

began to break up, and disappeared in faculæ on the 13th. None others seen.

Mr. M. A. Veeder, Lyons, N. Y.: on March 4th a large spot, unusually far north on the sun's surface, appeared by rotation. On succeeding days it divided into several parts, and by March 13th had nearly faded out. Faculæ in its location reappeared by rotation on March 31st. On March 7th faculæ appeared by rotation and made the entire transit, being seen at the western limb on March 20th. On March 19th a group of faculæ was about two days removed from the eastern limb. The groups of faculæ of March 7th and 19th were in the location of areas that have long been much disturbed, and whose

return at the eastern limb have been attended by the chief magnetic storms of recent years, manifesting at times for months together a very exact twenty-seven day periodicity. There has been a similar reoccurrence of magnetic perturbations associated with the area occupied by the spot of March 4th continuing however since August, 1889, only.

Mr. John W. James, Riley, Ill.: a small group surrounded by very prominent faculæ, on the eastern edge of the sun, 4th, very changeable in appearance, daily, and vanished 13th, before reaching the western edge. None others seen.

Mr. H. D. Gowey, North Lewisburgh, Ohio: sun spots were observed on the 9th.

VERIFICATIONS.

FORECASTS FOR 24 HOURS IN ADVANCE.

[Verifications made by Assistant Professor C. F. Marvin, assisted by Mr. H. E. Williams, chief clerk of the Forecast Division.]

The forecasts for districts east of the Rocky Mountains for March, 1890, were made by Captain James Allen, 3d Cavalry, Signal Officer, and those for the Pacific coast districts were made at San Francisco, Cal., by 2d Lieutenant J. E. Maxfield, Signal Corps.

Percentages of forecasts verified, March, 1890.

States.		States.	
Maine.....	81.4	Kentucky.....	83.9
New Hampshire.....	83.5	Ohio.....	74.5
Vermont.....	84.2	West Virginia.....	79.7
Massachusetts.....	84.8	Indiana.....	77.4
Rhode Island.....	82.4	Illinois.....	82.8
Connecticut.....	84.1	Lower Michigan.....	82.1
Eastern New York.....	83.4	Upper Michigan.....	79.5
Western New York.....	75.2	Wisconsin.....	82.1
Eastern Pennsylvania.....	81.5	Minnesota.....	79.4
Western Pennsylvania.....	73.9	Iowa.....	78.6
New Jersey.....	84.4	Kansas.....	75.2
Delaware.....	91.5	Nebraska.....	80.5
Maryland.....	90.6	Missouri.....	82.6
District of Columbia.....	89.0	Colorado.....	71.7
Virginia.....	86.0	North Dakota.....	77.4
North Carolina.....	85.9	South Dakota.....	81.4
South Carolina.....	82.2	Southern California*.....	82.1
Georgia.....	83.7	Northern California*.....	82.8
Eastern Florida.....	78.1	Oregon*.....	75.9
Western Florida.....	86.3	Washington*.....	78.4
Alabama.....	84.8	By elements: Weather.....	82.1
Mississippi.....	81.9	Temperature†.....	81.5
Louisiana.....	80.8	Monthly percentage of weather and temperature combined †.....	81.9
Texas.....	81.1		
Arkansas.....	82.3		
Tennessee.....	86.2		

\* In determining the monthly percentage of weather and temperature combined, the Pacific coast states are not included. † The forecasts of temperature in districts east of the Rocky Mountains for March, 1890, were made with reference to the maximum temperature alone; that is, a prediction of warmer or cooler indicated that the maximum temperature of the day designated would be higher or lower than the maximum of the previous day. ‡ The monthly percentage of weather and temperature combined is determined by multiplying the percentage of weather by 6, and the percentage of temperature by 4, and dividing their sum by 10.

FORECASTS FOR 48 AND 72 HOURS IN ADVANCE.

Appreciating the great importance that long time predictions possess for the general public the Chief Signal Officer has authorized forecasts for forty-eight and seventy-two hours, covering the second and third days in advance. Such forecasts are

optional with the predicting officer, and are only made when clearly in the public interest, and cover, in all cases, considerable areas of country, and are not confined to localities.

