

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU,

CO-OPERATING WITH THE

MARYLAND STATE WEATHER SERVICE

Established by an Act of the General Assembly of the State of Maryland, 1892,
and Maintained in Connection with



The Johns Hopkins University and the Maryland Agricultural College.

CENTRAL OFFICE, JOHNS HOPKINS UNIVERSITY, BALTIMORE, MD.

PROF. WM. B. CLARK,
JOHNS HOPKINS UNIVERSITY,
Director.

PROF. MILTON WHITNEY,
MARYLAND AGRICULTURAL COLLEGE,
Secretary and Treasurer.

DR. C. P. CRONK,
U. S. WEATHER BUREAU,
Meteorologist in Charge.

VOL. IV, No. 10.

MONTHLY REPORT.

FEBRUARY, 1895.

Address of Major H. H. C. Dunwoody,

President of the American Association of State Weather Services,

At the Third Annual Convention of the Association,
held in Brooklyn, N. Y., August 17, 1894.

At the last annual meeting of the American Association of State Weather Services, official duties enforced my absence, greatly to my regret. It is therefore with more than uncommon pleasure that I am able to be with you upon the occasion of the third annual meeting of the Association of State Weather Services.

The expansion and development of these services, to a degree scarcely anticipated by the most ardent advocate of the system, make it desirable, if not absolutely necessary, that those who have this important work in hand should meet in convention for the purpose of discussing ways and means of furthering their work. That former meetings have been productive of great good is amply attested by the rapid progress that has been made in the several lines of work during the two years that have passed since the establishment of this association. It is equally evident that this and future conventions will continue to produce good results. It is profitable for us to meet from time to time, to learn from discussion and personal inquiry as to the methods of work employed in the several states, that each official may return to his field of operations better prepared to prosecute and extend his work. The published proceedings of past conventions have been eagerly looked for by the State service officials not fortunate enough to

attend the meetings of the association, and the valuable information that has been given through these published proceedings, concerning exposure of instruments and other essentials in observation work, has contributed much toward creating and increasing interest in meteorological subjects.

With about 3000 voluntary observers taking observations of temperature and rainfall and recording miscellaneous meteorological phenomena, it is possible to supply, through the State weather service, climatological information for almost any locality in the United States. Nearly every county in the whole country is now provided with a station equipped with instruments of the Government standards, and if the work of establishing new stations continues during the next two years at the same rate as during the past two years, there will not be a county within the limits of our country that will not have a meteorological station.

Since the last annual convention of State weather services, which took place in Chicago, August 21 to 25, 1893, the work of State weather-service organization has gone rapidly forward, and the past twelve months in some of the more important lines may be marked as an era of exceptional progress. While there has been a decided extension in all the branches of work conducted by these organizations, the weather-crop service and the dissemination of forecasts have received greatest attention, and in these two lines have the most marked successes been achieved.

The weather-crop service of the National bureau now undoubtedly ranks next in import-

ance to the work of making forecasts. The system of gathering reports upon which the weather-crop bulletins are based has been so perfected in recent years that further improvement in some states can scarcely be expected. The crop bulletins of the states have been improved and are now more complete than at any previous time, and the increased circulation that these bulletins have attained amply attests their value. It is believed that there is no other class of information to which so much space is devoted in the public press to-day. A file of these bulletins for all the states for a year will form a most complete history of the weather conditions attending the growth and development of the several crops throughout the country.

More than 10,000 crop correspondents are to-day co-operating with the National weather service through the State organizations, 3000 voluntary observers are furnishing monthly reports of daily observations of temperature and rainfall, and over 11,000 persons assist in the work of distributing the weather forecasts of the National weather service. This latter work has been more rapidly pushed during the past year than any other feature of State weather-service work, and it is expected that during the ensuing year the already large number of communities receiving the Government weather forecasts will be further increased from 5000 to 6000. With a continuation of the present liberal policy of the Honorable Secretary of Agriculture and the Chief of the Weather Bureau toward these services, there will be in a comparatively short time no important agricultural community in the United States, with the proper mail facilities, that will not receive the benefits of the forecasts.

The monthly reports of many of the states are model publications of their kind. It is to be hoped that in those states where, as yet, the more approved methods of publishing meteorological data are not practiced, means may be found by which their reports may be improved and raised to the standard attained where better facilities have been available. Uniformity in size, as far as practicable, and strict uniformity as to tabular data are very desirable. A daily record of temperature and rainfall for purpose of detailed investigation is most essential, and these should, if possible, form a part of each report.

