

The following report is taken from the Rochester "Democrat and Chronicle" of May 28, 1887:

WELLSBURG, N. Y., May, 27.—A meteor of extraordinary size fell on the farm of Jas. Harney at Lowmanville, Thursday night. As the stone is buried quite deep it is impossible to tell its exact dimensions. Its descent occurred about 11 o'clock at night and was observed by Robert Wells, a farmer, who had just returned from Elmira. Wells was first startled by the brilliancy of the sky, as if there was a prolonged flash of lightning. Then there was a loud hissing sound and he saw a huge ball of fire, which he thought struck near, but it was so dark after the stone fell that he abandoned the effort to find it.

This morning a mysterious pit forty feet across and twenty feet deep was discovered in a ten acre field on Mr. Harney's farm a mile away. The sides have caved in, but an effort will be made to find the meteor, which, from all accounts, is a large one. The Harneys say the house was severely jarred during the night and think it must have been caused by the meteor striking so near them.

Meteors were also reported during the month as follows:

Limona, Fla., 1st; Logansport, Ind., 6th, 13th; Manatee, Fla., 6th, 15th; Sanford, Fla., and Pekin, Ill., 8th; Factoryville, N. Y., 9th; Marion, Va., 11th; Aiken, S. C., 15th; Woodstock, Md., 16th, 20th; Clayton and Egg Harbor City, N. J., 18th; Nashau, N. H., 19th; New Haven, Conn., 20th; Kalamazoo, Mich., 21st, 22d; Riley, Ill., Elkin, Ky., and Dover, N. J., 23d; Stateburg, S. C., 25th; Omaha, Nebr., 26th; Boise City, Idaho, 28th; Cleburne, Tex., 30th.

#### MIGRATION OF BIRDS.

*Geese flying northward.*—Red Bluff, Cal., 1st, 3d; Tatoosh Island, Wash., 1st to 6th, 8th, 12th, 17th, 18th, 27th, 29th, 30th.

*Geese flying southward.*—Duluth, Minn., 10th; Fort Custer, Mont., 28th.

*Ducks flying northward.*—Tatoosh Island, Wash., 1st to 8th, 13th to 15th, 17th, 18th, 24th to 27th, 29th, 30th.

*Cranes flying northward.*—Rappahannock, Va., 16th, 19th, 21st.

#### POLAR BANDS.

Polar bands were reported from the following stations:

Napoleon, Ohio, 1st, 2d, 6th, 29th; Wauseon, Ohio, 2d, 12th; Sacramento, Cal., 3d; Archer, Fla., 3d, 4th, 11th, 25th, 28th, 29th; Montrose, Colo., 4th, 17th, 24th, 26th; Nashville, Tenn., 5th; Lead Hill, Ark., 7th; Centreville, Mo., 8th; Ninnescah, Kans., 20th; Blakely, Wash., 22d; Salina, Kans., Fort

McDowell and Fort Mojave, Ariz., 26th; Dale Enterprise, Va., 30th; Gardiner, Me., 31st.

#### SAND STORMS.

Fort Maginnis, Mont.: at 9 p. m. of the 7th the air was filled with dense clouds of sand, rendering it almost impossible to face the wind. At 4 p. m. of the 10th the wind was blowing a gale and the air became so densely filled with sand that the sun appeared like a large ball.

Saint Vincent, Minn., 2d: at 6.35 a. m. a gale set in from the northwest, attaining its maximum velocity, thirty-eight miles from the northwest, at 3.35 p. m., and ending at midnight. During the afternoon clouds of dust and sand were raised by the wind, rendering travel on foot and in vehicles difficult and uncomfortable, and causing a general suspension of work among farmers and laborers. During the afternoon of the 7th a sand storm occurred, which was more severe than that on the 2d instant; the air was so full of smoke, sand, dust, and burnt prairie grass that persons caught in it could not see ten feet from them.

