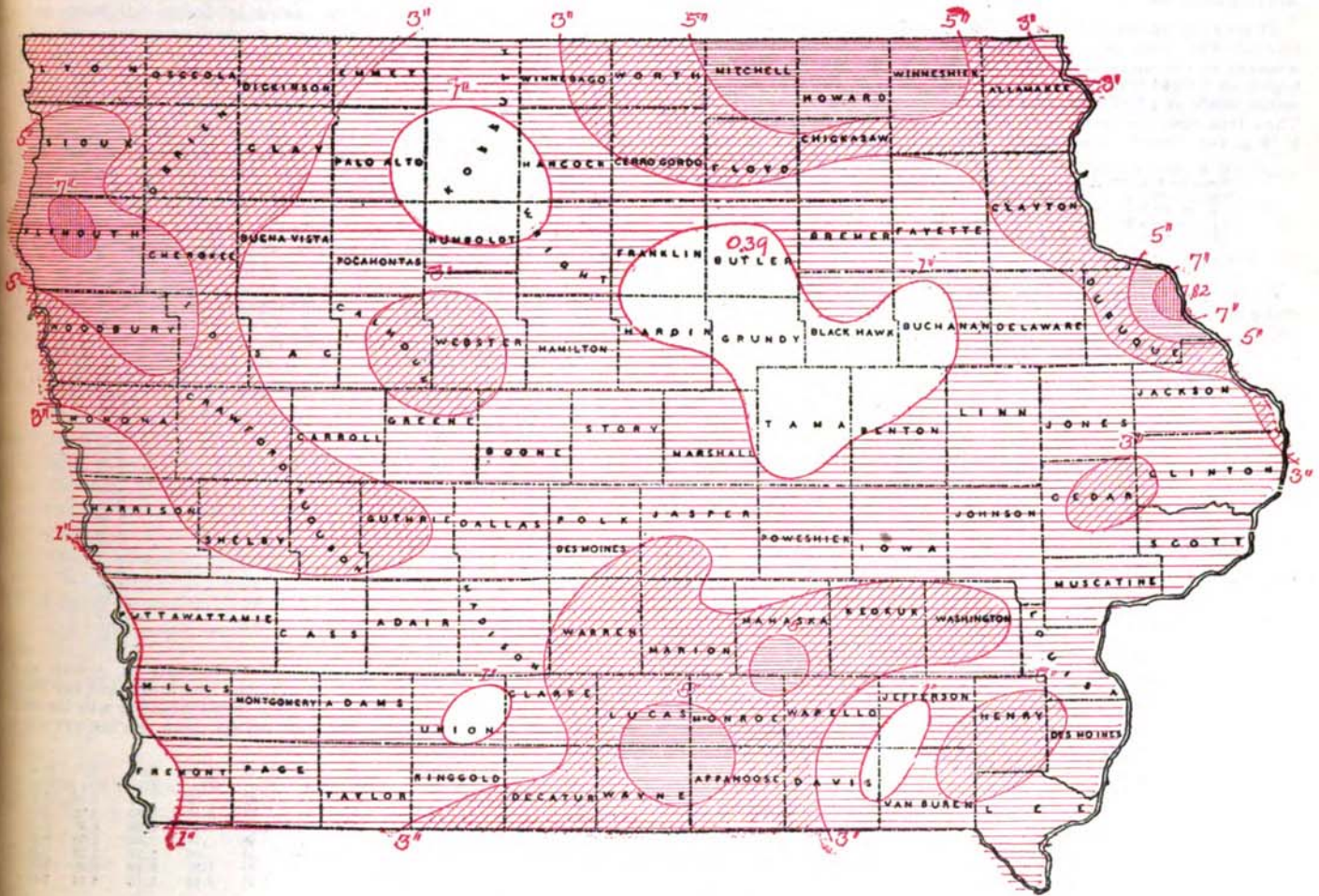


TOTAL PRECIPITATION, JULY, 1919.



