TORNADOES

what they are and what to do about them

U. S. DEPARTMENT OF COMMERCE
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WASHINGTON, D. C. Revised MARCH 1960

The tornado is a violent local storm with whirling winds of tremendous speed. It is usually recognized as a rotating funnel-shaped cloud which extends toward the ground from the base of a thundercloud. Its color varies from gray to black. All tornadoes have one common characteristic—the rapidly rotating winds that cause them to spin like a top. When nearby, a tornado usually sounds like the roaring of hundreds of airplanes. It is one of the smallest and most dangerous of all storms.

An average of slightly over 200 deaths result from tornadoes each year in the United States. However, the chance of a tornado striking any particular spot is extremely small. The reason for this is that the average tornado path is but 16 miles long and less than one-fourth mile wide.

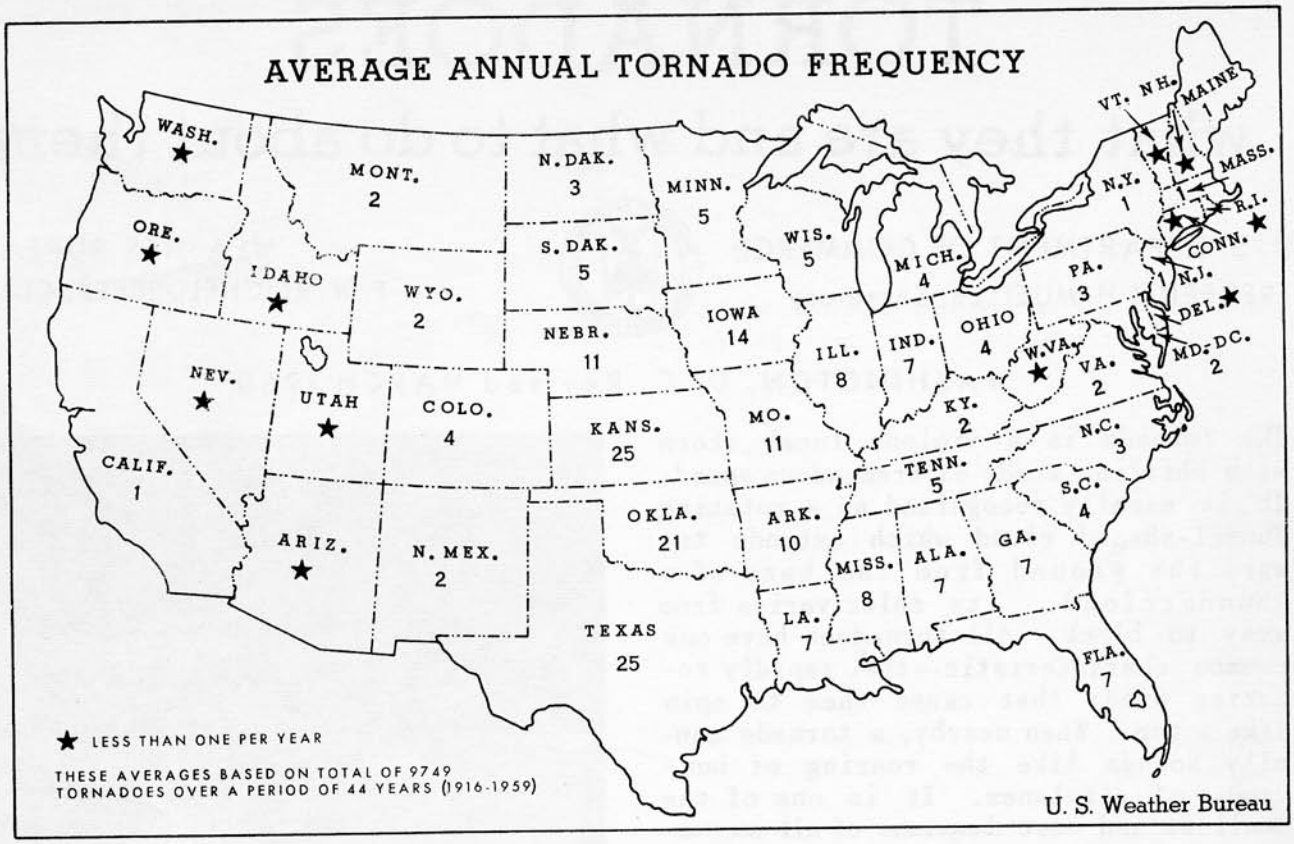
Tornadoes start to form several thousand feet above the earth's surface and some never reach the ground, or they may touch the ground and rise again. Tornadoes usually occur in connection with thunderstorms, especially those from which hailstones fall to the ground. Tornadoes may form in a series of two or more, in which case there is a large primary tornado and one or more secondary or lesser storms.