Sand storms also occurred at the following places:

Pekin, Ill., 2d; Fort Yates, Dak., 10th, 29th; Fort Grant, Ariz., 16th; Yuma, Ariz., 17th, 18th; Fort McDowell, Ariz., 26th, 27th, 29th; Spartanburg, S. C., 27th.

#### SUN SPOTS.

Mr. John W. James, voluntary observer of the Signal Service at Marengo, McHenry Co., Ill., reports having observed sun spots as follows:

An unusually large spot appeared on the sun's east limb on the 3d; it was on the sun's meridian on the 7th when it had a diameter of 37,800 miles; this spot disappeared by solar rotation on the 13th, and had entirely vanished when due again on the east limb; On the 16th and 17th a large group of spots broke out on the sun's west quadrant, disappearing by solar rotation on the 22d; this group contained two large, and twenty-one small spots, and was estimated to have been 118,000 miles long with a width from one-fourth to one-third as great as the length. No sun spots were seen after the 23d.

Mr. H. D. Gowey, of North Lewisburg, Champaign Co., Ohio, reports sun spots were observed from the 2d to 4th, on the 10th, 13th, 15th, 18th, and from 20th to 27th.

## VERIFICATIONS.

#### INDICATIONS.

The predictions for May, 1887, were made by 1st Lieutenant Robert Craig, 4th Artillery, U. S. Army, Acting Signal Officer and Assistant; the verifications were determined by 2d Lieutenant Frank Greene, Signal Corps, U. S. Army, Assistant, as follows, viz.: for North Carolina and Wisconsin, from May 1st, 7 a. m. to May 14th, 3 p. m., inclusive; for Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, east Florida, lower Michigan, and Iowa, from May 1st, 7 a. m. to May 21st, 3 p. m., inclusive; and for all other states and districts from May 1st, 7 a. m. until May 24th, 7 a. m., inclusive. The remainder of the verifications for the month were determined by 2d Lieutenant John P. Finley, Signal Corps, U. S. Army, Assistant.

The detailed comparison of the tri-daily indications for May, 1887, with the telegraphic reports for the succeeding thirty-two hours, shows the general average percentage of verifications to be 68.51.\* The percentages for the different elements are: Weather, 67.83; wind, 66.90; temperature, 69.76. By states, etc., the percentages are: For Maine, 67.59; New Hampshire, 68.20; Vermont, 69.25; Massachusetts, 69.26; Rhode Island, 66.14; Connecticut, 68.30; eastern New York, 71.08; western New York, 69.29; eastern Pennsylvania, 67.07;

\*In determining the general average percentage of verifications the Pacific coast districts have not been included.

western Pennsylvania, 71.25; New Jersey, 67.64; Delaware, 64.43; Maryland, 67.76; District of Columbia, 64.96; Virginia, 69.55; North Carolina, 68.32; South Carolina, 68.27; Georgia, 69.55; eastern Florida, 64.06; western Florida, 64.11; Alabama, 66.76; Mississippi, 67.90; Louisiana, 70.78; Texas, 76.08; Arkansas, 63.03; Tennessee, 63.44; Kentucky, 72.06; Ohio, 73.16; West Virginia, 74.65; Indiana, 72.11; Illinois, 71.05; lower Michigan, 73.51; upper Michigan, 65.48; Wisconsin, 66.05; Minnesota, 65.70; Iowa, 69.78; Kansas, 67.19; Nebraska, 75.65; Missouri, 66.75; Colorado, 69.11; eastern Dakota, 70.24; Washington Territory, 74.65; Oregon, 74.12; northern California, 80.39; southern California, 83.90.

There were ten omissions to predict, out of 8,529, or 0.12 per cent. Of the 8,519 predictions that have been made, seven hundred and seventy-six, or 9.11 per cent., are considered to have entirely failed; six hundred and fifty-eight, or 7.72 per cent., were one-fourth verified; 1,971, or 23.14 per cent., were one-half verified; 1,827, or 21.45 per cent., were three-fourths verified; 3,287, or 38.58 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

#### CAUTIONARY SIGNALS.

Of the total number of signals ordered during May, 1887, it was practicable to determine the verifications of thirty-two; of these, twenty-four, or 75.00 per cent., were fully verified both as to direction and velocity. No direction or on-shore signals were ordered during the month. Number of signals

ordered late, *i. e.*, after the verifying velocity had begun, one, or 3.00 per cent.

