THUNDERSTORMS ON AUGUST 2, 1899.

By ALFRED J. HENRY, Chief of Division.

On August 2, 1899, thunderstorms were observed in almost every State and Territory of the Union. In the majority of cases the storms brought a welcome shower of rain and cooled the heated atmosphere. In the Middle States, however, particularly over a region 300 miles in width, extending from the Adirondacks southward to the Lower Potomac, the storms were of unusual violence. In many cases large trees were uprooted or broken off, barns and outbuildings were prostrated by the force of the wind, and fields of grain and tobacco were beaten down and destroyed by the hail. The electrical discharges were numerous and exceedingly destructive of human life. Four persons were killed by lightning stroke in New York, four in Pennsylvania, and one each in New Jersey, Maryland, West Virginia, and New Hampshire. In addition to the foregoing, two persons were killed in Montana and one in Indiana, making a total of fifteen casualties by lightning for the day. A mother and two children were blown into the Patuxent and drowned, and three other persons lost their lives as a direct result of the fury of the wind.

The distribution of pressure and temperature and the direction of the wind at 8 a. m., seventy-fifth meridian time, are graphically shown on the small chart below, Fig. 2.

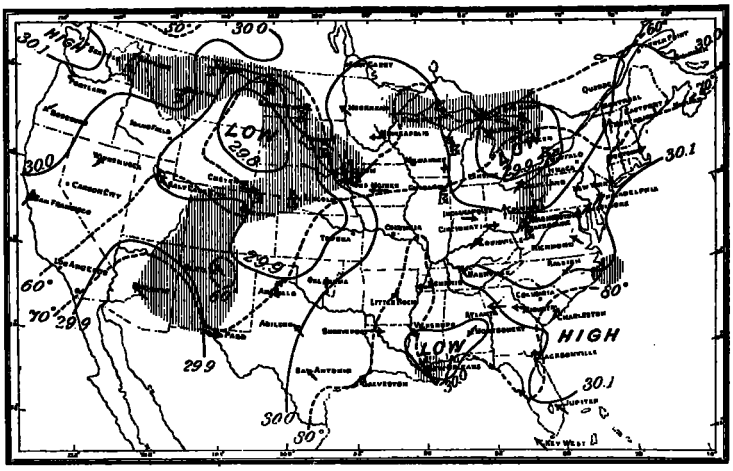

FIG. 2.—Weather map of August 2, 1899, 8 a. m.

Two weak cyclonic systems appear on this chart. The first covers the northeastern slope of the Rocky Mountains; the second lies over Lakes Huron, Erie, and Ontario. The thunderstorm symbol is shown at those stations where thunderstorms occurred within the preceding twelve hours. The occurrence of a thunderstorm at the hour of observation has been indicated by placing the letter R at the station in addition to the thunderstorm symbol. It will be noticed that thunderstorms were in progress at Bismarck, N. Dak.; Huron, S. Dak.; and Sioux City, Iowa, in the West, and at Parkersburg, W. Va., in the East at the morning observation hour.

Passing directly to the consideration of the eastern group of thunderstorms, with which we are most interested, we may observe, first, that the position of the dominating cyclonic system is particularly favorable to the rapid development of thunderstorms throughout central and eastern New York, eastern Pennsylvania, New Jersey, Delaware, and Maryland, since those regions will probably remain within the influence of the cyclonic circulation during those hours when the vertical circulation in the lower air is most active.

At the morning observation of August 2, immediately to the southward of the storm center, the weather was clear, with light westerly to northwesterly winds. To the southeastward, in Maryland and the District of Columbia, a relatively small area of cloudy weather prevailed, while in eastern Pennsylvania and New Jersey it was clear. The temperature was slightly above normal from the Potomac northward to the St. Lawrence Valley, and light southerly to southwesterly winds prevailed over the greater part of this region.

In the upper half of western Pennsylvania, and in western New York, cloudiness increased during the forenoon, and light thunderstorms occurred here and there. By 1 o'clock p. m. the area of increasing cloudiness and rain had moved to central Pennsylvania and New York, and numerous light thunderstorms began to develop in this region and move in a northeasterly direction with the general surface winds. These storms were separate and distinct; they do not appear to have united in a general storm front, nor to have attained marked violence. Their progressive motion seemed to be wholly with the surface winds, much as an eddy floats down stream with the current.

The first and only series of severe southwesterly storms occurred in northeastern New Jersey in the towns of Plainfield, Dunellen, Flemington, Newark, and Elizabeth. The place last named, in particular, suffered heavily. The force of the wind was so great that many persons believed the city had been visited by a tornado. While there is every reason to believe that the wind assumed hurricane force in streaks throughout portions of its track through the city the evidence as to its tornadic character is not conclusive.