Tornado formation requires the presence of layers of air of contrasting temperature, moisture, density and windflow characteristics. Cool dry air from the west or northwest moves over warm, moist

TORNADO MOVING ALONG GROUND

surface air. When this occurs and is accompanied by a narrow band of strong winds at intermediate levels, there are complicated energy transformations which can produce a vortex or whirl. It seems probable that a tornado occurs only when there is a precise combination of several rather common but highly variable weather conditions.

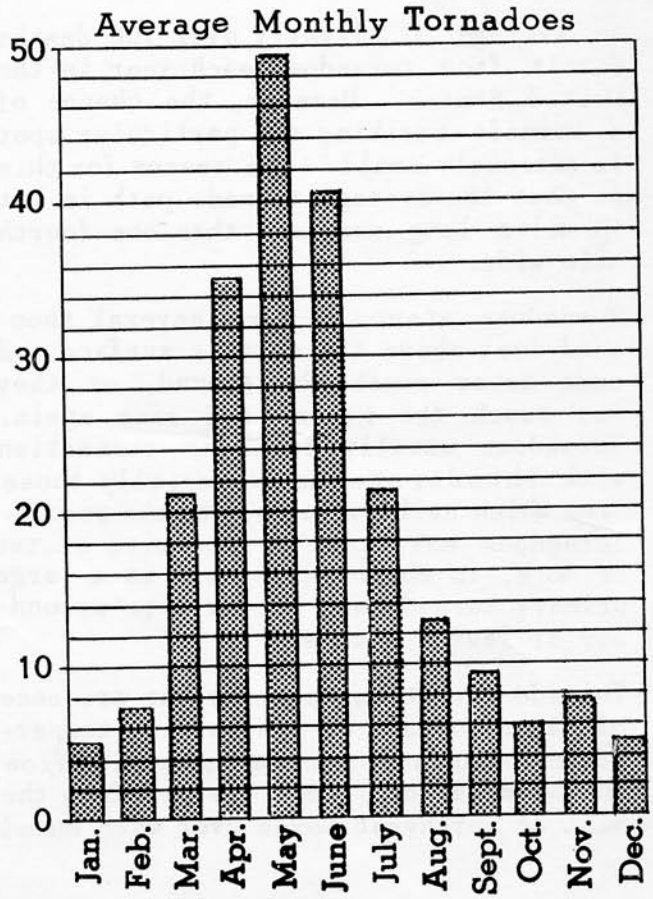
Tornadoes occur in many parts of the world and in all of our states, but no place is more favorable for their formation than the central part of the United States. The number of tornadoes normally starts to increase in February



through the eastern Gulf States and reaches a peak in March over this area. This increase spreads northwestward to reach a peak in Iowa and Kansas during May and June. From July until January there is a rapid decline in the number of tornadoes over the country as a whole.

The average number of tornadoes ranges from 25 per year in one of the Mid-Western states to less than one per year in most of the Northeastern and far Western States. The national average is around 200 a year, over half of which occur in three months—April, May, and June.

Tornadoes can occur at any hour of the day or night, but they appear to form most readily in the hours closely following the warmest parts of the day. 42% of these storms have occurred between the hours of 3 to 7 p.m; 82% have occurred between noon and midnight. The individual hours of 4 to 5 p.m. and 5 to 6 p.m. are those during which the greatest number have been reported. These two hours account for 22% of the storms.



