

THE MIDDLE MISSOURI VALLEY TORNADOES, SEPTEMBER 13, 1928

By G. K. GREENING, Jr.

[Weather Bureau, Sioux City, Iowa]

On the afternoon of September 13, 1928, a series of tornadoes—four in all—developed within a radius of 80 miles of Sioux City, Iowa, in southeastern South Dakota, northeastern Nebraska and northwestern Iowa. The Iowa storms visited Ireton, 40 miles north and Fonda, 80 miles east of Sioux City. Both of these were relatively of minor development and the damage was largely local in area. The other two, violent and destructive, claimed a toll of eight lives and property damage slightly in excess of \$1,000,000. A complete survey by the American Red Cross furnished herewith shows 51 families were made homeless, 87 horses were killed, 136 cattle, 1,619 hogs and 11,690 head of poultry. Three school buildings were destroyed, 66 dwellings and 264 farm buildings. One hundred and three dwellings were damaged, 5,914 acres of corn and 24,641 acres of other crops were destroyed. Estimates of loss for the Nebraska area were \$765,815 and \$246,700 for South Dakota. The South Dakota storm originated about 3:15 p. m., near Fordyce, Nebr., and terminated 45 miles northeastward near Davis, S. Dak.

The tornado in northeastern Nebraska on the same afternoon began 2 miles west and 5 miles south of Pender, Nebr., and travelled in a northeastward path, about 30° east of north. It dissipated one-half mile north of Dakota City, Nebr. or within 5 miles of Sioux City. Had the path of destruction been projected 10 miles farther, the storm would have passed over the business and best residential section of Sioux City.

Eye observations over the 33 miles of desolation have been made between Pender and Dakota City, Nebr. The report will henceforth be confined to that area. The first accurate check on the time of occurrence was made by the train dispatcher of the Omaha Railway, who states that the telegraph wires went down at Pender at 3:50 p. m. The storm crossed the main highway between Pender and Walthill 3 miles east of Pender and from that location over the remainder of the path, except for 2 miles from 2 to 4 miles northeast of Homer, the storm cloud skirted the ground. The section traversed is a hilly and at times wooded country on the hillsides, from Pender to Homer, devoted to agriculture, including general farming and livestock raising. The hills terminate 2 miles northeast of Homer where the country to the northeast broadens out into fertile bottom lands bordering the Missouri River.

The velocity of translation over the 26-mile path from the time the storm crossed the Omaha Railway southeast of Pender at 3:50 p. m. till it broke up near Dakota City at 4:30 p. m. was approximately 40 miles an hour.

Coming, as it did, very late in the season, with the corn crop nearly matured and livestock at more advanced growth than in the spring, the damage was much greater than had the storm occurred several months earlier. With much of the area planted to corn and considerable timber along the slopes and over the hillsides, the path is easily discerned. Hail storms occasionally riddle fields of corn in this territory to a sickening degree, but it remains for a tornado to reduce a corn field to nothingness. The corn, where struck, was husked, shredded, and leveled to the ground, a total loss at one blow. A few rods away, the corn stands upright and ready for harvest, a striking contrast as to how nature can frown or smile on neighboring farmers.

The lay of the débris and timbers was easily noted. Most of the corn was flattened to the north, or somewhat to the left of the storm path and uprooted trees lay at right angles in many instances. The wrath of the storm seemed to vent itself on the abrupt north slopes, where best sheltered from high southwest winds. The terrific suction as the funnel swoops over the hillside must account for the abnormal force that draws everything toward it.

Most appalling of all that was laid waste were three rural schools that were in the direct path of the storm, two of which were well sheltered by high hills to the southwest. The first to be struck, the James School, 3 miles east of Pender, was more in the open, with slight rises both to the north and south. A farmer lad, Dale Larson, on sighting the storm, hurried to the schoolhouse and assisted the teacher, Miss Dorothy Smith, in rushing the 29 pupils into a storm cave alongside the building. About two minutes later the tornado struck and the pump at the well and a swing device set in concrete alone survived. No trace of the building was to be seen. A few days later while traveling over the storm area, a happy truck load of children were seen coming from Pender, where they had been taken to school, thanks to that inexpensive refuge that should be found at all country schools in this region—a little cave.