In addition to the above, fifty-five signals were ordered at display stations, the verifications of which it was impracticable to determine.

In twenty-seven instances winds were reported which would have justified the display of cautionary signals, but for which no signals were ordered, and in twenty-eight instances winds which would have justified the display of on-shore signals, but for which no signals were ordered.

#### COLD-WAVE SIGNALS.

Total number of cold-wave signals ordered, the verifications of which were determined, twenty; verified, seventeen, or 85.00 per cent. Three signals were ordered, the verifications of which it was impracticable to determine.

#### LOCAL VERIFICATIONS.

The following is from the report of the "Michigan State Weather Service" for May, 1887:

Weather and temperature signals were displayed in one hundred and twelve cities and towns and on the Chicago and Grand Trunk Railway; Detroit, Grand Haven and Milwaukee Railway; Detroit and Port Huron Division Grand Trunk Railway; and the Port Huron and Northwestern Railway. The percentage of verifications was 81.5 on weather, and 77.9 on temperature, predictions. There are many towns ready to display signals after July 1st, when they can be supplied with indications by telegraph.

One cold-wave signal was displayed during the month. The order was re-

ceived at 11.15 a. m. of the 2d, and the minima temperatures in the state on the morning of the 4th were from 28° to 45°.

The following is from the May, 1887, report of the "Minnesota Weather Service":

Verifications of weather signals for Minnesota were 73 per cent. for weather and 89 per cent. for temperature; for eastern Dakota, 75 per cent. for weather and 90 per cent. for temperature; for northern Iowa, 81 per cent. for weather and 85 per cent. for temperature.

The following is from the May, 1887, report of the "South Carolina Weather Service":

The percentage of verification of the weather and temperature predictions for the whole state was: for weather, 69.2 per cent.; for temperature, 86.0 per cent.

The following is from the May, 1887, report of the "Tennessee State Board of Health Bulletin":

The percentage of verification of the temperature and weather predictions during the month at Nashville and Clarksville were as follows: Nashville, temperature, 83.9 per cent.; weather, 77.4 per cent.; Clarksville, temperature, 93.8 per cent.; weather, 66.6 per cent.

#### ERRATA.

In the REVIEW for March, page 79, under "Monthly snow-falls," that for Yellow Springs, Ohio, given as 9.3 inches, should read 0.8 inch; and under "Depth of snow on ground at end of month," on same page and for same station, the depth given as 0.8 inch should not have been published; there was no snow on ground at the end of the month at Yellow Springs.

### STATE WEATHER SERVICES.

The following extracts are republished from the reports for May, 1887, of the directors of the various state weather services:

The "Alabama Weather Service," P. H. Mell, jr., of the Agricultural and Mechanical College, Auburn, director:

The temperature during the month has been mild and beneficial to vegetable growth. No sudden and injurious changes have been reported from any station. The average temperature for the state was normal.

The rainfall for May was below the normal 1.53 inches. The distribution, however, has been so uniform and precipitations so frequent the condition of the crops has been very materially improved over that reported in the April bulletin. Farmers are very much encouraged with the outlook and, with the exception of the oat crop, anticipate a full yield from all plantings.

The spring months just closed furnish an average temperature of 64°, which is 1° below the normal. The total precipitation for the same period was 7.02 inches, falling below the normal 10.98 inches.

#### Summary.

Mean temperature, 73°.6; highest temperature, 99°, at Roanoke, on the 9th; lowest temperature, 40°, at Gadsden, on the 1st; range of temperature, 59°; greatest monthly range of temperature, 53°, at Gadsden; least monthly range of temperature, 20°, at Moultrie; mean daily range, 17°.8; greatest daily range of temperature, 52°, at Gadsden, on the 1st; least daily range of temperature, 1°, on the 25th, at Trinity.

