

had, the loss of life and destruction of property would have been greater still.

Huntsville, Ala.—Extract from the *Huntsville Telegram*: * * * Mrs. Newt Flippin suffered the amputation of an arm, which was twisted off by the wind. The wind performed many freak stunts with cattle, moving many animals from one farm to another without injuring them, and blowing the feathers off chickens. Many farm animals were killed, however. The pump at Flippin's home was pulled out of the well and broken into two parts, the upper part not having been seen since the storm. The property damage is estimated at about \$50,000 to houses and barns, and there was very little damage to crops because of the lateness of the season. * * * Practically no one had tornado insurance.

Owens Cross Roads, Madison County.—Postmaster's report: The storm occurred at Brownsboro, route No. 1, at 12:30 p. m. It came from the southwest and went toward the northeast. The funnel-shaped cloud was observed. Trees on the north side of the path pointed toward the south; in the center, in all directions; on the south side, to the north; width of path of great destruction, 300 yards. Damage, except to crops, \$2,500. Four killed, 10 injured. * * * No hail; thunder, but no heavy rain; black cloud.

Gurley, Madison County.—Postmaster M. I. Williamson's report: The storm occurred west and north of Gurley at 12:30 p. m. It came from the southwest and went toward the northeast. The funnel-shaped cloud was observed. Trees on the north side of the path pointed to the north; none left in the center; on the south side they pointed to the south. Path of great destruction was 60 yards wide. Damage, except to crops, \$25,000. Nine were killed, 10 injured. * * * The storm did not cut a clean path. It dipped here and there along the path, and went clear over trees in other places. Where it did strike the earth, it swept everything clean.

Brownsboro, Madison County.—Postmaster's report: The storm occurred 1 mile east of Brownsboro at 1:15 p. m.; it came from the west and went toward the east. The funnel-shaped cloud was seen. Trees on the north side of the path pointed southward; in the center, eastward; on the south side, northward. Path of great destruction was 100 yards wide. Fifteen houses, 12 barns, and about a thousand dollars' worth of timber totally destroyed. Thirteen killed, 18 injured. A little hail; hailstones small. Thunder very heavy; little rain fell.

Madison, Madison County.—Extract from Form No. 1009—Meteorological, April 20: Maximum temperature, 73°; minimum, 67°; temperature at 6 p. m., 68°; rain began at noon; ended, 1 p. m.; amount, 0.38 inch; prevailing wind direction for the day, south; character of the day, cloudy.

Scottsboro, Jackson County.—Extract from Form No. 1009—Meteorological, April 20: Maximum temperature, 76°; minimum, 65°; temperature at 5 p. m., 66°; rain ended 1 p. m.; amount, 0.40 inch; prevailing wind direction for the day, southwest; character of day, cloudy.

The following newspaper extracts may be of interest as showing the weather at points off the storms' tracks:

Greenville, Butler County.—From the *Greenville Advocate* for April 23: Speaking of the 20th, all day the wind was blowing a gale, and many people feared the storm would reach here.

Sylvauga, Talladega County.—From the *Sylvauga Advance*, for April 21: Referring to the 20th, heavy thunder and electrical storm; * * * a smokehouse was damaged by falling trees.

90th meridian time used throughout this report.

Figure 3 shows the location of the storms' paths.

IN TENNESSEE.

A tornado occurred on April 20, 1920. On first consideration of the reports received we got the idea that two different tornadoes occurred, but further examination of the reports leads us to believe that it was one tornado striking the ground at intervals.

It first appeared in Wayne County about 9 a. m., passing about 3 miles south of Waynesboro at 9:15 a. m. Its course was from southwest to northeast. We have no reports of tornadic wind effects in Lawrence and Lewis Counties (northeast of Waynesboro), though very heavy rain occurred at Hohenwald, Lewis County, and heavy at Ashwood, Maury County. But there was no tornado in the vicinity of Hohenwald or Ashwood. However, at 10:30 a. m. a tornado struck in the vicinity of Spring Hill, Maury County, and near Burrwood and Thompsons Station, Williamson County, moving north-eastward, in line with the track through Wayne County, made about 1 hour and 15 minutes earlier. It was probably the same tornado.