It is believed that nothing can contribute more toward securing reliable and accurate observations than an inspection of the voluntary stations, that the observers may be made thoroughly acquainted with the proper conditions of instrumental exposure, and be informed as to other essentials connected with their work.

It is to be hoped that at future meetings there will be not only a large representation of State weather service officials, but that many voluntary

observers, crop correspondents, and displaymen may be present.

After correspondence and personally consulting with officials of the American Association of State Weather Services, a programme of subjects for discussion at this meeting has been formulated and published. No doubt other important matters, not therein enumerated, will be suggested by members present and will receive your careful consideration.

Having originally suggested the organization of State weather services, and having watched with keen interest their rapid growth for more than a decade of years, I shall not in the future lose that interest I have always taken in their operations, believing that the State weather service affords the most effective means of reaching the masses of people with information collected by the National weather service. I will conclude my remarks by expressing to the members of the Association my thanks for the honor they have twice conferred by electing me their president.

Report of the Third Annual Meeting of the American Association of State Weather Services.

This Report is published as Bulletin No. 14 of the U. S. Department of Agriculture, Weather Bureau, and includes information invaluable to State weather service directors looking to improvement in their systems of operation, and worthy of consideration by all concerned in agricultural pursuits. It will doubtless be read with interest and profit by voluntary observers.

The address of the President of the Association, delivered at the opening of the meeting, is so comprehensive in its brief review of past work accomplished by State weather services, and so suggestive as to future improvement, that it is reprinted above, in full.

In the arrangement of the pamphlet the order of proceedings has been strictly adhered to, the discussion of the several topics selected by the Secretary following the President's address. The remarks made upon each subject are fully quoted, the name of each speaker preceding his comments. This portion of the book, in particular, reflects credit upon its editor, Mr. James Berry, Secretary of the Association. He disclaims any ability as a shorthand writer, but certainly nothing that the speakers would care to have printed has been omitted.

Interesting and instructive papers by George N. Salisbury, Director of the Utah Weather Service, and F. P. Chaffee, Director of the Alabama Weather Service, are printed at the close of the Report.

Review of the Month—January.

WEATHER.

Low and High Areas.—At the beginning of the month an irregularly formed area of high barometric pressure (an anti-cyclone) of great extent was central in Georgia, and overlaid nearly the whole eastern half of the country. With such an extensive "cold-producer," including Maryland within its borders, it is not surprising that the temperature throughout the State on January 1st was in the neighborhood of 12 degrees below the normal for that day. Almost as a matter of course, the weather was clear. The area moved northeast, passing off the middle Atlantic coast on the 2nd, and was followed by an area of low barometric pressure, or cyclone, which made its appearance in the west Gulf states that morning.

The cyclone passed east to the south Atlantic coast during the 2nd and 3rd, and to it was due the snow that fell on both days. A low area also passed from west to east across the Lake Region on the 3rd, but its influence was not felt as far south as Maryland, except as regards a very slight rise in the temperature, which still remained several degrees below the normal.

The second high area of the month made its appearance in the extreme Northwest on the 2nd, and reached the middle Atlantic States on the 4th. To it was due the cold weather of the 5th and the generally fair weather of the 4th and 5th. It was followed by a storm which developed in Montana on the 4th. This storm moved southeast to Missouri, and then curving northward, passed east across the Lake Region on the 6th and 7th. It caused the warmest weather of the month in Maryland, the temperature rising, on the 7th, to 60 degrees or higher at a number of stations. The rains of the 6th and 7th may also be ascribed to its influence.

The last-mentioned storm had barely passed when it was succeeded by another, apparently a secondary of its predecessor, which came in from the Southwest, and passing slowly eastward to Florida, moved thence directly north to the Lake Region—an unusual path. After reaching the Lake Region, this strangely behaved cyclone, instead of passing immediately northeast to the St. Lawrence Valley, moved southeast to Maryland, its center being in this State on the 12th. Thence it traveled northward again, and after hesitating in the St. Lawrence Valley on the 13th and 14th, finally disappeared northward. This unusual storm was principally responsible for the snows and rains which continued, except for short intervals of fair weather, from the 8th to the 13th. While it was remaining stationary in Florida on the 8th and 9th, a high area from the West passed by on the north, causing the low temperatures of the 9th. This anti-cyclone

did not come quite near enough to Maryland to bring fair weather.