SCALE OF SHADES—IN INCHES



INTENSE RAIN STORM AND FRESHET, DUBUQUE, IOWA,
JULY 9, 1919.

J. H. Spencer.
(75th Meridian Mean Time Used Herein.)

The rain storm of July 9, 1919, was the worst at this station since July 4, 1876, when 40 persons were drowned at Rockdale, on the outskirts of Dubuque. In the storm of July 9 seven persons were drowned in freshets caused by the torrential rains and great damage resulted to streets in all portions of the city lying below the bluffs. Although three houses were struck by lightning, thunder and lightning were rather less severe than in some of the storms of the past eight years; damage from lightning was slight, probably due to the heavy rainfall, which prevented serious fires. Wind velocity was light, and therefore the crop damage was comparatively small, except on flooded lowland, where they were ruined.

At no time during the hours that preceded the period of heaviest rainfall was there much indication of a severe storm, although the weather in the morning quickly changed to warm and sultry. Rain began as a light thundershower from 11:25 a. m. to 11:55 a. m. Rain began again at 12:15 p. m. and was moderately heavy until 2:50 p. m. Then followed the great downpour of 2.64 inches from 2:51 p. m. to 3:36 p. m. Hourly amounts for the entire storm were as follows:

11 a. m. to noon.....	.06
Noon to 1 p. m. ....	.44
1 p. m. to 2 p. m. ....	.34
2 p. m. to 3 p. m. ....	.80
3 p. m. to 4 p. m.	2.23
After 4 p. m. ....	.01
Total	3.87 inches

Rainfall was excessive from 2.51 p. m. until 3:36 p. m., and accumulated amounts were as follows for this period:

5 minutes .....	.17	30 minutes	2.16
10 " .....	.51	35 "	2.40
15 "	1.17	40 "	2.51
20 "	1.71	45 "	2.64
25 "	1.91		

The following are the greatest amounts during the entire storm in—

5 minutes .....	.80	30 minutes	2.23
12 "	1.20	One hour	2.70
15 "	1.62	Two hours	3.03

Union Park, a pleasure resort on the outskirts of the city to the northwest, is a narrow valley only a few hundred feet wide in places, with steep hills on either side. Running through the valley is a creek, which is practically dry except during wet periods. During the period of excessive rainfall on July 9th this creek became a raging torrent many feet deep, overflowing its banks, and destroying park property of all kinds. A number of picnickers took shelter from the rain in a pavilion near the creek. The rising waters quickly flooded the building and finally swept it away, precipitating its occupants into the freshet. In spite of heroic deeds upon the part of the park employees and others, five persons were drowned here or elsewhere in the park. They were: Mrs. Chris Wagner, age 38; Blanche Wagner, age 10; Edmund Wagner, age 3; Sarah Sezer, age 6; Herbert Ricke, age 4. Property loss at Union Park is estimated at from \$10,000 to \$15,000.

Another tragedy occurred on 32d street, near Heim's brick yard. Mrs. George Kennicker and two small children attempted to cross the street and the woman and one child were swept by the torrent of water into the Bee Branch sewer and drowned. The dead child is Ruth Brose, age 3. The other child was carried over the mouth of the sewer and escaped, but with serious injuries.

The damage to waterway streets and to many streets on the level below the bluffs was surprisingly great. Kaufmann Avenue was completely ruined and also West Locust Street between Jackson School and Mt. St. Joseph College. Julian Avenue and Dodge Street were badly damaged. Much of the brick paving on 8th street for several blocks above Bluff was stripped off and thousands of brick carried down by the water to the business section of the city. The wood block paving for several blocks on Couler Avenue

above 18th Street was carried away and the avenue over this area was a wreck after the storm. Some of the streets below Main, particularly from the Carr, Ryder & Adams Co. factory northward to the Brunswick-Balke-Collender Co. factory, were covered with water during the height of the storm; water in large areas was 2 to 3 feet deep. Hundreds of cellars were flooded and some were completely filled with water and mud, the water reaching to the first floor in many instances. These are only typical instances of the damage by the storm. Few sections of the city from Eagle Point and the Brunswick-Balke-Collender Co. factory on the north to Dodge Street and the lumber yards on the south—a distance of about four miles—escaped damage.