The map (fig. 3) shows approximately the path of the tornado. Its path was between Burrwood and Spring Hill, about 1 mile east of Burrwood and 3 miles west of Spring Hill. It was traveling directly toward Franklin, about 9 miles northeast of Burrwood, but did not reach Franklin. Apparently, its destructive violence ceased at a point 2 or 3 miles northeast of Burrwood and about 2 miles north of Thompson's Station.

In Wayne County property damage of about \$5,000 was reported, but no lives were lost. In Maury and Williamson Counties the losses were heavier, being estimated at a total of \$20,000. One man was killed and 8 or 10 persons injured near Burrwood, Williamson County.

The rainfall was very heavy in Davidson County, washing away some bridges and causing damages of \$10,000 or more, while in Nashville the streets that were macadamized suffered to the extent, according to estimate, of \$50,000.—*Roscoe Nunn, Nashville.*

TORNADO IN UNION COUNTY, N. C., APRIL 12, 1920.

By G. S. LINDGREN, Meteorologist.

[Charlotte, N. C., May 20, 1920.]

The low-pressure area, which gave rise to the tornado of April 12, 1920, in North Carolina, moved from the middle Mississippi Valley to northwestern Pennsylvania between 8 a. m. and 8 p. m. of that date. The general form of the low on the 8 p. m. map was that of a very much elongated ellipse whose major axis extended from the upper St. Lawrence Valley to the east Gulf coast. Thunderstorms with brilliant lightning occurred at Charlotte during the evening hours. There was little wind and about 0.86 inch rainfall. The barometer at that place dropped during the day, reaching a minimum about midnight.

The temperature gradient on the evening map was decidedly steep in the northwest quadrant, the current temperature at Pittsburgh being 60° F., and that at Toledo, 28° F., approximately 200 miles to the northwest.

At about 9 p. m. of the above date a tornado of marked severity formed in the northwestern part of Union

County, 18 miles southeast of Charlotte, which caused the loss of three lives, seriously injured several persons, and inflicted considerable damage to cattle, farmhouses, timber, and orchards, the total loss being estimated at about \$250,000.

Available records indicate that an average of about one tornado per year has occurred in North Carolina, but nearly all of these appear to have been of a light to moderate type. The loss of life or extent of destruction to property attending the passage of previous storms of this character is unknown, but the one under consideration will rank among the severest that have ever visited this section of the country.

The tornado path was about 3.2 miles long, running northeastward across Union County, extreme northwestern Anson County, and southeastern Stanley County, the last damage reported being 2 miles from the county line. Its width averaged about 150 yards, never being

more than 200 yards; the time occupied in passing was about 45 minutes.

The storm was attended by vivid lightning, moderate to light rains, and a little hail in Union County. A funnel-shaped cloud was seen in Stanley County, but none was observed in Union County, probably because of darkness. That it existed is evidenced by the position of the débris in the path of the storm and by the twisting of the trees that were uprooted or broken off.

The tornado first struck the home of Robert L. Polk, a farmer living about a mile from Ebenezer, killing him, injuring several members of his family, and demolishing all the buildings on the farm. At Ebenezer, the church and schoolhouse were swept away, but no other buildings were touched. Two miles beyond this place the storm seems to have been at its greatest intensity. All that is left of a large and substantial farmhouse is a pile of

rocks; the barn is gone, and other outbuildings completely wrecked. A mule was hurled 100 feet against a tree stump, its body pierced by a 2 by 4 scantling; a horse was carried several hundred feet into a patch of wood, where it was found the following morning apparently unhurt; a steel range from the Preston home was found 3 miles away in a wheatfield; harrows, plows, and other agricultural implements were scattered over the fields for a mile around; a sewing machine was found hanging from a tree limb. Heavy live stock losses were sustained and an extensive orchard completely demolished. The path is marked by the wide swath of twisted and wrenched tree trunks where it passed through forests; but in several cases many houses directly in the storm track were spared. The tornado apparently came to an end in Stanley County, 2 miles west of the Yadkin River.