When the above-described storm was central over Maryland, on the 12th, comparatively warm weather was its accompaniment, but on account of its lagging movement it had become closely pressed by a high area from the Northwest, with attendant cold wave in its front. On the morning of the 12th, with the isotherm of 30° passing through Baltimore and Washington, and the isotherm of -10° through Cincinnati and Louisville, a remarkable change was evidently imminent; and that the change occurred is well remembered. The temperature at Baltimore on the 12th at 8 p. m. was 41°; 12 hours later it was 9°. At some other places the fall was even more remarkable. With such a decided drop in temperature, precipitation of course occurred, the rain changing to snow.

The fair weather of the 14th and 15th was due to the last-mentioned high area, which was then on the south Atlantic coast. On the 15th a second cyclone, or low area, was observed to be moving northeast from the west Gulf region. On the 16th it extended, a long tongue-shaped depression, from the Gulf northeast to New Jersey. The rain and snow of that date resulted, together with a slight rise in temperature.

An extensive high area, that was apparent on the Pacific coast as far back as the 13th, extended over most of the country east of the Mississippi on the 17th. It caused generally fair weather to prevail on the 17th and 18th. On the 18th and 19th a shallow depression passed from the Lake Region to the coast, but it occasioned very little precipitation in Maryland.

On the 19th the last-mentioned high area apparently united with a similar area from the West, and fair weather resulted on the 19th and 20th. The precipitation of the 21st was due to a storm that, originating in Iowa on the 20th, passed east over Canada on the 21st and 22nd. A high area followed, and besides making the weather generally fair from the 22nd to the 25th, brought a cold wave, and the temperature again fell far below the normal.

The third storm of the month to make its entrance from the Southwest was first apparent in southern Texas on the 23rd. On the 24th it began a rapid and direct movement northeast to the St. Lawrence Valley, which it reached on the 26th. It occasioned the snow and rain of the 26th, and a slight rise in temperature. It was a severe storm, of great extent, and the most perfect in development of any that occurred during the month.

The great high area which followed was not so regular in shape, but it extended, on the 27th, from the State of Washington southeast to Georgia. It was, however, between two storms, and

not being strong enough to resist their combined forces, broke in two. The eastern half, which had given fair weather to Maryland on the 27th, moved northeast and the storm from the Southwest followed, causing the snow and rain of the 28th and 29th. As the center of this cyclone passed on the south side of Maryland, and was much stronger than the companion storm to the northward, there was no rise of temperature. That the 30th and 31st were generally fair and cold was due to the arrival of a second portion of the great high area before mentioned.

Temperature (degrees).—Monthly mean (for entire territory covered), 29.4, being 3.4 below the normal; highest monthly mean, 37.4, at Pocomoke City; lowest monthly mean, 21.4, at Deer Park; highest temperature, 66, at Pocomoke City, on the 7th; lowest temperature, -17, at Sunnyside, on 13th; greatest local monthly range, 73, at Sunnyside; least local monthly range, 39, at College Park; monthly mean range, 50.8; monthly mean maximum, 37.4; monthly mean minimum, 20.8; highest minimum for the month, of any station, was 16, at Pocomoke City, on the 2nd and 5th.

The isotherms on the map, page 81, show a great variation in the mean temperatures of the various sections. The Eastern Shore was considerably warmer than other portions, while the lowest average temperature occurred in Garrett county.

Precipitation (in inches).—Average, 4.12, being 1.09 above the normal; greatest amount, 9.89, at Oakland; least amount, 1.87, at Mt. St. Mary's College. The greatest fall of snow during the month, in Maryland, 56 inches, is reported by the observer at Oakland. The next greatest fall, 27.5 inches, is reported by the observer at Sunnyside.

The distribution throughout the month is shown by the table of daily precipitation, and the distribution over the State by the map, page 81.

Wind.—Prevailing direction, northwest. Total movement in miles, Philadelphia, 8161; Baltimore, Md., 6020; Washington, D. C., 5021; Norfolk, Va., 7508.

Thunderstorms.—At Millsboro, Del., on the 16th; at Princess Anne, on the 16th; at Solomon's, on the 16th; at Pocomoke City, on the 16th; at Mardela Springs, on the 16th; at Charlotte Hall, on the 16th, 18th; at Jewell, on the 16th.

Hail.—At Woodstock, on the 6th, 8th, 24th; at Wilmington, Del., on the 8th, 15th; at Oakland, on the 9th, 10th, 25th, 26th; at Bachman's Valley, on the 25th; at Solomon's, on the 8th; at Seaford, Del., on the 25th; at Hancock, on the 25th; at Sunnyside, on the 9th, 25th; at

Pope's Creek, on the 10th; at Glyndon, on the 8th; at Burkittsville, on the 5th, 25th.