Percentages of verifications of forecasts made for second day in advance. Number of predictions made: weather, 195; temperature, 132. Percentages of verifications: weather, 78.5; temperature, 94.2. Weather and temperature combined, 83.3. For third day in advance. Number of predictions made: weather, 7; temperature, 34. Percentages of verifications: weather, 82.9; temperature, 86.5; weather and temperature combined, 85.6.

CAUTIONARY SIGNALS FOR MARCH, 1890.

Statement showing percentages of justifications of wind signals for the month of March, 1890:

Wind signals.—(Ordered by Captain James Allen.) Total number of signals ordered, one hundred and ten; justified as to velocity, wholly, seventy-seven, partly, eight; justified as to direction, one hundred and two. Of the signals ordered, seventy-two were cautionary signals, of which fifty were wholly, and four partly justified, and thirty-eight were storm signals, of which twenty-seven were wholly, and four partly justified. Forty-nine signals were ordered for easterly winds, of which forty-four were justified, and sixty-one were ordered for westerly winds, of which fifty-eight were justified. Percentage of justifications, 71.6.

Gold-wave signals.—(Ordered by Assistant Professor T. Russell.) Total number of signals ordered, seventy-four; justified, twenty-nine. Percentage of justifications, 39.2.

Percentages of verifications of weather and temperature signals reported by directors of the various State Weather Services for March, 1890.

States.	Weather.	Temperature.	States.	Weather.	Temperature.
Illinois.....	81.0	78.2	New Jersey.....	84.7	92.3
Indiana.....	85.0	88.0	New York.....	84.3	87.3
Kansas.....	82.7	86.6	North and South Dakota.....	82.0	84.0
Michigan.....	84.4	82.9	Ohio.....	80.0	85.0
Minnesota.....	69.0	82.0	Pennsylvania.....	82.0	85.0
Missouri.....	80.0	85.0	South Carolina.....	83.6	91.4
Nebraska.....	79.9	86.6	Tennessee.....	84.7	86.6

STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts and summaries are republished from reports for March, 1890, of the directors of the various state weather services:

ALABAMA.

Temperature.—The average temperature was 1.08 below the normal; highest monthly mean, 58.4, at Citronelle; lowest monthly mean, 47.8, at Valley Head; maximum, 84, at Citronelle, 19th, Montgomery, 21st, and at Wiggins, 20th and 26th; minimum, 10, at Valley Head, 2d; greatest local monthly range, 64, at Uniontown, Valley Head, and Wiggins; least local monthly range, 50, at Union Springs.

Precipitation.—The average was 0.66 below the normal; greatest monthly, 9.67, at Carrollton; least monthly, 2.09, at Bermuda.

Wind.—Prevailing direction, north.—P. H. Mell, Signal Corps, Auburn, director.

ARKANSAS.

Temperature.—The mean temperature was about 2 above the normal; highest monthly mean, 54.7, at Pine Bluff; lowest monthly mean, 44.9, at Wins-

low; maximum, 85, at Texarkana, 20th; minimum, 8, at Winslow, 1st; greatest local monthly range, 73, at Lead Hill; least local monthly range, 58, at Dallas, Forrest City, Ozona, and Winslow.

**Precipitation.**—The average precipitation was about 0.50 above the normal; greatest monthly, 10.46, at Conway; least monthly, 3.91, at Washington.—*M. F. Locke, Commissioner of Agriculture, Little Rock, director; W. U. Simons, Sergeant, Signal Corps, assistant.*

#### COLORADO.

**Temperature.**—The monthly mean was about 2 in excess of the average of the past three years; highest monthly mean, 45, at Lamar; lowest 17.4, at Climax; maximum, 83, at Lamar, 25th; minimum, -31, at Breckenridge, 12th; greatest local monthly range, 96, at Breckenridge; least local monthly range, 48, at Moraine.

**Precipitation.**—The average for the state was considerably in excess of the average for the last three years.

**Wind.**—Prevailing direction, west.—*Prof. F. H. Loud, Colorado Springs, director; W. S. Miller, Sergeant, Signal Corps, assistant.*

#### ILLINOIS.

**Temperature.**—The mean temperature was 3.5 below the normal of the last fifteen years; maximum, 72, at Flora, 21st; minimum, -26, at Belvidere, 2d.

**Precipitation.**—The average was 1.15 above the normal of the last thirteen years; greatest monthly, 9.21, at Golconda; least monthly, 1.57, at Sycamore.