TORNADOES IN NORTHEASTERN OKLAHOMA, MAY 2, 1920.

There appear to have been three, if not four, distinct tornadoes that swept their trails of death and desolation across Rogers, Mayes, and Cherokee Counties. One struck just outside Chelsea and moved northeast, advancing about 5 miles before it rose. Its path was about a city block. This was at 6 o'clock. It resulted in five deaths. Another swept a path a half mile wide and 3 miles long across the Missouri, Kansas & Texas Railway right of way, 4 miles north of Choteau. Houses were tumbled in its path, but no one was killed. Scores of dead cattle and hogs were found in its wake.

The third storm wiped out Peggs, an inland town of 200 people, occupying a knoll among the foothills of the Spavinaw Mountains. At 8:35 p. m. the tornado leaped a protecting range of hills to the west, dipped into the valley, tore a path of devastation a mile wide and 3 miles long through the countryside, and disappeared. A heavy rain and hail accompanied it. On the following day the official count of the dead stood at 50 and the badly injured at more than 80. Three days later the death list was increased to 60. Most of the persons that remained unhurt after the storm had passed were those who had sought the protection of storm cellars.

The *Muskogee Daily Phoenix* of May 4 gives an account of the Peggs storm in great detail. A few excerpts follow:

[Mr. A. J. Cagle's] family of seven were in the house when the wind crushed it. Two of his sons were blown through the wall into the roadway. Except for a few slight bruises they were unhurt. [Although the house was demolished, not one of the others was scratched.]

A large hole was torn in the Robinson house [next door], and the roof of the back porch dropped to the floor. On the porch a refrigerator, heavily laden, stood between two washtubs. The wind picked up the refrigerator, sucked it out from beneath the roof, hurled it over the housetop, and carried it away. The tubs were not moved.

Only one structure in the entire town escaped wholly unscathed. That building, a small one-story house of wood, is the "city jail." [It

was unoccupied.] Not 30 feet from it the concrete store of Mr. Robinson lies in utter ruins.

By the side of the road a mile from Peggs an automobile, tangled and twisted, had been driven halfway into the ground by the wind.

At the aerological station, Broken Arrow, Okla., 40 miles west of Peggs, an observation at 3 p. m. showed a general drift of the air from the southwest, the wind veering from south-southwest, 5 m/s at the surface and 9 m/s at 1,000 meters through southwest, 14 m/s, at 2,000 meters, and west-southwest, 14 m/s, at 3,000 meters altitude. The tornado paths were observed to move with the wind above 1,000 meters, i. e., from southwest to northeast.*

The day had been oppressively warm and immense cumulus clouds prevailed during the afternoon. By 7 p. m. the lower clouds had disappeared except in the east in the vicinity of the storm, and the sky was clear except for 0.3 cirro-stratus clouds from the west.

The cloud formation over the storm was watched from Broken Arrow from 6:45 p. m. until darkness. Immense cumulus, boiling up with violent commotion, rose to a great height, above which a veil of alto-stratus spread out to the west or windward side. This view of the storm from the rear under a nearly clear sky afforded an unusual spectacle. The cumulus tops were aglow with the last rays of the evening sun and were brightly lighted at intervals by lightning within the clouds.

It is a singular fact that, although very many people in this portion of the State watched this phenomenon with interest, it was six hours after the disaster at Peggs before the news reached the nearest town from which a call for help could be sent out.—*J. A. Reihle, Broken Arrow.*

* These tornadoes occurred about the time of passage of a line of conveyance of wind from the south and west. This line extended in a general northeast-southwest direction through east Texas and Oklahoma.