City officials estimate that the streets of the city were probably damaged to the extent of \$75,000 to \$100,000. This may be correct, because many thousands of dollars will be required to clean and repair the streets, while some are beyond repair and will have to be replaced. There are hundreds of individual losses, relatively small.

About 20 small bridges in Dubuque County were damaged or destroyed, causing a loss of nearly \$25,000. Total damage from the storm was approximately \$125,000. This includes damage to city streets, county roads and bridges, at Union Park, and to homes and factories.

Incidental to the storm of July 9, 1919, it is worthy of note that during the past nine years (1911 to 1919, inclusive) there have been seven storms in which more than 3.00 inches of rain within 24 consecutive hours fell, or more storms of similar intensity than occurred during the 29-year period from 1882 to 1910, inclusive, which gave only six. On the other hand, during the eight-year period from 1874 to 1881, there were nine storms that gave more than 3.00 inches of rain within 24 consecutive hours.

The following table gives the dates of all storms at Dubuque from 1874 to 1919, inclusive, in which 3.00 inches or more of rain fell within 24 consecutive hours:

September 18-19, 1874	3.70 inches
September 8-9, 1875	5.40 "
July 4-5, 1876	4.55 "
September 5, 1876	3.40 "
July 6-7, 1879	3.39 "
June 24, 1880	3.03 "
September 25, 1880	3.38 "
July 10, 1881	3.42 "
September 26, 1881	4.01 "
August 23-24, 1885	3.89 "
May 9-10, 1890	3.18 "
June 2-3, 1890	3.04 "
June 16, 1892	3.48 "
July 26, 1896	4.83 "
September 13-14, 1900	3.25 "
August 10-11, 1911	3.75 "
August 18-19, 1912	5.23 "
August 31-September 1, 1914	3.18 "
September 14-15, 1914	3.38 "
September 25-26, 1915	4.79 "
August 16-17, 1918	5.22 "
July 9, 1919	3.87 "

The following table gives the heaviest rainfall in periods of 5 minutes, 10 minutes, 15 minutes, 30 minutes, one hour, and two hours for a number of storms. It shows how much heavier was the rainfall on July 9, 1919, within a one hour period, than during any storm at Dubuque in recent years:

Storm of—	In 5	In 10	In 15	In 30	In 1	In 2	In 24
	Min.	Min.	Min.	Min.	Hr.	Hrs.	Hrs.
August 10-11, 1911.....	.32	.52	.62	.81	1.12	1.97	3.75
August 18-19, 1912.....	.50	.71	.94	1.46	1.95	2.82	5.23
August 31-September 1, 1914 .....	.41	.72	1.08	1.30	1.95	3.18	
September 14-15, 1914.....	.34	.51	.58	.73	.85	1.36	2.38
September 25-26, 1915.....	.34	.46	.53	.68	1.27	2.22	4.79
August 16-17, 1918.....	.35	.62	.79	1.37	2.10	2.96	5.22
July 9, 1919.....	.80	1.20	1.62	2.23	2.70	3.06	3.87

From the record of "Excessive" precipitation at Dubuque the following data are taken: On July 4, 1876, 4.55 inches fell in two hours, five minutes. On July 7, 1879, 1.87 inches fell in 27 minutes. On August 18, 1912, 1.81 inches fell in 43 minutes. On August 31, 1914, 1.23 inches fell in 20 minutes. On September 26, 1915, 2.57 inches fell in two hours, 27 minutes. On August 16-17, 1918, 2.48 inches fell in one hour, 18 minutes. On July 9, 1919, 2.65 inches fell in 45 minutes.