**Wind.**—Prevailing direction, northwest.—*John Craig, Sergeant, Signal Corps, Springfield, in charge.*

#### INDIANA.

March, 1890, was cool throughout and much rain fell.

**Temperature.**—Highest monthly mean, 42.6, at Marengo; lowest monthly mean, 28.9, at Point Isabel; maximum, 72, at Marengo, 25th; minimum, -6, at New Providence, 6th; greatest local monthly range, 74, at New Providence; least local monthly range, 52, at Marion, Logansport, and Butlerville.

**Precipitation.**—The precipitation was everywhere much above the normal; greatest monthly, 16.20, at Marengo; least monthly, 1.40, at Marion.

**Wind.**—Prevailing direction, northwest.—*Prof. H. A. Huston, La Fayette, director; C. F. R. Wappenhans, Sergeant, Signal Corps, assistant.*

#### IOWA WEATHER CROP BULLETIN SERVICE.

**Temperature.**—Highest monthly mean, 33.4, at Glenwood; lowest monthly mean, 22.8, at Wesley; maximum, 75, at Clarinda, 24th; minimum, -24, at Fayette, 2d; greatest local monthly range, 86, at Glenwood; least local monthly range, 62, at Iowa City and Manson.

**Precipitation.**—Greatest monthly, 2.43, at Keokuk; least monthly, 0.32, at Grinnell.

**Wind.**—Prevailing direction, northwest.—*G. M. Chappel, Sergeant, Signal Corps, Des Moines, in charge, Iowa Weather Crop Bulletin Service.*

#### KANSAS.

**Temperature.**—The temperature was 3 below the normal in the eastern division, this deficiency diminished towards the west, and changed to 4 above the normal in the western division; highest monthly mean, 48.2, at Lakin; lowest monthly mean, 33.6, at Allison; maximum, 85, at Eureka Ranch and Kellogg, 17th, and at Weskan on the 25th; minimum, -5, at Tribune, 1st; greatest local monthly range, 85, at Tribune; least local monthly range, 55, at Ellsworth; greatest daily range, 48, at Dodge City, 16th; least daily range, 3, at Halstead, 30th.

**Precipitation.**—There was a deficiency in precipitation over the entire state; greatest monthly, 1.38, at Marmaton; least monthly, 0.00, at several stations.

**Wind.**—Prevailing direction, northeast.—*Prof. J. T. Lovewell, Topeka, director; T. B. Jennings, Sergeant, Signal Corps, assistant.*

#### KENTUCKY.

**Temperature.**—The average temperature was about 3 below the normal; maximum, 78, at Canton, 21st; minimum, 3.5, at Shelbyville, 6th; greatest monthly range, 68, at Princeton; least monthly range, 48, at Mount Sterling.

**Precipitation.**—The precipitation was about 4.00 above the normal; greatest monthly, 10.60, at Shelbyville; least monthly, 5.40, at Millersburg. Snow storms were general throughout the state on the 1st, 5th, 30th, and 31st; the average monthly snowfall was 5.10. At nearly all stations in the northern and eastern parts of the state, a depth of from one inch to three inches was reported on the ground at the end of the month.

**Wind.**—Prevailing direction, southwest.—*Dr. E. A. Grant, Louisville, director; Frank Burke, Sergeant, Signal Corps, assistant.*

#### LOUISIANA.

The month opened with the most severe cold wave of the winter, which lasted until the 3d. The effect of the freeze on the growing crops and fruit was very disastrous.

**Temperature.**—The average temperature over the state was slightly below the normal; highest monthly mean, 65.1, at Bayou Sara; lowest monthly mean, 55.3, at Farmerville; maximum, 89, at Cameron, 25th; minimum, 19, at Liberty Hill, 1st; greatest local monthly range, 68, at Liberty Hill; least local monthly range, 31, at Port Eads.

**Precipitation.**—The average precipitation was about normal in the northern section, and about one-half inch below the normal in the southern section; greatest monthly, 9.31, at Vidalia; least monthly, 1.17, at Minden.

