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. 11. MONTHLY REPORT. MARCH, 1895.

Argon.

BY PROF. IRA REMSEN.

The plain facts concerning argon are these: For some time past Lord Rayleigh has been engaged on refined work involving the weighing of various gases. Last year he found that the nitrogen obtained from the air is a little heavier than that made from definite chemical compounds. This led him to further experiments and, at the same time, Professor W. Ramsay, of University College, London, also undertook experiments with the object of explaining, if possible, the discrepancy. The general method of work consisted in passing air, first through substances that have the power to remove those constituents that are present in small quantities, such as water vapor, carbonic-acid gas, etc., then through a heated tube containing copper. The oxygen of the air unites with the heated copper, and what has hitherto been regarded as nitrogen remains uncombined. This 'atmospheric nitrogen' was subsequently treated in three different ways for the purpose of removing the nitrogen from it.

(1) It was drawn through clay pipes in the hope that, if the gas is a mixture, one of the constituents would pass through the porous material more easily than the other, and at least a partial separation be thus effected. While something was accomplished in this way, the experiment was on the whole unsatisfactory.

(2) The 'atmospheric nitrogen' was mixed with oxygen in a vessel containing caustic alkali, and electric sparks were passed through the mixture. Under these circumstances the oxygen united with nitrogen and formed a compound which is soluble in alkali. After no further absorption of nitrogen could be effected by sparking, any unchanged oxygen present was removed, and there was then found a residue of gas which was certainly not oxygen nor nitrogen. This proved to be the substance about which the world is now talking.

In this connection it is of great interest to note that Cavendish, in 1785, probably had this same substance before him free from nitrogen. He performed the experiment above described, and noticed the residue, and says in regard to it: "We may safely conclude that it is not more than $\frac{1}{120}$ of the whole." This is very nearly the truth as regards the relative amount of argon in the air.

(3) The most satisfactory method for obtaining the gas on the large scale consists in passing 'atmosphere nitrogen' over highly-heated magnesium, which has the power of uniting with nitrogen, while the newly-discovered gas has not this power. But, even by this method, the preparation is very slow, and, up to the present, the gas cannot easily be obtained in large quantity.

The new substance is heavier than nitrogen. The density of hydrogen being taken as unity, that of nitrogen is 14, of oxygen 16, and of argon 19.7.

Perhaps the most remarkable property of argon is its inertness. It has not been possible thus far to get it to combine with any other substance, so that anything more than a general comparison with known substances is out of the question. It owes its name to its inertness, argon being derived from two Greek words signifying 'no work.'

A determination of the ratio of the specific heat of argon at constant pressure to that at constant volume was determined by means of observations on the velocity of sound in the gas, and the ratio was found to be 1.66. This is of much importance as showing that the particles of which the gas is made up act as individuals. If this conclusion is correct, it follows further that argon must be either a single element or a mixture of elements, and that, if it is a single element, its atomic weight must be nearly 40, as its density is 19 7 and its atom is identical with its molecule.

Professor Crookes has studied the spectra of argon and, in an article giving his results in detail, he says: "I have found no other spectrum-giving gas or vapor yield spectra at all like those of argon." * * * "As far, therefore, as spectrum work can decide, the verdict must, I think, be that Lord Rayleigh and Professor Ramsay have added one, if not two members to the family of elementary bodies."

Finally, Professor Olszewski, of Cracow, the well-known authority on the liquefaction of gases, has succeeded in both liquefying and solidifying argon. It was found to boil at 186 9° C., and to solidify at —189.6° C., forming a mass resembling ice.

To quote from Professor Ramsay's article read before the Royal Society: "There is evidence both for and against the hypothesis that argon is a mixture: *For*, owing to Mr. Crookes' observations of the dual character of its spectrum; *against*, because of Professor Olszewski's statement that it has a definite melting point, a definite boiling point, and a definite critical temperature and pressure; and because, on compressing the gas in presence of its liquid, pressure remains sensibly constant until all gas has condensed to liquid."

