

## METEOROLOGY

# Tornado Time Approaches

A sharp increase in the frequency of tornados in the United States usually occurs in March. These small storms swoop down causing heavy death and damage yearly.

By ANN EWING

► THE TORNADO season is approaching. Each year in March there is a sharp increase in the average number of tornados reported in the United States.

The figure jumps from six in February to 21 in March, and reaches a peak of 43 in May, closely followed by 40 in June.

These small but dangerous storms have whirling winds of tremendous speeds. Rotating funnel-shaped clouds swooping down from the base of thunderclouds cause an average of more than 200 deaths and damage estimated at \$21,000,000 each year.

Although the chances of a tornado striking any particular spot are extremely small, it is not possible to predict exactly where one will hit any more than it is possible to pinpoint where lightning will strike. However, it is possible to predict the general areas where conditions are ripe for tornado formation. For these regions, advance action can save lives, cut down property damage and reduce public alarm.

## Warning Systems

Any town can organize a local tornado reporting and warning network, and many communities in Texas and nearby states have taken on the more ambitious project of underwriting a radar set, operated by the Weather Bureau, which is also part of a network.

Any kind of network, however, requires action by public-spirited citizens who will promptly report dangerous weather conditions to the nearest Weather Bureau office, police station or other local center.

A new kind of automatic warning system is being tested this year on a fairly wide scale. A sensitive device indicates by a red light and a buzzer when a "pressure jump," one indication of tornado-brewing weather conditions, occurs.

## Conditions for Twister

Definite conditions are required to spawn a "twister," which is the reason certain regions, such as the country's mid-section, are much more frequently hit than other areas, such as the Northeast or Far West.

At the earth's surface, warm, humid and oppressive weather usually prevails, with winds often from a southerly direction. Above this damp, hot air, at around 10,000 feet, is a cooler air current, generally moving from west to east.

When this cool, dry air from the west

or northwest moves over the warm, moist surface air, accompanied by a narrow band of strong winds at intermediate levels, the stage is set for stormy weather.

Such an unstable atmosphere often results in a long line of thunderstorms, in which the tornado's spinning funnel is found embedded. Stretching for 100 miles or so and usually moving from west to east, this line is called a squall line. It is characterized by severe thunder, strong wind squalls and heavy rains, as well as considerable lightning.

## Pressure Jump Line

This squall line is also known as a pressure jump line, because a sudden rise in barometric pressure always accompanies it. Since these pressure jump lines can occur without precipitation, a warning system to detect them would go even farther than radar in helping to spot regions where tornados are likely.

In the automatic network now being tested, about 100 of the buzzing devices have been set up 25 to 30 miles apart in Kansas, Missouri, Oklahoma and Texas. They are installed at police and fire stations, water plants and other places where people are normally on 24-hour duty and can telephone local Weather Bureau offices when the instrument sounds off.

This distance scale was chosen deliberately. Weather Bureau stations average about 200 miles across, too far apart to catch every tornado. On the other hand, a trained meteorologist who might be able to see about five miles under good conditions, could not watch the formation, growth and death of a tornado.

The average width of the storm's destructive path is usually only a few hundred yards, and its length is only about 15 miles. During the half hour or so of its existence, a tornado swirls forward at 20 to 30 miles an hour. The winds that whip around its low pressure center have been estimated as up to 500 miles an hour.

Both the violent winds and the strong pressure differences over small areas account for the tornado's terrifying destructive powers. Buildings can be torn apart and the pieces shot through the air in a lethal barrage. Walls may collapse. The sudden reduction of pressure may have an explosive effect, sometimes moving heavy objects for considerable distances.

When the Weather Bureau issues tornado forecasts, they are meant to alert volunteer storm reporters, police and the public to watch for tornados if the sky becomes

threatening. Any necessary action required so that a place of safety can be reached quickly should be taken then.

When a tornado warning is issued, it means a tornado has been sighted. Warnings include the storm's location and direction of movement, so that safe shelter can be taken by those in the tornado's path.

## Tornado Hints

A person actually seeing a tornado approaching should act swiftly.

The safest place to be during a "twister" is in a cave, storm cellar, or other underground excavation with an air outlet. If time does not permit this, lie flat in the nearest depression, such as a ditch or ravine in the open country.

Always try to move at right angles to the tornado's path.

In a city, seek inside shelter, preferably along the inside walls on the lower floors of a steel-reinforced building. It is wise to stay away from windows.

At home in a frame house, the southwest corner of the lowest floor, the basement if possible, offers the most safety.

People living in brick or stone houses should find other shelter, such as a storm cellar or the southwest corner of a frame house.

If time permits, turn off the gas and electricity.

The Weather Bureau points out that during the 41-year period from 1916 through 1956, the total number of deaths caused by tornados was less than one-fourth the number of fatalities, 40,200, reported by the National Safety Council as the result of automobile accidents in the single year 1956.

