

vaded dwellings. The potato bug has also damaged to a considerable extent the tomato fields in the vicinity.

The following is from "The Daily (Chattanooga, Tenn.) Times" of June 20th:

HARRISBURG, Pa., June 19th.—The entire lower portion of Centre county, Pa., is at present plagued by a most extraordinary visitation of snails or garden slugs. They come from the hiding places in crevices, under board walks, stones, etc., only at night, and they cover the roads and walks by the million. In Penn's Valley and Broomfield and the surrounding country they have eaten every growing thing in their path. Some gardens have been entirely destroyed. A letter from Penn's Valley says that on mornings after warm nights walks and roads are literally covered with the slum these insects leave in their trails and by bushels of dead snails that have been crushed by pedestrians and wagons. Lime, Paris green, salt, and other insect destroyers have been scattered liberally where the snails travel and feed, but they have no effect on them. The singular part of this plague is that no insects of the kind were ever known to be in the county before. Where they came from or what influences have brought them there so suddenly and in such immense numbers is a mystery no and has been able to solve.

Charleston, Coles Co., Ill., 26th: chinch bugs are destroying Indian corn in some places. During the earlier part of the month the potato crop was injured by potato bugs.

East Portland, Multnomah, Co., Oregon, 30th: caterpillars are destroying the foliage of apple trees; some orchards have been almost ruined.

Spartanburg, Spartanburg Co., S. C., 30th: grasshoppers are reported to be very numerous.

Swartz Creek, Genesee Co., Mich., 30th: insects have done serious injury to the wheat crop in this county.

La Crosse, Wis., 30th: chinch bugs have caused great damage in this section; the corn crop has escaped serious injury.

METEORS.

Nashua, Hillsborough Co., N. H.: at 8.42 p. m. on the 15th a meteor was observed in the western sky, just above Jupiter; it shot downward towards the south or southeast and exploded when at an altitude of 15°, showing red, white, and green colors.

Des Moines, Iowa, 16th: a large meteor fell last night upon the farm of Ollie Botelson, who lives not far from what is known as Pilot Mound. So rapid was its descent that the roar was almost deafening. A beautiful trail of light was seen in its wake, which illuminated the earth for many miles and lighted up the scene as would a bright moonlight.

Keeler, Inyo Co., Cal.: a brilliant meteor of dark bluish tint was observed at 12.35 a. m. on the 17th; it was first seen at an altitude of 40°, azimuth 45°, and passed in a parallel line to azimuth 88°, being visible about seven seconds. Several meteors of minor brightness were observed in the southwestern sky between midnight and 1 a. m.

Fort Maginnis, Mont.: a very large meteor was observed at this station at 11 p. m. of the 18th; it passed almost entirely across the sky from southeast to southwest.

Corpus Christi, Tex., 21st: a large meteor was observed at 9.45 a. m. in altitude 50° and azimuth 20°; it disappeared beyond the horizon in azimuth 10°. The color of the meteor was whitish-green, and it appeared about four times as bright as the planet Venus.

Meteors were also observed during the month on the following dates:

- 1st.—Charleston, Ill.; Fort Bidwell, Cal.
- 5th and 9th.—Fort Grant, Ariz.
- 12th.—Windsor, Ill.; Kalamazoo, Mich.; Elkin, Ky.; Evansville, Ind.
- 13th.—Riverside, Cal.; Springfield, Ill.

15th.—North Colebrook, Conn.; Cambridge and Dudley, Mass.; Nashua, N. H.

16th.—Windsor, Ill.; Dover and Egg Harbor City, N. J.

17th.—Tecumseh, Nebr.; Davenport, Iowa.

18th.—Butler, Ind.; Charlotte, N. C.; Cleburne, Tex.; Middlebrook, W. Va.; Bishopville and Stateburg, S. C.

19th.—Cleveland and Jacksonborough, Ohio; Cleburne, Tex.

20th and 22d.—Cleburne, Tex.

23d.—Stateburg, S. C.

25th.—Concord and Nashua, N. H.

26th.—Yuma, Ariz.

27th.—Gardiner, Me.

28th and 29th.—Kalamazoo, Mich.

30th.—Pekin, Ill.

MIGRATION OF BIRDS.

Ducks flying northward.—Tatoosh Island, Wash., 5th.

Ducks flying eastward.—Fort Custer, Mont., 4th.

POLAR BANDS.

Polar bands were reported from the following stations:

Lead Hill, Ark., 1st, 15th; Archer, Fla., 1st, 4th, 5th, 7th, 9th, 11th, 21st, 24th; Stateburg, S. C., 3d; Prairie du Chien, Wis., 3d, 14th to 16th; Napoleon, Ohio, 4th, 11th to 15th, 19th, 20th, 22d, 24th, 25th, 27th, 28th, 30th; Sitka, Alaska, 5th; Gardiner, Me., 5th, 15th, 17th; Oakland, Cal., 10th; Wauseon, Ohio, 10th, 12th, 13th, 20th, 22d, 24th, 25th, 27th; Montrose, Colo., 12th; Riley, Ill., 14th, 27th, 29th; Wytheville, Va., 15th; Ninnescah, Kans., 17th, 21st; Nashville, Tenn., 24th; Beverly, N. J., 25th; Bowling Green, Ky., 27th; North Colebrook, Conn., 29th.