The above is a brief account of all that is known about argon, and it would evidently be premature to indulge in speculation regarding its position in the system. It may as well be said at once that, if it is an element or a mixture of elements, it will apparently be difficult to find a place for it on Mendeléeff's table. It will be well to await developments before worrying on this account. If the time should ever come when Mendeléeff's table has to be given up, something better will take its place.

The suggestion has been made repeatedly that argon is perhaps an allotropic form of nitrogen. The strongest argument against this view is the established fact that the gas conducts itself as if made up of individual particles, while any allotropic form of nitrogen, which is heavier than this, must, according to all that we know of such matters, consist of more complex molecules than nitrogen itself.

Visit of the Chief of the U. S. Weather Bureau, in Baltimore.

At the invitation of the Scientific Association of the Johns Hopkins University, Prof. Mark W. Harrington, Chief of the U. S. Weather Bureau, was present at the March meeting, Thursday, March 21st, and presented a paper upon "Preliminary Results of the Water Temperatures of the Great Lakes." Prof. Harrington was accompanied by Mr. N. B. Conger, Inspector in charge of the Lake Marine Service, who has been associated with him in the investigations. The results of this work, which has been systematically conducted since 1892, admit of the establishment of very satisfactory isothermal lines for large areas of the Great Lakes. Especially is this true of Lake Superior, which is much less affected by the inflow and outflow of tributary waters, due to its relatively smaller drainage basin. Elaborate maps and diagrams were presented to illustrate the leading points of the address. The results are of great practical importance on account of their aid in the explanation of the system of lake currents, which have only recently come to be recognized as a result of this and other lines of investigation.

After the meeting a visit was made to the Baltimore Weather Bureau station and central office of the State Weather Service, in the Physical Laboratory of the University.

Weather-Crop Service of the Weather Bureau.

The following circular, which is self-explanatory, has been issued to the public:

U. S. DEPARTMENT OF AGRICULTURE,
WEATHER BUREAU.

Washington, D. C., *March* 15, 1895.

WEATHER-CROP SERVICE.

The object of this circular is to briefly describe the Weather-Crop Service of the Weather Bureau and the system by which it is conducted.

The National Weather Bureau and the State Weather Services throughout the country collect and publish in bulletin form, from week to week during the season of planting, cultivating, and harvesting of crops, prevailing weather conditions and their effects upon farming operations and crops. Both State and National Bulletins are issued on Tuesday, the National Bulletin treating of the general weather and crop conditions of the whole country, while State Bulletins give detailed information concerning the weather and its effects upon the various staples of the several States.

All State Weather Services are branches of the National Bureau, and the general plan of

work, in the several States, is practically identical. The National Weather Bureau furnishes, through the various local weather services, to weather-crop correspondents, a suitable blank, for rendering reports, in the form of postal cards, bearing the government frank, which admits of their transmission through the mails without postage. These card forms provide for a brief statement of the weather and crop conditions of the week, and also for a record of temperature and rainfall for each day, but the temperature and rainfall data can only be supplied by those who are provided with thermometers and rain gauges. Very valuable reports, however, can be rendered by those who have not these instruments, as an intelligent and accurate statement of the general conditions, as observed by the correspondents, affords valuable information to the State Weather Service official in the preparation of his weekly bulletin.

The card reports are mailed by the special correspondents to the central station of the State Weather Service, the official in charge furnishing the necessary instructions as to time of mailing. Upon receipt of the reports at the central station of the State Service they are carefully summarized and used in the preparation of the State Bulletin, in which the reports of the correspondents are, whenever practicable, printed in full. The bulletins are sent to co-operating correspondents in exchange for their reports and are published in newspapers and given conspicuous display in commercial exchanges, post offices, and other prominent places for the benefit of the public.

A file of these bulletins, preserved from year to year, will certainly be found a valuable and interesting means of comparison, and in time a study of them in connection with the meteorological data, which the State Weather Service collects and publishes, will discover the cause of the general success or failure throughout the State of any one crop, and in case of diversified farming, point out the particular products which will average best in each section of the State; also whether other products cannot be acclimatized and profitably grown. Records of this nature must be accumulated before the science of agriculture can be advanced to the point where it will be of the greatest value to the practical farmer.