**Wind.**—Prevailing direction, southeast.—*R. E. Kerkam, Sergeant, Signal Corps, New Orleans, in charge.*

#### MICHIGAN.

**Temperature.**—The mean temperature for the state was 2.9 below the aver-

age of fifteen years; highest monthly mean, 34.1, at Chelsea; lowest monthly mean, 14.4, at Atlantic; maximum, 60, at Adrian, 21st; minimum, -35, at Grayling, 6th; greatest local monthly range, 82, at Crystal Falls; least local monthly range, 39, at South Albion; greatest daily range, 54, at Roscommon, 8th; least daily range, 0, at Bell Branch, 24th.

**Precipitation.**—The average was 0.51 below the normal of fifteen years; greatest, 4.22, at Buchanan; least, 0.68, at Flint.

**Wind.**—Prevailing direction, northwest.—*N. B. Conger, Sergeant, Signal Corps, Lansing, director.*

#### MINNESOTA.

**Temperature.**—The temperature was nearly normal at Moorhead; it was about 2 deficient at Saint Vincent and Duluth, and it was from 5 to 6 cooler than usual in the lower half of the state; highest monthly mean, 25.9, at Mankato; lowest monthly mean, 11.8, at Saint Vincent; maximum, 55, at Mankato, 24th; minimum, -40, at Pokegama Falls, 5th; greatest local monthly range, 86, at Pokegama Falls; least local monthly range, 62, at Farmington and Rolling Green; greatest daily range, 40, at Saint Vincent, 19th; least daily range, 2, at Duluth, 27th.

**Precipitation.**—The precipitation was slightly in excess in the vicinity of Saint Vincent, in all other portions of the state the precipitation was deficient; greatest monthly, 2.80, at Farmington; least monthly, 0.11, at Crookston.

**Wind.**—Prevailing direction, northwest.—*John Healy, Corporal, Signal Corps, Saint Paul, in charge.*

#### MISSOURI.

**Temperature.**—Maximum, 76, at Oregon, Mo., and Leavenworth, Kans.; minimum, -10, at Craig.

**Precipitation.**—The distribution of rainfall has been nearly normal; greatest monthly, 13.00, at Oak Ridge; least monthly, 0.77, at Craig.—*Prof. Francis E. Nipher, Saint Louis, director.*

#### METEOROLOGICAL REPORT OF THE MISSOURI STATE BOARD OF AGRICULTURE.

**Temperature.**—The mean temperature was about 4 below the normal; highest monthly mean, 42.9, at Carthage, and Cairo, Ill.; lowest monthly mean, 32.2, at Conception; maximum, 78, at Ozark, 23d; minimum, -11, at Princeton, 1st; greatest local monthly range, 83, at Conception; least local monthly range, 63, at Saint Louis, and Cairo, Ill.

**Precipitation.**—Greatest monthly, 14.20, at Oak Ridge; least monthly, 0.77, at Craig.

**Wind.**—Prevailing direction, northwest.—*Levi Chubbuck, Secretary of State Board of Agriculture, Columbia, director; A. L. McRae, Sergeant, Signal Corps, assistant.*

#### NEBRASKA.

The month has been cold and backward, with less than the usual rainfall, but more than the usual number of rainy days.

**Temperature.**—The mean temperature was about 3 below the normal; maximum, 75, at Fort Sidney; minimum, -7, at Yankton, S. Dak.

**Precipitation.**—With the exception of a narrow strip along the northern border and a wider one along the northeastern border, the precipitation amounted to less than one inch; in the extreme northeast, and at Valentine, it amounted to over two inches.—*Prof. Goodwin D. Swezey, Crete, director; G. A. Loveland, Sergeant, Signal Corps, assistant.*

#### NEVADA.

The weather was very changeable, with more precipitation and lower temperature than usual.

**Temperature.**—The mean for the month was 0.6 below the normal; highest monthly mean, 61.6, at El Dorado Canyon; lowest monthly mean, 28.1, at Ruby Hill; maximum, 82, at El Dorado Canyon, 23d; minimum, -15, at Elko; greatest local monthly range, 77, at Elko; least local monthly range, 40, at El Dorado Canyon, Tuscarora, and Mill City.