Sleet.—At Baltimore, on the 9th, 25th; at Grantsville, on the 10th; at Newark, Del., on the 25th; at Millsboro, Del., on the 25th; at Oakland, on the 10th; at Upper Marlboro, on the 25th; at Princess Anne, on the 9th; at Bachman's Valley, on the 6th; at Solomon's, on the 25th; at Frederick, on the 25th; at Easton, on the 25th; at Cumberland, on the 8th, 16th, 18th; at Boettcherville, on the 6th; at Sunnyside, on the 9th, 25th; at Pope's Creek, on the 10th; at College Park, on the 26th; at Burkittsville, on the 6th, 16th, 25th; at Sharpsburg, on the 6th, 10th, 12th.

Fog, dense.—At Baltimore, on the 21st; at Woodstock, on the 20th, 30th; at Wilmington, Del., on the 6th, 7th, 8th, 10th, 17th, 20th, 21st, 26th, 30th, 31st; at Millsboro, Del., on the 8th, 10th, 12th, 21st, 30th; at Oakland, on the 18th; at Mardela Springs, on the 8th, 11th, 21st, 26th.

Auroras.—At Millsboro, Del., on the 19th, 22nd, 24th.

Coronæ, lunar.—At Millsboro, Del., on the 5th.

Halos, solar.—At Baltimore, on the 15th.

Halos, lunar.—At Millsboro, Del., on the 3rd, 4th, 30th; at Solomon's, on the 5th, 7th; at Pocomoke City, on the 5th, 6th; at Mardela Springs, on the 5th, 11th; at Mt. St. Mary's, on the 4th, 11th; at Cumberland, on the 4th, 14th.

Polar Bands.—At Cumberland, on the 11th, 20th.

Notes by Observers.

Boettcherville.—12th, snow blizzard, 7 p. m. to 11 p. m. The wind was estimated to be blowing at the rate of 40 to 50 miles per hour. 3 inches of snow fell between 6 and 11 p. m.

Cumberland (a).—16th, blue birds seen. 27th, 7.30 p. m., zodiacal light observed distinctly up to 55° or 60°. Rivers and creeks frozen over since December 25th; skating every day.

Cumberland (b).—42°, the highest temperature registered by maximum thermometer during January, '95, was the lowest maximum for 24 years.

Solomon's.—12th, distant lightning, with gale of wind from South, at 8.30 p. m. 25th, storm from the East, with terrific wind, backing to southwest.

Millsboro, Del.—5th, ice 4 inches thick on millpond.

Grantsville.—The weather of January was remarkable for snow and cold; ground covered with snow at all times of the month. 13th, peaches and many cherries thought to have been killed, the minimum temperature being 14° be-

MAP OF
MARYLAND AND DELAWARE
 SHOWING
 THE PRECIPITATION
 AND
 LINES OF MEAN TEMPERATURES
 FOR JANUARY, 1895.

Scale of Shades:

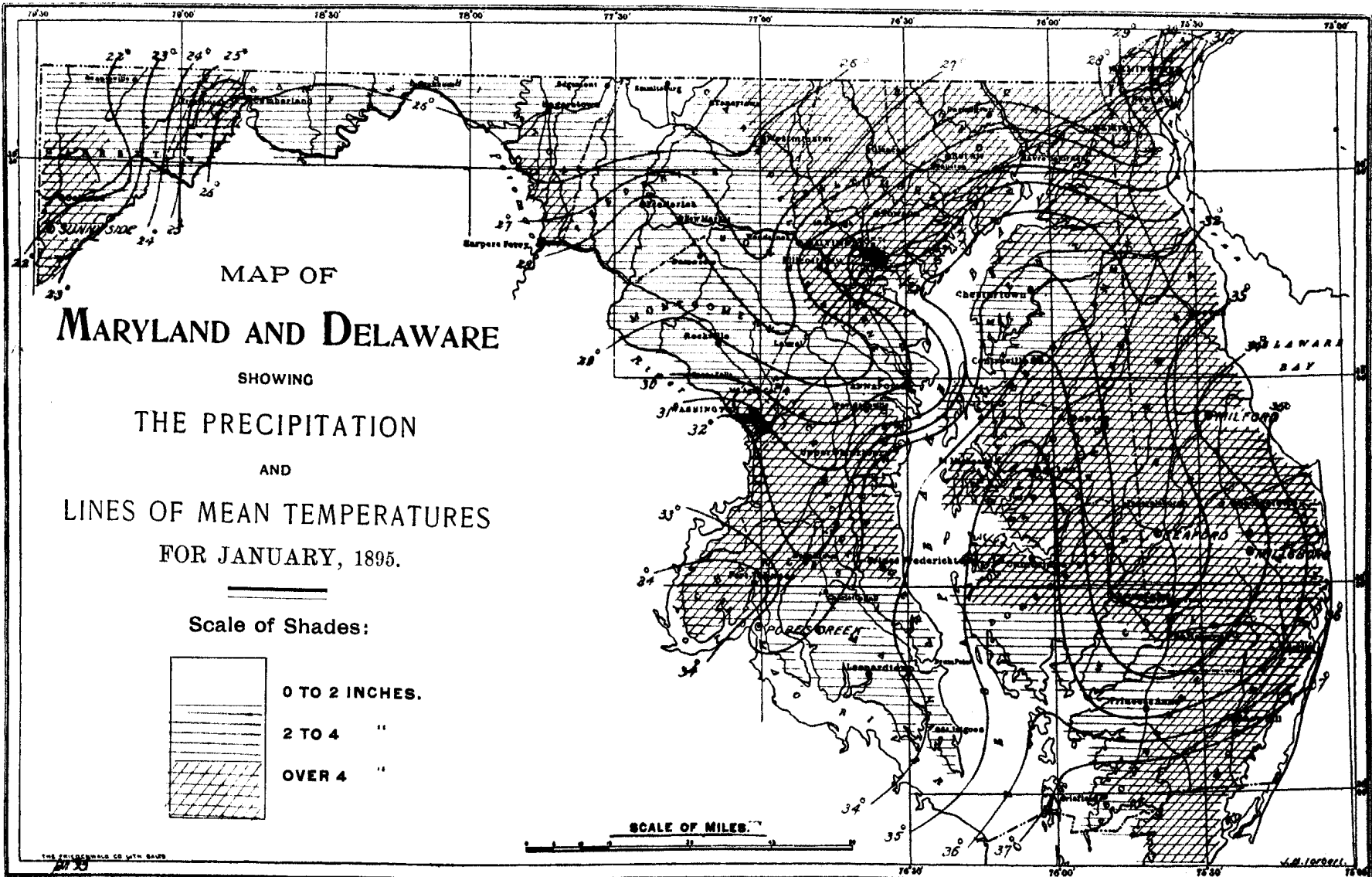


0 TO 2 INCHES.

2 TO 4 "

OVER 4 "

SCALE OF MILES.



Meteorological and Weather Signal Display Stations of the Maryland State Weather Service.