SAND STORMS.

Abilene, Tex., 5th: a sand storm, during which the wind attained a velocity of fifty-two miles an hour, began at this place at 6.40 p. m.; for three-quarters of an hour the air was filled with dust to such an extent that buildings only fifty feet away could not be seen. The dust extended to an elevation of about two hundred feet.

Atlantic City, N. J.: a heavy gale prevailed during the 14th; the weather was so dry that the wind caused the sand to form deep drifts, resembling snow drifts; at some street corners the sand accumulated to such a depth as to impede travel.

San Carlos, Ariz., 26th: a violent sand and dust storm set in from the south at about 2.30 p. m. and continued for about one hour, the wind blowing at the rate of thirty-five miles per hour; a dense cloud of sand and dust enveloped everything.

Sand storms also occurred at the following places:

Rio Grande City, Tex., 2d: Fort McDowell, Ariz., 2d, 3d, 5th, 23d, 29th, 30th; Yuma, Ariz., 2d, 12th, 13th; Keeler, Cal., 5th, 13th, 18th; Fort Thomas, Ariz., 8th, 14th; Maricopa, Ariz., 22d; Fort Maginnis, Mont., 25th.; San Carlos, Ariz., 25th, 29th, 30th.

SUN SPOTS.

Mr. H. D. Govey, of North Lewisburg, Champaign Co., Ohio, reports having observed sun spots on the following dates: 1st, 3d, 4th, 7th, 10th to 19th, 21st, 22d, 23d, 26th to 30th, or sun spots were observed on every clear day during the month.

The following report on sun spots is taken from the report of the "Illinois Weather Service:"

Mr. John W. James, observer at Riley, McHenry county, reports, as follows: "A very large spot came in sight on east limb of sun on the 5th, was on sun's meridian 11th, and disappeared, by the solar rotation, 17th; estimated diameter, 37,700 miles. A smaller spot appeared on east limb, morning of 26th."

VERIFICATIONS.

INDICATIONS.

The predictions for all districts east of the Rocky Mountains for June, 1887, were made by 2d Lieutenant F. M. M. Beall, Signal Corps, Assistant; those for the Pacific coast districts were made by 2d Lieutenant J. E. Maxfield, Signal Corps,

Assistant; the verifications were determined by 1st Lieutenant Robert Craig, 4th Artillery, U. S. Army, Acting Signal Officer and Assistant.

The detailed comparison of the tri-daily indications for June, 1887, with the telegraphic reports for the succeeding

thirty-two hours, shows the general average percentage of verifications to be 74.42.* The percentages for the different elements are: Weather, 75.67;* wind, 64.10;* temperature, 75.41.* By states, etc., the percentages are: For Maine, 70.67; New Hampshire, 70.31; Vermont, 67.86; Massachusetts, 71.40; Rhode Island, 78.57; Connecticut, 76.10; eastern New York, 71.63; western New York, 71.02; eastern Pennsylvania, 73.98; western Pennsylvania, 74.62; New Jersey, 77.03; Delaware, 75.62; Maryland, 76.88; District of Columbia, 77.50; Virginia, 79.51; North Carolina, 75.96; South Carolina, 75.70; Georgia, 77.50; eastern Florida, 75.06; western Florida, 83.60; Alabama, 76.79; Mississippi, 72.38; Louisiana, 72.79; eastern Texas, 80.62; Arkansas, 69.69; Tennessee, 70.67; Kentucky, 77.99; Ohio, 76.92; West Virginia, 78.93; Indiana, 77.63; Illinois, 74.29; lower Michigan, 72.19; upper Michigan, 63.21; Wisconsin, 74.87; Minnesota, 70.85; Iowa, 77.05; Kansas, 70.45; Nebraska, 71.64; Missouri, 71.52; Colorado, 76.77; eastern Dakota, 66.53; Washington Territory, 70.94; Oregon, 76.43; northern California, 85.18; southern California, 90.05.

There was one omission to predict, out of 8,352, or 0.01 per cent. Of the 8,351 predictions that have been made, seven hundred and thirty-three, or 8.78 per cent., are considered to have entirely failed; six hundred and five, or 7.24 per cent., were one-fourth verified; 1,580, or 18.92 per cent., were one-half verified; 1,537, or 18.40 per cent., were three-fourths verified; 3,896, or 46.66 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 June, 1887, it was practicable to determine the justification or failure of sixteen; of these, eleven, or 68.75 per cent., were fully justified

* In determining the general average percentage and the percentages for the different elements, the Pacific coast states have not been included.

both as to direction and velocity. But one on-shore signal was ordered and this was not justified; for northeasterly winds eight signals were ordered, all of which were justified; seven signals were ordered without regard to direction, and of these, three, or 42.86 per cent., were justified. No signals were ordered late.

In addition to the above, there were ordered at display stations three signals, the justification of which it was impracticable to determine.

LOCAL VERIFICATIONS.