Mean depth of rainfall, 2.85 inches; mean daily rainfall, 0.092 inch; greatest depth of monthly rainfall, 6.60 inches, at Marion; least depth of monthly rainfall, 0.91 inches, at Gadsden; greatest daily local rainfall, 2.65 inches, at Livingston, on the 26th.

Average number of days on which rain fell, 10; average number of cloudy days, 7; average number of fair days, 17; average number of clear days, 7.

Warmest day, 17th; coldest days, 1st and 6th.

Prevailing direction of wind, southwest.

The "Monthly Review of the Illinois Weather Service," Col. Charles F. Mills, of Springfield, director:

There have been but two spring months in the past thirteen years having a greater degree of heat than that of the past month, May of 1880, with a mean temperature of 68°.1, and May of 1881, with a mean of 69°.1, being these exceptions.

The mean temperature of May, 1887, 67°.4, was 4°.5 above the normal for the past thirteen years. The coolest May in that period being in 1882, with a mean of 58°.1

The mean temperature of the northern division was 65°.2; of the central division, 67°.9, and of the southern division, 69°.9.

The departures above the normal were marked in each of the three divisions, and in but one of the counties reporting (Clay) was the mean temperature a trifle below the normal.

Temperature.—The maximum temperature, 98°, is the highest on record for the month, and the mean temperature was nearly five degrees above the May normal for thirteen years.

There has been a general deficiency of rainfall during the month, notably

so in the northern division, where the average for the past spring was over five inches below the spring average for the past ten years. The average rainfall for the central and southern divisions was less than one inch below the normal for May, and was well distributed, falling at opportune times. Thunder-storms were frequent, but few casualties from lightning were reported. Hail fell in certain sections, being reported quite heavy, but without damage to crops.

There were no violent wind or rain storms reported during the month.

Precipitation (*inches and hundredths*).—A great deficiency for the month is noted for the northern division. The average for the state, 2.94, was 1.24 below the May normal for the past ten years, but the rainfall for the central and southern divisions being only from 0.67 to 0.76 below their respective averages, it is apparent that the bulk of the deficiency noted above is due to the lack of rainfall in the northern division, where the average for the month, 1.77, was 2.09 below the May normal for the past ten years. The average amount in the central division, 3.84, was 0.67 below the May normal, and in the southern division, 3.44, was 0.76 below the normal for the month.

Rain fell on twenty days during May in the northern division, but the amount deposited was inappreciable nearly two-thirds of the time. Prior to the 21st there was barely appreciable rainfall. More moisture was deposited during the general thunder-storm of the 22d than the total for the remainder of the month.

The "Indiana Weather Service," Prof. H. A. Huston, of Purdue University, Lafayette, director:

The temperature was considerably above the normal, 4°.7 for the whole state, the greatest excess being 5°.4 and the least 3°.2. Though the temperature was unusually high, the range was unusually small; the average for the state was only 38°. The lowest recorded was 42°, while at one station, Angola, 100° was recorded, so that the extreme range was 58°.

The precipitation was below the normal, except at Vevay, where it was 0.54 inch above the average of twenty-one years, and Connersville, where it was 1.48 above the average of five years. On the whole the deficiency for the state was from 1 to 2 inches. There were, however, considerable heavy local rains, 2 inches being recorded at Marengo on the 23d, while at Princeton, on the 12th, 1.10 inches fell in twenty-five minutes.

The "Iowa Weather Service," Dr. Gustavus Hiurichs, Iowa City, director:

May, 1887, was very warm and dry, fair to fine weather, and southerly winds generally prevailing.

The mean temperature of the air was six degrees above normal. During the past seventeen years May has but three times been as warm or warmer, namely, in 1881, 1880, and 1871. During the thirty-two years ending 1870, but twice was it as warm, namely, in 1839 and 1870. In forty-nine years May has thus but six times been as warm as it was this year, and half of this number has occurred during the past eight years.

The first twenty days of May averaged eight degrees above normal; the last