At the same time that the southwesterly storms were advancing over northeastern New Jersey and southeastern New York, a severe thunder and hail storm began to move in a southeasterly direction through the central districts of Maryland. Many details in regard to the this storm were collected by Mr. F. J. Walz, Director of the Maryland Climate and Crop Service, who has published a summary of his conclusions in the August bulletin of that service. We make the following excerpts from Mr. Walz's report:

> In interior Maryland the storm was severe over a large area, extending from eastern Washington and western Carroll counties in a southeastern direction to Calvert and St. Mary counties. On the western limits of the storm's path the winds reached their highest velocities from the northwest, while on the eastern limits the more violent winds came from the northeast.
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> In the storm stricken region 139 buildings, including barns and sheds, were destroyed by the wind; 3 were struck by lightning and burned; 7 were damaged by lightning, and 43 by the wind.
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> In the northern portion of the storm's path the main loss was occasioned by hail. Where the winds were the highest and the lightning most incessant there the hail was the heaviest. In some places hail lay unmelted for hours, and some of the elongated forms were 6 inches in length. In the areas of great destruction by hail the damage occurred largely in streaks or parallel bands, with intermediate strips that were left untouched.

The storm in Maryland differed from those more to the northward, in that it was well united, compact, and retained its violence over a course about 100 miles in length, which it traversed in about two hours. It swept over the country much as a swift steamer makes headway against a current. Immediately on its front the outrushing squall winds came from a northerly quarter, but as soon as the disturbance had passed, the surface winds took up their former course, viz: from the south. Later in the day, in southeastern Pennsylvania and New Jersey, thunderstorms developed and moved in a southerly direction, accompanied by a severe squall wind from the north, but no sooner had the disturbances passed the point of observation than the winds resumed their previous directions, viz, from a southerly quarter, as in the case of the Maryland storm. These temporary incursions of north winds, with thunderstorms, while seemingly of no avail as regards effecting an immediate change in the direction of the surface winds were evidently the forerunners of a general shift of the winds to the west and northwest, with clear weather and lower temperature. I have thought it of interest to note the times when the wind shifted to the westerly quarter at weather Bureau stations in the region under con-

sideration. Beginning at the most northerly, that is the station nearest the storm center, these times were: Albany, N. Y., 6:15 a. m., August 3; Binghamton, N. Y., 9:30 a. m., 3d; New York, N. Y., 11:50 p. m., 2d; Philadelphia, Pa., 2 a. m., 3d; Harrisburg, Pa., 7 a. m., 3d; Baltimore, Md., 12:25 a. m., 3d; Washington, D. C., 1:30 a. m., 3d.

In looking for an explanation of the severity of the storms in New Jersey and Maryland are met with that bugbear of almost all scientific investigation, "insufficient data." The only suggestion we have to offer is that the atmosphere in the localities named was more humid (relative humidity 92 per cent at Washington, D. C., and 82 per cent at Baltimore, Md., on the morning of the 2d) and that the vertical circulation, as indicated by the formation of cloud early in the day, was more active than in adjacent districts. The eastward drift of the cyclonic system that covered the Lake region in the morning would bring it into districts whose atmospheric conditions, from the causes just mentioned, were already in a highly favorable state for the development of thunderstorms. This might also be offered as accounting, in a measure, for the severity of the storm.

OBSERVATIONS AT RIVAS, NICARAGUA.

Simultaneous observations at 1 p. m. Greenwich (or 7:17 a. m. local) time, August, 1899.

Date.	Temperature.		Wind.		Upper clouds.*			Lower Clouds.		
	Air.	Dew-point.	Direction.	Force.	Kind.	Amount.	Direction from.	Kind.	Amount.	Direction from.
	°	°								
1	79	73	se.	5				k.	Few*	*se.
2	79	73	se.	2	ck.	10	sw.	k.	Few	se.
3	79	75	ne.	3				ks.	3	ne.
4	77.5	74	ne.	3				k.	10	ne.
5	78.5	75	ne.	3	ck.	10		ks.	Few	ne.
6	79.5	73	ne.	5				ak.	10	ne.
7	79.5	72	ne.	6				fk.	5	ne.
8	80	73	ne.	6				fk.	1	ne.
9	79	73	ne.	5	c.	1	sw.	fk.	1	ne.
10	80	76	ne.	3	cs.	5	e.	fk.	Few	ne.
11	79.5	76	ne.	1				ak, k.	9	ne.
12	80.5	75	ne.	2	cs.	9	se.	k.	1	ne.
13	80	76	se.	3	ck.	9		k.	1	se
14	77.5	75	nw.	0				k.	10	se.
15	80	76	e.	3				fk.	9	e.
16	78.5	75	ne.	3				k.	10	ne.
17	80	73	ne.	4				fk.	8	ne.
18	80	73	se.	4				k, ks.	10	se.
19	78	74	ne.	5				fk.	1	ne.
20	78.5	75	ne.	3				ak.	9	ne.
21	79	73	ne.	6	ck.	2		k.	7	ne.
22	80	73	e.	5				ak, k.	5,2	se., e.
23	79	75	ne.	5				k.	10	ne.
24	78.5	75	se.	4				ak, k.	10	se.
25	76	73	ne.	2				k.	9	ne.
26	74	74	†	0				kn.	10	n.
27	75.5	72	ne.	0				ak.	10	ne.
28	75.5	72	ne.	5				ak.	7	ne.
29	77	73	ne.	3	ck.	10		k.	Few	ne.
30	75.5	72	ne.	0	cs.	2	se.	k.	1	ne.
31	76.5	74	se.	1	cs.	5		ak.	Few	se.
Means	78.4									
Departure	+1.50									