The National Weather-Crop Bulletin, besides giving a brief telegraphic summary from each State Weather Service center, contains a series of four charts, showing respectively for each week (1) lines of maximum and minimum temperatures, (2) departures from normal temperature, (3) departures from normal rainfall, and (4) the actual rainfall. Meteorological tables also accompany the charts, showing the detailed data for the several Weather Bureau stations from which the charts are constructed. The records of observations at Weather Bureau stations for the most part cover periods closely approximating a quarter of a century. From these records temperature and rainfall normals for each day in the year have been computed, with which current data telegraphed weekly from the several stations are compared, enabling the Bureau to construct the charts above referred to, showing in graphic manner how the prevailing weather conditions of the current season throughout the United States compare with the average for a long series of years.

The map of maximum and minimum temperature lines shows to what extremes of temperature the various sections of the country are subjected during each week; those giving departures from normal temperature and rainfall show the regions receiving an average, excess, or deficiency of heat and rainfall, while the fourth map shows the actual amount of rain that has fallen. These charts in connection with the summaries of the reports furnished by more than 10,000 special correspondents throughout the United States constitute the National Weather-Crop Bulletin which furnishes to all classes interested in agriculture—producer, consumer, and dealer alike—accurate and impartial information as to actual weather and crop conditions from week to week throughout each season, which information is given extensive circulation throughout the country. The Chief of the Weather Bureau will, as far as the edition will allow, furnish copies of the National Bulletin to postmasters or others who may be willing to give the Bulletin prominent display for the benefit of the public, but the limited edition will not permit him to supply the bulletin to private individuals.

The Weather-Crop Service, which was begun as an experiment in a very limited way in 1887, has grown in importance and efficiency from year to year until at this time it is regarded as second only to the work of issuing daily weather forecasts.

The Chief of the Weather Bureau acknowledges his indebtedness to the voluntary observers and special correspondents throughout the country for their valuable aid in furnishing, gratuitously, weekly reports from their respective communities. Without such voluntary assistance it would be impossible to carry on this important work.

MARK W. HARRINGTON,
Chief of Bureau.

How the Force of the Wind is Estimated.

A request has been received, asking for information as to how the force of the wind is

estimated, when the record of an anemometer cannot be consulted. The following scale, in explanation, is taken from General Instructions to Observers of the Weather Bureau:

Name.	Miles per hour.	Apparent effect.
Calm	0	No visible horizontal motion to inanimate matter.
Light	1 to 2	Causes smoke to move from the vertical.
Gentle	3 to 5	Moves leaves of trees.
Fresh	6 to 14	Moves small branches of trees and blows up dust.
Brisk	15 to 24	Good sailing breeze and makes white-caps.
High	25 to 39	Sways trees and breaks small branches.
Gale	40 to 59	Dangerous for sailing vessels.
Storm	60 to 79	Prostrates exposed trees and frail houses.
Hurricane	80 or more.	Prostrates everything.

Review of the Month—February.

WEATHER.

Low and High Areas.—Eight low areas, or cyclones, and four high areas, or anti-cyclones, exerted an influence upon Maryland weather during the month of February, 1895. That the high areas—the dry and cold weather producers—were the most potent is evidenced by the small amount of precipitation given and the severity of the month, it having surpassed in cold weather all previous Februaries, at least since the establishment of the Weather Bureau, in 1870, besides making a record for dryness seldom equalled.

Of the eight low areas, three moved along the Atlantic coast from the South, and the remainder, coming from the Northwest, followed the chain of the Great Lakes and the river St. Lawrence. Most of the precipitation that occurred during the month was caused by the three coast storms. They passed on the 2nd, 7th, and 12th, respectively, the dates corresponding to the heaviest and most general snow-storms. The little precipitation that occurred at other periods of the month was, for the most part, caused by the five storms that crossed the continent north of the lower Lake region. They did not come near enough to Maryland to produce a marked effect either as regards precipitation or temperature, though the highest temperatures corresponded quite closely with the dates of passage.