**Precipitation.**—Greatest monthly, 4.39, at Lewer's Ranch; least monthly, 0.00, at Columbus Marsh.

**Wind.**—Prevailing direction, southwest.—*Prof. Chas. W. Friend, Carson City, director; H. E. Wilkinson, Corporal, Signal Corps, assistant.*

#### NEW ENGLAND METEOROLOGICAL SOCIETY.

**Temperature.**—The average temperature for New England was 0.1 above the normal; highest monthly mean, 39.2, at Salem; lowest monthly mean, 20.0, at West Milan; maximum, 78, at Taunton, 18th; minimum, -22, at West Milan, 4th; greatest local monthly range, 78, at West Milan; least local monthly range, 36, at Eastport; greatest daily range, 69, at West Milan, 10th; least daily range, 0, at Kendal Green, 6th.

**Precipitation.**—The average for New England was 2.39 above the normal; greatest monthly, 10.31, at Fall River; least monthly, 2.54, at Northfield.

**Wind.**—Prevailing direction, northwest.—*Prof. William H. Niles, Boston, Mass., president; Prof. Winslow Upton, Providence, R. I., secretary; J. W. Smith, Sergeant, Signal Corps, assistant.*

#### NEW JERSEY.

**Temperature.**—The mean temperature was 0.8 above the normal; highest monthly mean, 42.0, at Bridgeton; lowest monthly mean, 34.4, at Tenafly; maximum, 77, at Beverly, 12th; minimum, zero, at Tenafly, 7th; greatest local monthly range, 73, at Tenafly; least local monthly range, 51, at Ocean City; greatest daily range, 34, at Tenafly, New Brunswick, Hanover, and Egg Harbor City, 10th, 12th, 20th, and 28th, respectively; least daily range, 1, at Tenafly, Billingsport, Lambertville, Trenton, and Moorestown, 2d, 14th, 15th, and 29th, respectively.

**Precipitation.**—The average precipitation was 2.49 above the normal; greatest monthly, 7.92, at Tenafly; least monthly, 4.14, at Imlaystown.  
**Wind.**—Prevailing direction, northwest.—*E. W. McGann, Sergeant, Signal Corps, New Brunswick, in charge.*

**NEW YORK.**

**Temperature.**—The mean temperature was above the normal at nearly all stations in the central lake region, and at New York City, Setauket, Canton, North Hammond, Plattsburgh, Palermo, Rochester, and Humphrey; it was generally below the normal in the regions of the Hudson and Mohawk valleys, the central plateau, and the great lake region; maximum, 74, at Fort Wadsworth, 12th; minimum, -21, at Queensbury, 7th.

**Precipitation.**—The rainfall was generally above the average, excepting along Lakes Erie and Ontario, and in the Saint Lawrence Valley, where deficiencies were reported; greatest monthly, 7.23, at Fort Schuyler; least monthly, 0.94, at Lyons. The greatest monthly snowfall, 28.5, was reported from Brookfield.

**Wind.**—Prevailing direction, northwest.—*Prof. E. A. Fuertes, Ithaca, director; I. W. Brewer, Private, Signal Corps, assistant.*

**NORTH CAROLINA.**

**Temperature.**—The monthly mean temperature was about normal; highest monthly mean, 53.6, at Southport and New Berne; lowest monthly mean, 39.6, at Highlands; maximum, 82, at New Berne, 22d; minimum, 4, at Highlands, 18th; greatest local monthly range, 64, at Willetton, Douglas, Franklin, and Highlands; least local monthly range, 46, at Hatteras.

**Precipitation.**—The precipitation was 2.00 below the normal, but well distributed; greatest monthly, 7.82, at Highlands; least monthly, 1.50, at Wilmington.

**Wind.**—Prevailing direction, southwest.—*Dr. Herbert B. Battle, Raleigh, director; C. F. von Herrmann, Sergeant, Signal Corps, assistant.*

**NORTH AND SOUTH DAKOTA.**

**Temperature.**—The mean temperature was about normal; highest monthly mean, 83.6, at Oelrichs, S. Dak.; lowest monthly mean, 12.7, at Gallatin, N. Dak.; maximum, 69, at Oelrichs and Fort Sully, S. Dak., 23d; minimum, -36, at Sanborn, N. Dak., 3d, and at Gallatin, N. Dak., 5th; greatest local monthly range, 81, at Fort Buford, N. Dak.; least local monthly range, 63, at Yankton, S. Dak.

**Precipitation.**—The average was about 0.10 below the normal; greatest monthly, 2.80, at Canton, S. Dak.; least monthly, 0.03, at De Smet, S. Dak.