## Worst Tornado

Damage-wise, the most outstanding tornado since 1900 was the storm that hit central and eastern Massachusetts on the afternoon of June 9, 1953. It took 90 lives and injured 1,288 and the estimated property damage was \$52,000,000.

In number of lives lost, 689, the tornados that hit Missouri, Illinois and Indiana on the afternoon of March 18, 1925, were the deadliest since 1900. Property damage was estimated at \$16,500,000, and 1,980 people were injured in that storm.

Tornados can occur at any hour of the day or night, but they are most likely to form following the warmest hours of the day, 43% occurring between the hours of three and seven p.m. Of all known tornados, 82% have hit between noon and midnight.

The individual hours of four to five p.m. and five to six p.m. are those during which the greatest number have been reported.



**TORNADO'S TERRIFYING FUNNEL**—Why tornadoes are aptly named "twisters" is strikingly shown in this photograph taken on the afternoon of June 27, 1955, when the funnel-shaped tornado cloud was four and a half miles away.

These two hours account for 23% of the storms.

Tornado forecasts for the entire United States are prepared at the Weather Bureau's Severe Local Storm Forecasting Center in Kansas City. Specialists there analyze and interpret a large number of weather charts and diagrams to spot any areas in the country where tornado formation is likely.

Their forecasts are coordinated with district offices, and are distributed to the public by radio and television stations in or near the threatened areas up to six hours in advance.

The various tornado studies and experiments being made by the Weather Bureau, by universities and by research organizations are aimed at a better understanding of the conditions under which "twisters" are brewed and how they grow, with the aim of improved forecasting, thus helping to save lives and cut down property damage.

Within a few years, the Weather Bureau plans to have about 100 radars operating, blanketing the country with a network for spotting any severe storms, particularly hurricanes and tornadoes.

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#### MEDICINE

## Need "Trauma" Hospitals

► TRAUMA hospitals, to train young surgeons in the treatment of injuries, are needed throughout the country, Dr. Michael L. Mason, professor of surgery at Northwestern University Medical School, proposes.

Injuries that cause open wounds have assumed increasing interest and importance. Accidents take about 100,000 lives every year, cause up to 500,000 severe injuries, and probably total close to 10,000,000 injuries in the aggregate. Fortunately, most injuries are trivial and lead to little or no disability, particularly if a few basic principles of care are followed in their management.

But Dr. Mason feels that the warnings about the need for preparation to handle mass casualties, whether they come from

nuclear warfare or civilian disasters, have not been heeded.

"The important thing is that we become trauma conscious," he believes.

"If some of the diseases for which special campaigns have been set up caused one-tenth the mortality, misery, financial loss and disability that trauma does, or if we were threatened with an epidemic one-thousandth as serious as nuclear warfare, the country would go hysterical in campaigns to eradicate the disease and to train doctors in its management," Dr. Mason said.

Fortunately, more and more hospital training is being given in the treatment of wounds, the surgeon said, and the old system whereby the emergency room is staffed

by the youngest and least experienced members of the hospital staff is changing.

But still, Dr. Mason finds that trauma has been dignified by honorable status in only a few of the country's large centers and teaching hospitals.

Dr. Mason reports on the need for trauma hospitals and other new approaches to the treatment of open wounds in the *Bulletin of the American College of Surgeons* (Jan.-Feb.).

Science News Letter, February 23, 1957

#### CHEMISTRY

## New Magnesium Alloy Means Faster Planes

► A NEW alloy that promises to give airplanes and missiles a greater kick was reported. It is a combination of magnesium and thorium.

Undergoing extensive tests by its developers, the Dow Chemical Company, Midland, Mich., the alloy has already proved that it can better withstand high temperatures than any aluminum or magnesium alloy being used today. The Air Research and Development Command in Baltimore, Md., for whom the new alloy was made, says that use of the alloy may make it possible for Air Force planes and missiles to go faster and farther.

The metal was subjected to a temperature of 700 degrees Fahrenheit for 100 hours and there was no change in its tensile strength, yield strength or elongation properties. Tabbed HM 21XA-T8, the new alloy is 30% lighter than aluminum alloys.

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#### MEDICINE

## Pulling on Infants Causes Bone Injury

► PULLING a child's arm to keep him from falling can cause an injury that may be mistaken for scurvy, bone infection, or even a malignant tumor of the bone, Dr. Morris S. Friedman, South Bend, Ind., told the American Academy of Orthopaedic Surgeons meeting in Chicago.

The injury may be nothing more than a self-correcting inflammation of the periosteum, the membrane that covers the bone. Infants and young children have a much more loosely attached periosteum which can be stripped off more easily than an adult's can, Dr. Friedman reported.

The injury can occur without being suspected and can even result from a strong pull exerted on the infant's legs during the birth process.

Even light injuries can cause internal bleeding in the membrane. This is followed by new bone formation which sometimes looks like a faint fracture line in an X-ray picture, the physician reported.

The problem will clear up by itself within a few weeks and should not be confused with more serious conditions, he said.

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