To give some idea of the frequency of tropical hurricanes a table is attached giving dates of all that have occurred on the coast of South Carolina for two centuries.

*Hurricanes on the coast of South Carolina.*

| Year. | Month. | Day. | Lives lost. | Moon's age. |
|---|---|---|---|---|
| 1700 | Sept | 16 | ..... | 1 |
| 1713 | ...do | 16 | ..... | 25 |
| 1728 | ...do | 14 | ..... | 8 |
| 1752 | ...do | 15 | 20 | 5 |
| 1787 | ...do | ..... | 23 | ..... |
| 1797 | ...do | 5 | ..... | 12 |
| 1804 | ...do | 7 | ..... | 1 |
| 1811 | ...do | 10 | ..... | 22 |
| 1813 | Aug | 27 | 15 | 0 |
| 1815 | Sept | 28 | ..... | 25 |
| 1822 | ...do | 27 | 200 | 10 |
| 1830 | Aug | 16 | ..... | 27 |
| 1837 | Sept | 1 | ..... | 0 |
| 1841 | ...do | 16 | ..... | 29 |
| 1844 | Oct | ..... | ..... | ..... |
| 1846 | Aug | 16 | ..... | 23 |
| 1850 | ...do | 24 | ..... | 16 |
| 1851 | ...do | 24 | ..... | 27 |
| 1852 | ...do | 27 | ..... | 11 |
| 1854 | Sept | 7 | ..... | 14 |
| 1871 | Aug | 19 | ..... | 3 |
| 1874 | Sept | 28 | 2 | 16 |
| 1878 | ...do | 11 | ..... | 13 |
| 1881 | Aug | 27 | ..... | 3 |
| 1882 | Oct | 11 | ..... | 29 |
| 1885 | Aug | 25 | 21 | 14 |
| 1893 | ...do | 27 | 2,000 | 14 |
| 1893 | Oct | 13 | 25 | 2 |
| 1894 | Sept | 27 | ..... | 27 |

The above table gives the dates of all tropical hurricanes that have visited the coast of South Carolina during the last two centuries of which record can be found. Where loss of life on land is mentioned, the estimated number is given. The moon's age at each date is also shown, to indicate whether the hurricane occurred nearest the time of spring or neap tides. Of 29 in all, 16 fell nearest to the spring tides, and 11 the neap.

## REPORT ON THE TORNADOES OF MAY 25 IN THE STATE OF MICHIGAN.

By NORMAN B. CONGER, Inspector, Weather Bureau (dated Detroit, June 22, 1896).

The data for this report is gathered from all reliable, available sources, but the most reliable data is contained in the report of the committee on cyclone damages appointed by Governor John T. Rich to ascertain the total damages and the amount of relief necessary in the district covered by the tornado. The report of this committee covers the counties of Oakland and Lapeer only, and it is in this district that the majority of the damage occurred, and where the tornado was most severe. That report covers the path of the storm so fully that it will not be necessary to repeat it. Reports were also received from the postmasters at Dryden, Utica, Amadore, Fostoria, Otisville, Oakwood, Ortonville, Otterlake, Metamora, Thomas, and one by Mr. Alexander G. Burns, of this office, who made personal inspection of the track of the storm that passed over Walkerville, Canada, just across the river from Detroit.

I made a personal visit the day after the storm to Thomas (Oakland County) to observe the action of the tornado and to follow its path for a short distance and observe its characteristics. The greatest damages were observed at Ortonville, Oakwood, and Thomas, in the northeast corner of the county.

I have made a careful study of the path of the storm at Thomas, Oakland County, and inclose a sketch, Chart No. VIII, drawn by Mr. E. F. Hulbert, showing the manner in which the storm distributed the debris.

The path of the storm was distinctly marked at Thomas. The south side of the storm showed all the trees, houses, and fences thrown to the northeast, while in the center of the path, which was probably an eighth of a mile in width at this point, the debris was laid to the east. The fence rails were laid due east and west, and all were laid out as carefully as though placed there by the hand of man. No two rails were laid one on another. On the north side, where the distinct path was of the same width as the center, the houses and debris were all turned to the south or southwest, with some few pieces lying to the west. From conversation with those who had visited the whole district, I learned that the same characteristics were observed throughout the length of the path. It was noticed in the center of the path that the grass was pounded down into the earth as though it had been washed into the earth by a heavy flow of water. The small trees on the south side of the path were stripped of their bark, even to the twigs, as though done by the careful hand of an experienced artisan. On one side of the road which runs north, at Thomas, the house of Mr. Kidder was carried bodily for about 300 feet, and then smashed into the earth, the contents of the house scattered beyond finding, while across the road, some 600 feet to the north, the frame house of Mr. Copland was taken free from the stone foundation, and the debris were found from 2 to 10 miles farther east-northeast. All that was left of his house was a square piano, which was standing on its side some 200 feet directly north of the foundations of the house, one end being pounded full of grass. One peculiarity of the freaks of this storm was the unroofing of the post office at Thomas, leaving only the lower story standing, and in the window was still displayed the weather forecast card of the day: "Severe local thunderstorms this afternoon and to-night; showers followed by fair, Tuesday." The forecast had been terribly fulfilled in this section.

Tornadoes occurred, or windstorms were reported, at about 6 p. m., local time, and at about 20 localities in the following counties, as represented on the map: Montcalm, Kalkaska, Midland, Bay, Tuscola, Genesee, Lapeer, Oakland, Macomb, St. Clair, Sanilac, and Wayne, the most damage occurring in the counties of Oakland, Lapeer, and Genesee, in the order named. That in Kalkaska County simply cut a path through the woods, and did not touch any houses.

The report of the damages from the storm at Mr. Clemens', Macomb County, has not been received, but the storm was quite severe there, and 2 lives were lost.

The reports from all sources indicate that there were 45 lives lost, about 100 persons injured more or less severely, and about $400,000 in damages to houses, barns, etc. The report of the committee gives also the amount of damage to crops, orchards, and fences in Lapeer and Oakland counties only.

## KITE EXPERIMENTS AT THE WEATHER BUREAU.

By C. F. MARVIN, Professor of Meteorology, U. S. Weather Bureau.
[Continued from April REVIEW.]

IN the April REVIEW the manner of using steel wire for the kite line was described and the results of experiments given, showing the strength and the best arrangement of the wire, splices, string, and other members composing the kite line. The means employed for determining accurately the length of wire unwound from the reel in any case were also given. We will next consider the action of the forces on kites and the form and construction of those with which experiments were made at the Weather Bureau.

*General remarks on single plane and cellular kites.*—Before the writer began work upon the kite problem many efforts had been made to reach great elevations with kites of the Malay type, the construction of which has already been described. It was often found that these kites would not continue to behave properly hour after hour. When several kites were flying in tandem they would fly very nicely for a time, but a strong gust of wind or the continued action of moderate winds would cause some derangement in one or more of the kites. This would mar the success of the experiment, if it did not bring about some worse result. The real cause of such difficulties was not fully understood at that

Chart VIII. Path of Tornado of May 25, 1896, at Thomas, Oakland County, Mich.