Stations.	County.	Meteorological Observer.	Displayman.
Annapolis	Anne Arundel	J. E. Abbott.	W. M. Abbott.
Appleton	Cecil		W. C. Henderson.
Bachman's Valley	Carroll	J. M. Myers.	
Baltimore		G. N. Wilson. J. H. Donaldson. A. T. Brewer. Ass't Editor of Monthly Report. R. C. New. Ass't Editor of Weekly Bulletin.	
Bel Air	Harford		N. N. Nock.
Bel Alton	Charles	Walter Cox.	
Boettcherville	Alleghany	F. F. Brown.	
Bradshaw	Baltimore		B. F. Taylor.
Buckeystown	Frederick		A. W. Nicodemus.
Burkittsville	Frederick	J. P. Slifer.	
Cambridge	Dorchester		Samuel Leman.
Charlotte Hall	St. Mary's	J. Francis Coad.	
Cherryfields	St. Mary's	J. Edwin Coad.	
Chestertown	Kent	Hon. M. deK. Smith.	
Cumberland	Alleghany	Howard Shriver. E. T. Shriver.	
Darlington	Harford	Prof. A. F. Galbreath.	
Deer Park	Garrett	S. P. Specht.	
Delaware City, Del.	New Castle		W. E. Reybold.
Denton	Caroline	F. C. Ramsdell.	
Dickerson	Montgomery		W. H. Dickerson.
Distributing Reservoir, D. C.		Col. G. H. Elliot.	
Dover, Del.	Kent	Jno. S. Jester	Philip Burnet.
Easton	Talbot	Henry Shreve	Henry Shreve.
Fallston	Harford	G. G. Curtiss, A. M.	
Frederick	Frederick	McClintock Young, W. A. Lantz,	W. T. Delaplaine.
Frederica, Del	Kent		Miss E. V. Newnom. Miss L. T. Frazier.
Garey P. O.	Howard		Walter Dorsey.
Glyndon	Baltimore	A. W. Nyce	J. J. Dyer.
Grantsville	Garrett	J. S. Miller	T. H. Bittinger.
Great Falls	Montgomery	Col. G. H. Elliot.	
Hampstead	Carroll		H. H. Meals.
Hartly, Del.	Kent		Miss C. A. Forde.
Havre de Grace	Harford		W. S. McCombs.
Johns Hopkins Hospital		W. L. Woods.	
Kenton, Del.	Kent		W. S. Arthurs.
Kirkwood, Del.	New Castle	J. S. Carnagy.	
La Plata	Charles	J. S. Turner	J. S. Turner.
Laurel, Del.	Sussex		E. D. C. Hegeman.
Lonaconing	Alleghany		J. J. Robinson.
Mardela Springs	Wicomico	A. E. Acworth	L. A. Wilson.
Marshall Hall	Charles	F. H. Deal.	
McDonogh	Baltimore	H. Pender.	
Middletown	Frederick		G. C. Rhoderick, Jr.
Milford, Del.	Kent	J. Y. Foulk	J. Y. Foulk.
Millsboro, Del.	Sussex	Rev. L. W. Wells.	
Mt. St. Mary's	Frederick	J. A. Mitchell, Ph. D.	Jos. H. Martin.
Newark, Del.	New Castle	Prof. Wm. H. Bishop.	
Oakland	Garrett	J. Lee McComas, M. D.	J. L. McComas, M. D.
Odenton	Anne Arundel		E. B. Watts.
Princess Anne	Worcester	Jas. R. Stewart.	
Pocomoke City	Worcester	R. M. Stevenson	R. M. Stevenson.
Pope's Creek	St. Mary's	George Dent.	
Receiving Reservoir, D. C.		Col. G. H. Elliot.	
Rising Sun	Cecil		E. A. Reynolds.
Rockville	Montgomery		Virgil T. Poole.
Salisbury	Wicomico		L. W. Gunby.
Seaford, Del.	Sussex	H. L. Wallace	H. L. Wallace.
Sharpsburg	Washington	R. L. Hiberger.	
Smyrna, Del.	Kent		A. D. Yocum.
Snow Hill	Worcester		Purnell & Vincent.
Solomon's	Calvert	W. H. Marsh, M. D.	
†Sparrow's Point	Baltimore		Md. Steel Co.
Sunnyside	Garrett	John G. Knauer.	
Sykesville	Carroll		J. S. Hyatt.
Upper Marlboro	Prince George's	J. B. Perrie.	
Washington, D. C.		S. W. Beall.	
Western Port	Alleghany	Prof. O. H. Bruce.	
West Friendship	Howard		Postmaster.
Westover	Somerset		E. D. Long.
Wilmington, Del.	New Castle	F. C. D. McKay	Wm. Lawton.
Woodsboro	Frederick		G. F. Smith.
Woodstock College	Baltimore	T. J. A. Freeman, S. J.	
*Birdsneat, Va.	Northampton	C. R. Moore.	
*Norfolk, Va.	Norfolk	Jas. J. Gray.	
*Warsaw, Va.	Richmond	C. H. Constable.	

*Stations of the Virginia State Weather Service. †Whistle signals only.

MONTHLY SUMMARY OF REPORTS FOR JANUARY, 1895.

Table with columns: STATIONS, COUNTIES, Altitude above sea in ft., Latitude, Longitude, TEMPERATURE (Monthly Mean, Mean of Max., Mean of Min., Max. Date, Min. Date, Monthly Range), Total Precipitation, Total Snow-fall, Clear Days, Fair Days, Cloudy Days, Rainy Days, Prevailing Wind.

* Extremes of temperature from observed readings of dry thermometer. A numeral following the name of a station indicates the hours of observation from which the mean temperature was obtained, thus:
Mean of 7 a. m. + 2 p. m. + 9 p. m. + 9 p. m. + 2. Mean of 8 a. m. + 8 p. m. + 2. Mean of 7 a. m. + 2 p. m. + 2.
The absence of a numeral indicates that the mean temperature has been obtained from daily readings of the maximum and minimum thermometers. Letters of the alphabet are used to denote the number of days that are missing from record; for instance, "a" denotes 1 day missing. An italic letter following the name of a station indicates that two or more observers, as the case may be, are reporting from the same station. † Omitted in computing averages. † Received after report had gone to press and therefore omitted in computing averages and in preparing map.