**Wind.**—Prevailing direction, northwest.—*S. W. Glenn, Sergeant, Signal Corps, Huron, S. Dak., in charge.*

**OHIO.**

**Temperature.**—The mean temperature was 1.4 below the average; maximum, 69, at Hanging Rock, 11th, and at Pomeroy, 14th; minimum, -4, at Jefferson, 7th; greatest daily range, 87, at Lewisburgh, 9th; least daily range, 8, at Cleveland, 2d, and at Columbus and Ohio State University, 31st.

**Precipitation.**—The mean for the state was 2.56 above the average; greatest monthly, 9.58, at Wapakoneta; least monthly 1.56, at Toledo.

**Wind.**—Prevailing direction, northwest.—*Prof. B. F. Thomas, Columbus, director; Lieut. Charles E. Kilbourne, secretary; C. M. Strong, Corporal, Signal Corps, assistant.*

**OREGON.**

**Temperature.**—The cool weather of the past few months continues; the mean temperature was 2.8 below the normal; highest monthly mean 48.3, at Bandon; lowest monthly mean, 35.6, at Burns; maximum, 71, at Toledo, Hubbard, and Grant's Pass, 14th; minimum, -8, at Lone Rock, 1st.

**Precipitation.**—The average was 0.66 above the normal; along the Columbia River from Portland to the Ocean it was about or below the normal, in other parts of the state it was generally slightly above the normal. Snow to a depth of from trace to four inches fell in western Oregon, and from trace to fifteen inches in eastern Oregon; at the close of the month there was no snow on the ground, except in the mountains and thickly wooded districts.

**Wind.**—Prevailing direction, southwest.—*Hon. H. E. Hayes, Master State Grange, Oswego, director; B. S. Pague, Sergeant, Signal Corps, assistant.*

**PENNSYLVANIA.**

**Temperature.**—The mean temperature was 5.5 below that of the corresponding month of 1889, and 2.5 below the normal; highest monthly mean, 38.8, at Philadelphia; lowest monthly mean, 26.3, at Eagle's Mere; maximum, 76, at Coatsville, Lancaster, Centre Valley, Annville, and Pottstown, 12th; minimum -16, at Blue Knob and Columbus, 7th; greatest local monthly range, 23.5, at Charlesville; least local monthly range, 11.9, at Rimersburgh and Eagle's Mere; greatest daily range, 69, at Charlesville, 12th; least daily range, 1, at Petersburg, 18th.

**Precipitation.**—The average precipitation was 2.00 above the normal; greatest monthly, 8.31, at Quakertown; least monthly, 2.90, at Altoona.

**Wind.**—Prevailing direction, northwest.—*Under direction of the Franklin Institute, Philadelphia; T. F. Townsend, Sergeant, Signal Corps, assistant.*

**SOUTH CAROLINA.**

**Temperature.**—The mean temperature was lower than for any other month since March, 1889; highest monthly mean, 57.2, at Hardeeville; lowest monthly mean, 45.1, at Evergreen; maximum, 85, at Hardeeville, 22d; minimum, 11, at Spartanburgh, 3d; greatest local monthly range, 65, at Spartanburgh; least local monthly range, 43, at Walhalla.

**Precipitation.**—Though the precipitation was less than the average, yet it was not deficient enough to do any apparent harm; greatest monthly, 6.10, at Aiken; least monthly, 1.85, at Winnsborough.

**Wind.**—Prevailing direction, southwest.—*Hon. A. P. Butler, Columbia, director; J. W. Cronk, Private, Signal Corps, assistant.*

**TENNESSEE.**

The meteorological features of March were the abnormally large rainfall, the low temperature on the 1st and 2d, the large percentage of cloudiness, and the high winds.

**Temperature.**—The mean temperature was a little below the normal for the past eight years; highest monthly mean, 50, at Savannah; lowest monthly mean, 41.2, at Ruggy; maximum, 81, at Memphis, 27th; minimum, 10, at Trenton and Lynnville, 1st and 2d, respectively; greatest daily range, 40, at Springdale and Hohenwald, 17th and 29th, respectively; least daily range, 2, Ruggy, Austin, Lewisburgh, Ashwood, and Savannah, 18th.