Destructive effects of the tornado are terrifying and result from both the violent winds and the strong pressure differences over small areas. Buildings can be torn apart and the pieces driven through the air in a dangerous barrage. Walls may collapse or topple outward. The sudden reduction of pressure may have an explosive effect which can cause machinery and other heavy objects to be lifted out of buildings, sometimes being moved for considerable distances.

It is not possible to predict the exact spot where a tornado will develop, just as it is not possible to determine where a bolt of lightning will strike. It is possible, however, to locate areas approximately 20,000 square miles in size where there is a reasonable possibility that tornadoes will occur. Radar is also helpful for this purpose.

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 identify general areas throughout the country where tornadoes can be expected to develop. The forecasts are coordinated with district forecast offices and are distributed to the public by radio and television stations in and near threatened areas up to six hours in advance. In addition, Civil Defense, Red Cross, State Police, sheriffs and other cooperators relay the forecasts to reach people in threatened areas.

TORNADO DAMAGE IN SMALL COMMUNITY

STORE DESTROYED BY TORNADO

TORNADO FORECASTS are issued to alert volunteer storm reporters, police, and the public to watch for tornadoes if the sky becomes threatening. People should take any necessary preliminary action so that a place of safety can be reached quickly if a tornado is sighted, or if a warning is issued that a tornado is approaching.

TORNADO WARNINGS are announcements that a tornado has been sighted. The warnings are made possible through the cooperation of many public-spirited people who promptly notify the nearest Weather Bureau office when a tornado is seen. Warnings are then issued which include the storm's location and direction of movement so that safe shelter can be taken by those in the path of the tornado. Communities are also encouraged to organize their own reporting and warning systems.

TORNADO
SAFETY RULES

TO KNOW WHAT TO DO WHEN A TORNADO IS APPROACHING, MAY MEAN THE DIFFERENCE BETWEEN LIFE OR DEATH ! !

I If you are near a tornado cellar :

When time permits, go to a tornado cellar, cave, or underground excavation which should have an air outlet to help equalize the air pressure. It should be kept fit for use, free from water, gas, or debris; and preferably equipped with pick and shovel. THERE IS NO UNIVERSAL PROTECTION AGAINST TORNADOES EXCEPT UNDERGROUND EXCAVATIONS.

II If you are in open country :

1. Move at right angles to the tornado's path. Tornadoes usually move ahead at about 25 to 40 miles per hour.
2. If there is no time to escape, lie flat in the nearest depression such as a ditch or ravine.

III If in a city or town :

1. Seek inside shelter, preferably in a strongly reinforced building. STAY AWAY FROM WINDOWS!
2. In homes: The corner of the basement toward the tornado usually offers greatest safety, particularly in frame houses. People in houses without basements can sometimes be protected by taking cover under heavy furniture against inside walls. Doors and windows on the sides of the house away from the tornado may be opened to help reduce damage to the building.
3. Standing against the inside wall on a lower floor of an office building offers some protection.

IV If in schools :

1. In city areas: If school building is of strongly reinforced construction, stay inside, away from windows, remain near an inside wall on the lower floors when possible. AVOID AUDITORIUMS AND GYMNASIUMS with large, poorly-supported roofs!
2. In rural schools that do not have strongly reinforced construction, remove children and teachers to a ravine or ditch if storm shelter is not available.

V If in factories and industrial plants :

On receiving a tornado warning, a lookout should be posted to keep safety officials advised of the tornado's approach. Advance preparation should be made for moving workers to sections of the plant offering the greatest protection.

VI

Keep calm! It will not help to get excited. People have been killed by running out into streets and by turning back into the path of a tornado. Even though a warning is issued, chances of a tornado striking one's home or location are very slight. Tornadoes cover such a small zone, as a rule, that relatively only a few places in a warned area are directly affected. You should know about tornadoes though, "just in case".

VII

Keep tuned to your radio or television station for latest tornado advisory information. Do not call the Weather Bureau, except to report a tornado, as your individual request may tie up telephone lines urgently needed to receive special reports or to relay advisories to radio and television stations for dissemination to thousands in the critical area.

UNITED STATES DEPARTMENT OF COMMERCE
WEATHER BUREAU

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* U. S. GOVERNMENT PRINTING OFFICE : 1959 O—495333