Seven miles onward it swept, destroying crops and farm buildings, until it reached the second rural school building, the Lamare School, which met a similar fate. Gene Keyser, father of one of the injured children, arrived at the school just as the tornado swept toward it over the hills from the southwest. Mr. Keyser and the teacher, Miss Phyllis Stewart, gathered the 23 children present together and ordered them to lie down on the floor and join hands, in an effort to escape injury. The building was swept entirely away as if it were a paper box and two children, Mary Belt and Kenneth Norris, were killed. The teacher was seriously injured.

Six miles to the northeast of the Lamare School, where 2 sets of farm buildings were totally destroyed, 11 persons found refuge in a cave. Freakish incidents, which were plentiful over the whole area, were especially noted at this place. A 1¼-inch cottonwood limb was driven into a 9-inch cement entrance of the same cave and straw was driven fully three-eighths of an inch into hedge posts in the neighborhood. The survivors who escaped injury in the cave gave various descriptions of the sensation felt, one of which was that the sensation "was like a person experiences when taking ether."

Two miles north from this point the third schoolhouse—the O'Connor rural school—met the same sad fate. The building was perfectly sheltered by the hills to the south. At the first signal of the approaching black clouds, Alva Traske, a farmer living near by hopped into his automobile and rushed to the school. En route he lost a tire and arriving at the school he loaded the school children into the car and urged the teacher, Miss Helen Rooney to go along. She declined and her lifeless body was discovered 100 yards west of where the school building had stood, with the door knob in her hand.

The storm moved out into the open country for about 2 miles after passing the O'Connor school and then left the ground for about the same distance, when it descended and left a well-marked trail until it reached Dakota City,

the county seat of Dakota County, where considerable property damage was done. The tornado dissipated about 4:30 p. m. one-half mile north of Dakota City, after having traversed a path of 33 miles across north-central Cuming County, diagonally across central Thurston and the eastern border of Dakota County, Nebr.

The path averaged from a few rods to three-fourths of a mile in width. Except for a distance of about 2 miles the funnel-shaped cloud, which was seen by reliable people over the whole course, never left the ground. Hail, not heavy, but large stones, fell with rain preceding the storm. The sky cleared rapidly after the passage of the tornado and a few observers reported that no rain fell at the time the storm struck. The cloud as a rule, was described as being jet black, with the usual grinding noise heard, timbers, straw, and debris being scattered by the whirling mass. Although the storm dissipated 5 miles southwest of Sioux City, straw, corn stalks, and leaves that had been hurled into the air were scattered over the city between 4:30 and 5 p. m.

Since the occurrence of this tornado, much has been said about a supposed old Indian legend to the effect that Sioux City is safe from tornadoes due to the convergence of three rivers—namely, the Big Sioux, the Floyd, and the Missouri. Previous disasters from the same cause do not warrant faith in such a fallacy, although many firm believers point to the dissipation of this storm within 5 miles of the Missouri River to prove their contentions. This writer has been commended by insurance writers in an article appearing in the daily press for holding such a theory as improbable.

Conforming to the general rule, the Pender tornado formed in the southeastern quadrant of a general cyclonic disturbance. It originated approximately 275 miles to the southeast of the main center. So far as known the only photograph of the storm was taken near Pender, a copy of which is inclosed. Witnesses in that section stated that the funnel when it first formed was made up of several sections, reaching upward from the ground to the main storm cloud, from which small jets of white cloud having the appearance of steam were emitted at intervals. As the cloud lowered the different sections merged into a whirling mass.

The maximum temperature chart for the afternoon of September 13 showed a sharp temperature gradient over the middle Great Plains States, ranging from 96° at Concordia, in north-central Kansas, to 52° at Cheyenne in southeastern Wyoming. The direct cause perhaps was due to the underrunning of the cold currents from the high barometric pressure area that was approaching the middle Rocky Mountain region. The air was very

oppressive immediately before the storm struck, as evidenced by noon humidity readings of 72 per cent at Sioux City and 82 per cent at Yankton.