**Precipitation.**—The precipitation was nearly 8.00 in excess of the normal of the past eight years; greatest monthly, 10.29, at Clarksville; least monthly, 2.40, at Cog Hill.

**Wind.**—Prevailing directions, north.—*J. D. Plunket, M. D., Nashville, director; H. C. Bate, Signal Corps, assistant.*

**NOTES AND EXTRACTS.**

**METEOROLOGICAL SUMMARY FOR HONOLULU, HAWAIIAN ISLANDS.**

The following communication from Mr. Curtis J. Lyons, in charge of the weather service of the government survey, Hawaiian Islands, is of interest when considered in connection with the abnormal meteorological conditions over the greater part of the North American continent during the winter of 1889-1890:

As there has evidently been a good deal of discussion in American papers and scientific circles as to the cause or causes of the unusual weather of the past winter, I would present the fact that the weather in the Hawaiian Islands has also been different from the normal. The temperature for the month of January was 71°.85, Fahrenheit, and the normal temperature for that month is 70°. This is slight, it is true, but in no previous year since reliable averages have been obtained has it been within a degree, Fahrenheit, of this. The humidity at 9 a. m. was 79 per cent., as against probably 70 per cent. for the normal, and cloudiness, 6.6, as compared with 5. There has been hitherto an absence of the usual southwesterly storms, though this was as marked a year ago. The characteristics of the winter of 1888-1889 were as follows: An abnormal daily rise and fall of the barometer. The normal winter range, a. m. and p. m., is about .075 or .080, while during the winter referred to it was .085 or .090 some days, and even .14 was observed, the barometer rising again to the morning height at 9 p. m. Instead of the winds shifting around by the south into southwest, the direction shifted abruptly to west and northwest from northeast, sometimes as far as to southwest, and then back by the north. Long, low lines of cirro-stratus clouds prevailed in both seasons.

Mr. Lyons has also furnished the following summary of barometric record for twelve years at Honolulu, and in an accompanying communication makes the following remarks relative to barometric pressure at that place:

Observations taken from 1878 to 1877, inclusive, by Captain D. Smith; from 1888 to March, 1890, inclusive, by the Government Survey. The record represents the mean of the 9.30 a. m. and 3.30 p. m. observations, reduced to 32° Fahrenheit and sea-level.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Average.
1873 ...	30.08	30.07	30.09	30.08	30.05	30.05	30.05	30.06	30.00	30.03	30.04	30.01	30.051
1874 ...	29.93	29.88	29.97	30.02	30.04	29.96	29.95	29.95	30.01	30.00	29.91	30.00	29.968
1875 ...	29.96	29.91	30.02	30.02	30.04	29.97	29.96	29.95	29.94	29.97	29.95	30.00	29.974
1876 ...	30.00	30.09	29.86	30.11	30.20	30.13	30.17	30.08	30.03	30.05	30.01	30.06	30.066
1877 ...	30.02	30.08	30.05	30.12	30.09	30.13	30.13	30.11	30.10	30.09	30.11	30.08	30.092
1878 ...	30.063	29.937	30.034	30.107	30.105	30.063	30.083	30.086	30.071	30.054	29.988	29.926	30.043
1879 ...	30.041	29.957	30.079	30.032	30.075	30.098	30.061	30.064	30.130	30.027	30.061	29.902	30.044
1880 ...	30.023	30.022	29.998	29.969	29.986	30.079	30.010	29.994	30.046	30.047	30.117	30.089	30.032
1881 ...	30.003	30.045	30.101	30.126	30.147	30.148	30.073	30.089	30.052	30.071	30.078	30.083	30.085
1882 ...	30.053	29.966	30.054	30.053	30.047	30.028	30.049	29.998	29.978	29.964	29.937	29.969	30.008
1883 ...	29.995	29.996	30.069	30.063	30.012	30.056	30.046	30.000	29.997	29.991	30.020	30.069	30.019
1884 ...	30.022	30.065	30.121	30.103	30.098	30.084	30.030	30.047	30.018	30.057	30.038	30.064	30.068
1890 ...	29.994	29.986	29.983	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
•	30.014	30.001	30.037	30.067	30.074	30.066	30.051	30.036	30.031	30.029	30.022	30.021	30.038

\* Average for 12 years, 1890 excepted.