.

When the radar screens show storms are brewing, movie cameras will begin recording the radar picture. The cameras will shoot four frames a minute. When projected at normal speed, the film strip will condense several hours of "storm" into a few minutes.

Each of these films will be duplicated. The recording station will get a copy, Texas A. & M. will get a reel, as will the Weather Bureau. Scientists then will launch an elaborate research program aimed at ferreting out the mysterious personality of the short-

lived tornadoes. The Weather Bureau will compare films received from several stations, all showing the same storm, and will learn what it can from the movies.

In time, the tornado menace should be greatly reduced if weathermen can flash accurate warnings ahead of twisters in time to save hundreds of lives. Weathermen themselves hope they will learn enough from the radar network so that they can eliminate the guesswork in tornado predicting.

Other states are watching the radar program in Texas. Oklahoma and Louisiana have asked to be hooked into the project. Illinois has been reported intensely interested in it.

Assuming the radar network does a creditable job, it seems likely that similar networks will spring up to cover completely "tornado alley," a wide swath of fertile farmland through the central United States stretching from Texas and Louisiana into Minnesota and Wisconsin. Tornadoes twist through this alley on the heels of spring as the season moves northward, touching growing things with its green thumb. The economic savings implied by such a network reach into the billions of dollars.

Many Sets Available

The Weather Bureau has about 80 more of the outdated radar sets it can provide communities that want to establish electronic eyes for their local weather outposts. It costs about \$10,000 to modify one of the outdated machines for weather service, but this is \$50,000 less than a shiny new set costs. Oklahoma and Louisiana have already requested sets.

Mr. Little said the Weather Bureau hopes to equip all airport weather stations east of the Rockies with storm-watching radar, and he said this probably will be done in time. However, because of limited funds, the Weather Bureau hopes the communities themselves will contribute as Texas communities have.

Needless to say, Weather Bureau meteorologists are enthusiastic over these matchless machines. In the vernacular of the punster, the radar sets will let weathermen predict up a storm.

Science News Letter, February 13, 1954

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By Joseph Degrazia, Ph.D.

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PHOTOGRAPHY

"Soft Snow Blanket" Wins Photograph Award

See Front Cover

➤ SHOWN ON the cover of this week's SCIENCE NEWS LETTER is a silver medal winner in the Chicago Natural History Museum's annual nature photography show, being displayed this month in the Stanley Field Hall of the museum.

Taken by Bosworth Lemere of Santa Barbara, Calif., the picture, entitled "Soft Snow Blanket," won first prize in the general and scenic division of the national photography contest.

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