A number of eyewitnesses saw the cloud that wrought havoc dissipate. Mr. E. L. Vannard, secretary of the Morningside Country Club, who with two others was watching the storm from the clubhouse located in the southeastern portion of Sioux City, states that a tree of moderate proportions dropped from the sky within a few feet from where they were standing and that a bundle of oats fell on the golf course. He saw a well-defined black funnel cloud approaching from the southwest, when suddenly it became disconnected and the upper portion seemed to draw up in the clouds while the lower section became disjointed and quickly faded out and disappeared on the ground.

The storm reached Sioux City in the form of a thunderstorm from the south, first heard at 3:56 p. m. and last heard at 4:59 p. m. Rain fell from 3:48 p. m. to 4:50 p. m., amounting to 0.99 inch. A trace of hail was recorded from 4:16 to 4:25 p. m. The maximum velocity of the wind for a 5-minute period was 30 miles from the southeast beginning at 4:31 p. m., with an extreme velocity of 46 miles. The barometer fell gradually from 7 a. m. till 3 p. m. and then quite abruptly till 4:25 p. m., when it reached a sea-level reading of 29.50 inches, the lowest recorded. Then there was a sharp rise making a graph similar to the passage of a thunderstorm.

Summary of damage furnished by the courtesy of American Red Cross

	Nebraska		South Dakota		Combined	
	Number	Value	Number	Value	Number	Value
Dead.....	4		4		8	
Injured.....	52		9		61	
Families homeless.....	51				51	
Families registered.....	153		20		173	
Number of individuals.....	846		97		943	
Livestock killed:						
Horses.....	86	\$4,300	1	\$50	87	\$4,350
Cattle.....	126	12,600	10	1,000	136	13,600
Hogs.....	1,280	19,200	339	5,085	1,619	24,285
Poultry.....	9,525	9,525	2,165	2,165	11,690	11,690
Schools destroyed.....	3	7,000			3	7,000
Dwellings destroyed.....	41	102,500	25	62,500	66	165,000
Dwellings damaged.....	67	67,000	36	36,000	103	103,000
Business houses destroyed.....			27	67,500	27	67,500
Farm buildings destroyed.....	222	111,100	42	22,100	264	133,200
Farm buildings damaged.....	237	47,400	46	9,200	283	56,600
Farm implement sets destroyed.....	72	36,000	14	7,000	86	43,000
Farm implement sets damaged.....	77	15,400	16	3,200	93	18,600
Acres corn destroyed.....	5,399	107,980	515	10,300	5,914	118,280
Acres other crops destroyed.....	22,581	225,810	2,060	20,600	24,641	246,410
Total.....		765,815		246,700		1,012,515

THE ROCKFORD, ILL., TORNADO, SEPTEMBER 14, 1928

By FRED H. WECK, Assist. Meteorologist

[Cicero Aviation Field, Chicago, Ill.]

The Rockford tornado originated in an area of low pressure which covered the Northern Plains States on Thursday, September 13, and was central over central Minnesota on the morning of September 14. On the afternoon of the 14th, the day of the storm, special reports indicated that the center was located in eastern Minnesota with a barometer reading of 29.46 inches, sea level.

The tornado developed in the southeastern portion of the depression and about 200 miles from the center. It descended to earth at the southern city limits of Rockford, a city of about 85,000 people, and moved northeastward over the southeastern portion of the city for a

distance of about 2¼ miles, affecting more than 30 city blocks. Passing across the Grant Highway east of town it moved into the country.

The first evidence of destruction was observed just outside of the city limits, where the roof and one gable were removed from a cottage. About 500 feet farther on a small dwelling, sheltering a family of 6, was completely demolished and the debris scattered over an open field for several hundred yards. While the parents were painfully injured and the children cut in numerous places all escaped death. To the northward at the adjacent house a man was found dead in the yard after the storm,