A chart giving the paths of the several storm centres reveals the cause of the small monthly precipitation. Not only did the storms from the Northwest pass too far to the northward, but the coast storms, with the exception of one, passed too far to the eastward to cause much precipitation in Maryland. The one storm that did come near enough to be strongly in evidence in Maryland was the cyclone which passed northward along the middle Atlantic coast on the 7th; and it is safe to say that with the exception of the "blizzard" of March 11, 1888, no storm that has occurred within recent years will be longer remembered for its severity. This cyclone made its appearance in the west Gulf region on the 6th, and moving rapidly to the South Atlantic states, passed northward along the coast during the 7th and 8th. As is usual with coast storms, high northerly winds resulted, which, together with the extremely low temperature occasioned by the contiguous cold wave, rendered the weather severe almost beyond parallel in this State.

The storm differed from the "blizzard" of 1888 in that it prevailed at a much lower temperature than its famous predecessor. The "blizzard" was accompanied by rain, which, freezing as it fell, coated exposed objects thickly with ice. Telegraphic communication was suspended on account of broken poles, tangled wires, and the defective insulation which resulted from the icy sheathing. The storm of the 7th, being much colder, was accompanied by a heavy fall of dry snow, and the telegraph service apparently suffered no impairment.

As for the high areas, though only four of them succeeded in journeying entirely across the continent, they were so extensive and so deliberate in movement that they gave the storms no opportunity of getting into central regions, and were thus the cause of the long period of very cold weather. From January 24th to February 20th, inclusive—27 days—the daily mean temperature at Baltimore never rose above the normal, and the total deficiency during that time was 317 degrees. With the exception of the long, cold spell in 1893, no such extended period of low temperature is noted upon the records of the Weather Bureau at Baltimore, and they date back to 1870. It is rather a curious coincidence that the mean temperature of January, 1893, at Baltimore, varies but 1 degree from that of February, 1895, the former being 25 and the latter 26. There was, apparently, small difference between the two cold winters in the extent of ice formation, the Chesapeake bay and its tributaries being closed to navigation for a considerable time in both seasons. The port of Baltimore, however, should be excepted from the above statement, so far as steam vessels are concerned, for with the assistance of iceboats they continued to arrive and depart daily throughout the two periods.

There was also a close agreement between the snowfall of January, 1893, and that of February, 1895, the former being 8 inches and the latter 93. inches.

Temperature (degrees).—Monthly mean (for entire territory covered), 24.5, being 10.3 below the normal; highest monthly mean, 29.3, at Pocomoke City; lowest monthly mean, 15, at Sunnyside; highest temperature, 72, at Burkittsville, on the 28th; lowest temperature, —18, at Deer Park, on the 6th; greatest local monthly range, 75, at Burkittsville; least local monthly range, 52, at Bachman's Valley; monthly mean range, 63.2; monthly mean maximum, 33.4; monthly mean minimum, 15.7; highest minimum for the month at any station was 3, at Solomon's and Princess Anne, on the 3rd.

The attention of observers is specially invited to the mean temperatures and isotherms as shown by the map, page 91. The great variation in temperature existing between stations makes apparent the necessity for accurate observations.

Precipitation (in inches).—Average, 1.26, being 1.47 below the normal; greatest amount, 2.14, at Princess Anne; least amount, .39, at Distributing Reservoir, D. C. The greatest fall of snow during the month in Maryland, 17 inches, is reported by the observer at Easton. The next greatest fall, 14.5 inches, is reported by the observer at La Plata. In Delaware the greatest fall of snow, 12.5 inches, is reported by the observer at Seaford. The next greatest fall, 12 inches, is reported by the observers at Newark and Dover. Milford, situated in the southern part of the same county as Dover, reports 11.5 inches.

Wind.—Prevailing direction, northwest. Total movement in miles, Philadelphia, Pa., 8406; Baltimore, Md., 7090; Washington, D. C., 6220; Norfolk, Va., 6686.

Hail.—At Millsboro, Del., on the 16th; at Mardela Springs, on the 16th; at Princess Anne, on the 7th; at Oakland, on the 27th.