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

The percentage of verification of weather and temperature signals for the month is as follows: temperature, 87.2; weather, 83.0; temperature and weather, 85.1.

The railway weather signals were verified as follows: Detroit, Grand Haven, and Milwaukee Railway, 84.3; Chicago and Grand Trunk Railway, 88.7; Port Huron and Northwestern Railway, 84.6.

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

Verifications of weather signals for Minnesota were 79 per cent. for weather and 80 per cent. for temperature; for eastern Dakota, 78 per cent. for weather and 78 per cent. for temperature; for northern Iowa, 76 per cent. for weather and 89 per cent. for temperature.

The following is from the June, 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, 81.6 per cent.; for temperature, 92.6 per cent.

The following is from the June, 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, 80.0 per cent.; weather, 73.3 per cent.; Clarksville, temperature, 100.0 per cent.; weather, 53.3 per cent.

STATE WEATHER SERVICES.

The following extracts are republished from the reports for June, 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 average temperature for the month was about the normal, but a cool wave which passed over the state on the 14th did some little damage to the cotton plant in checking its growth and causing lice to attack the tender plant; no material damage, however, is reported from this cause.

The rainfall was well distributed over almost the entire state and has affected all crops, particularly corn, very favorably. All crops are reported as good and in better condition than for years.

Summary.

Mean temperature, 79°.8; highest temperature, 102°, at Fayette, Montgomery, and Mount Willing, on the 19th; lowest temperature, 48°, at Gadsden, on the 14th; range of temperature, 54°; greatest monthly range of temperature, 48°, at Gadsden and Mount Willing; least monthly range of temperature, 24°, at Tuscaloosa; mean daily range of temperature, 14°.3; greatest daily range of temperature, 43°, at Gadsden, on the 14th; least daily range of temperature, 0°, at Osweechee, on the 28th.

Mean depth of rainfall, 3.82 inches; mean daily rainfall, 0.127 inch; greatest depth of monthly rainfall, 8.91 inches, at Mobile; least depth of monthly rainfall, 1.28 inches, at Gadsden; greatest daily local rainfall 3.09 inches, at Mobile, on the 21st.

Average number of days on which rain fell, 8; average number of cloudy days, 8; average number of fair days, 14; average number of clear days, 8; warmest days, 18th and 19th; coldest days, 1st, 2d, and 14th.

The "Dakota Weather Service," under the direction of Mr. P. F. McClure, Commissioner of Immigration:

The normal temperature for the month of June in Dakota, as computed from the observations at stations of the United States Signal Service for seven years past, is 64°.7. The average daily temperature for June, 1887, has been warmer than usual, exceeding the normal by about 1°, and the average mean of the year 1886 by 4°, and the mean of 1885 by 5°.7.

The rainfall in Dakota during the month of June, covering a period of seven years from and including 1881, has averaged 3.42 inches. The present year we have had 3.23 inches, being 0.19 of an inch below the average, although but three of the years of the seven, viz., 1881, 1882, and 1885, have exceeded in the quantity of rainfall in June that of the season of 1887.

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

The month of June, 1887, was notable for its high temperature, excess of sunshine, and great deficiency of precipitation.

A drought prevailed from the 9th to the end of the month, broken only by light local showers in the northern and central divisions from the 18th to 20th, and in the southern division on the 24th and 25th. Showers were frequent from the 1st to 9th, the amount of rainfall during that period being more than double that of the remainder of the month. The average deficiency was three inches for the state, and the greatest deficiency for any section was from four to five inches for De Kalb county.

The mean temperature of the month was three degrees above the June normal, and is the highest June mean temperature recorded in the past thirteen years. The maximum temperature, 104°.0, was reported from the northern and southern divisions on the same date, and is the highest June maximum temperature on record. A cool wave swept over the state on the 23d, the daily mean temperature falling gradually from 82°.0 on the 20th, to 63°.0 on the 23d, and then rose gradually to 79°.0 on the 30th. Light frosts were reported on the 23d-24th, in the lowlands of the northern counties, doing little, if any, damage to crops.

A severe local dust storm was reported from the north-central counties on the 18th, and a correspondent from Montgomery county reports a regular cloud-burst on the 16th that surpassed in violence anything of the kind that has heretofore occurred in that section.

The percentage of sunshine averaged 10 per cent. above the June normal.

The prevailing direction of the wind was from the southwest, and its maximum hourly velocity forty-eight miles, from the north, on the 9th. The average hourly movement of the wind was about seven miles per hour.

Temperature.—The mean temperature of the month for the state, 73°.4, was 3°.1 above the June normal for past thirteen years, and 1°.1 above the highest June temperature in the same period. The mean temperature of the northern division, 72°.0, was 3°.5 above the June normal for past ten years; of the central division, 73°.6, was 2°.1 above, and of the southern division, 74°.6, was 1°.8 above.

The month opened with a daily mean temperature of 60°.0 for the state, rising gradually to 76°.0 on the 4th, remaining in the seventies until the 16th, when it rose to 80°.0, remaining in the eighties for five days. A cool wave swept over the state at this period, causing a fall of 19°.0, the daily mean tem-