*On Ometepe. †n. by w.

Climatological observations for twenty-four hours ending at 7:17 a. m. local (or 1 p. m. Greenwich) time, August, 1899.

Date.	Temperature.		Wind.		Average cloudiness.	Total rainfall.
	Maximum.	Minimum.	Prevailing direction.	Maximum force.		
	°	°				*Inches.*
1	82	77.5	ene.	5	9	0.00
2	88	77	e., se.	7	3	0.00
3	87.8	77.6	ne-e.	5	5	0.01
4	86	78	ne.	5	9	0.19
5	87.5	76	ne.	4	7	0.02
6	88	77	ne.	6	6	0.06
7	85.8	78	ne.	5	9	0.00
8	89	78	ne.	7	8	0.00
9	87	79	ne-e.	6	6	0.00
10	89	77.6	ne.	5	7	0.00
11	88	78	ne.	4	3	0.03
12	87	78	ne.	8	8	0.00
13	89.1	78	ne.	3	10	0.00
14	86	79	se.	5	10	0.17
15	87	77	ese.	4	7	0.58
16	88	78	ne-e.	5	9	0.03
17	86.5	77	ne.	4	7	0.04
18	87	76.8	ne.	5	8	0.01
19	81	76	e-ne.	6	10	1.20
20	85.5	76	ne., se.	5	6	0.20
21	84	77.4	ne-e.	5	7	0.46
22	82.5	77.5	ne-se.	7	7	0.06
23	83	78	*	7	4	T.
24	83	79	ne-se.	6	7	0.95
25	84.3	77.5	e-se.	7	10	0.34
26	80.2	74.5	ne-se.	3	9	2.22
27	78	74	n-se.	2	10	1.02
28	82	75	ne-e.	4	9	0.00
29	84.5	75	ne.	6	6	0.07
30	84	76	ne-se.	5	8	1.40
31	85	73.5	ne-e.	3	7	0.22
Sums						†9.26
Means	85.0					
Departure						+1.31

*ne. by e.

†0.02 inch that fell on July 31 should be added to the above, and 0.05 that fell on the afternoon of August 31 should be transferred to the September rainfall, thus the corrected rainfall for August becomes 9.25.

The records contributed for many years by Dr. Earl Flint, at Rivas, Nicaragua, include barometric readings. His present station is at 11° 26′ N., 85° 47′ W. The observations at 7:17 a. m., local time, are simultaneous with Greenwich 1 p. m. The altitude of this barometer is now said to be 4 feet above ground; the thermometer 6 feet above ground; the rain gage 7 feet above ground. The ground is 210 feet above sea level. Until the barometer has been compared with a standard it seems hardly necessary to publish the daily readings. The wind force is recorded on the Beaufort scale, 0–12. When cloudiness is less than $\frac{1}{10}$, the letter "F," or "Few," is recorded

This station is situated on the western shore of Lake Nicaragua, not far from the eastern end of the western division of the Nicaragua Canal. The volcano Ometepe, on an island in Lake Nicaragua, is about 10 miles northeast of the station. Dr. Flint's records occasionally mention the presence of clouds on the summit of this mountain.

Dr. Flint's reports to the Weather Bureau now embrace two distinct features, namely, the simultaneous morning observations and the daily climatological summary, as given in the two prceding tables for each month.

NOTES BY THE EDITOR.

A NEWSPAPER TORNADO FAKE.

In mining engineering a fake is a worthless, deceptive stratum among the valuable ones; in theatrical usage it means a worthless piece of stage property or rubbish; in popular American usage it means a story that is plausible, and at first readily believed, but on investigation turns out to be a fiction that was intended to deceive, i. e., a cheat and a lie.

We regret to have to use this word so often, but it is expressive and appropriate. The popular interest in meteorology is intense, and thousands whose business depends upon knowing the exact truth do not generally care to stop and investigate a dubious startling novelty—they come straight to the Weather Bureau and overwhelm our observers with questions; they seem to look to the Bureau to protect them