Sleet.—At Millsboro, Del., on the 16th; at Princess Anne, on the 2nd.

Auroras.—At Charlotte Hall, on the 27th; at Millsboro, Del., on the 23rd, 24th, 26th; at Princess Anne, on the 21st.

Halos, solar.—At Baltimore, on the 6th; at Solomon's, on the 6th, 15th.

Halos, lunar.—At Baltimore, on the 3rd, 6th; at Millsboro, Del., on the 3rd, 9th, 11th, 28th; at Newark, Del., on the 6th.

Parhelia.—At Solomon's, on the 5th, 6th, 15th.

Coronæ, lunar.—At Baltimore, on the 6th.

Notes by Observers.

Bachman's Valley.—The most severe snowstorm that has been known for many years passed over this section on the 7th. In the evening the wind began to blow from the northwest, heaping the snow in very high drifts; by the morning of the 10th all the roads were impassable and traffic was generally suspended. In the Valley drifts were found as high as 10. feet; roads were opened by men using shovels.

Baltimore.—6th, the coldest day for several years; minimum temperature, 0.8 of a degree, at 8.30 a. m.; maximum temperature, 11°; mean temperature, 6°. A tangent arc and a secondary halo observed at 9 a. m. They were quite brilliant and remained visible about an hour.

The 7th was one of the coldest and stormiest days in the history of the station. Light snow began during the night 6-7 and continued until 9.45 a. m., when it changed to light rain, continuing until 10.15 a. m., when light snow again began falling, becoming much heavier, and this, with a high and increasing wind velocity, combined to make the weather blizzard-like in intensity. The total snowfall for the day was 4.3 inches on the level, but in many places it was drifted to a depth of several feet. The harbor was closed to sailing vessels on account of the ice, but steamers were moving. On account of the heavy snow all railroad trains were several hours late, and street-car lines (particularly the electric) were somewhat delayed. High winds prevailed from the 7th to the 10th, inclusive, the highest velocity being 42 miles per hour, from the west, on the 8th.

13th, a tangent arc and a parhelic circle observed between 8.30 a. m. and 4 p. m.

Cumberland (a).—Rivers and creeks closed by ice from December 25th to February 25th.

Cumberland (b).—Coldest February for 24 years. At close of month wells and creeks were clear of ice, but rivers not entirely so.

Denton.—6th, thermometer 6° below zero. 7th, thermometer zero; high northwest winds. 8th, the worst snowstorm for several years; high winds continued; snowdrifts between 8 and 9 feet deep in some places; roads impassable; no mails for several days. 15th, remarkably fine appearance of three mock suns and a parhelic circle observed at 5 p. m.

Cherryfields.—7th, a dreadful gale from the northwest. 8th, 7 a. m., temperature down to zero; high wind all day and night. 9th, St. Mary's river frozen over in spite of the wind and waves. 17th, dense fog in morning, with temperature between 15° and 17°. 24th, steamer Potomac cut through the ice for about 7 miles. 28th, frogs heard.

Easton.—7th, 8th, 10 inches of snow fell, which was driven by high winds into very compact drifts, and for 5 days Easton was cut off from all communication with other points, except by telegraph. 15th, between 3 and 4 p. m., parhelion observed.

Jewell.—Notwithstanding that the snow was still in drifts to the depth of 5 or 6 feet in places, many farmers made tobacco beds during the last three days of the month where it had melted; the ground was found to be in good condition for such work.

Solomon's.—7th, 8th, 9th, blizzard prevailed; Patuxent river frozen over down to its mouth; roads impassable on account of snowdrifts; river remained closed until the 24th.

Grantsville.—8th, 9th, severe snowstorm, worst for 16 years; weather very cold; many potatoes frozen in cellars; sleighing for more than two months; snow drifted more than at any time since 1856.

Sharpsburg.—7th, snowstorm from the N. E., changing to N. W. at 9.52 p. m., followed by severe windstorm from N. W., which caused snow to drift in roads, impeding travel. At close of the month some roads not yet opened.

Upper Marlboro.—Peaches thought to have been killed by severe cold weather on the 3rd, and from the 5th to 11th.

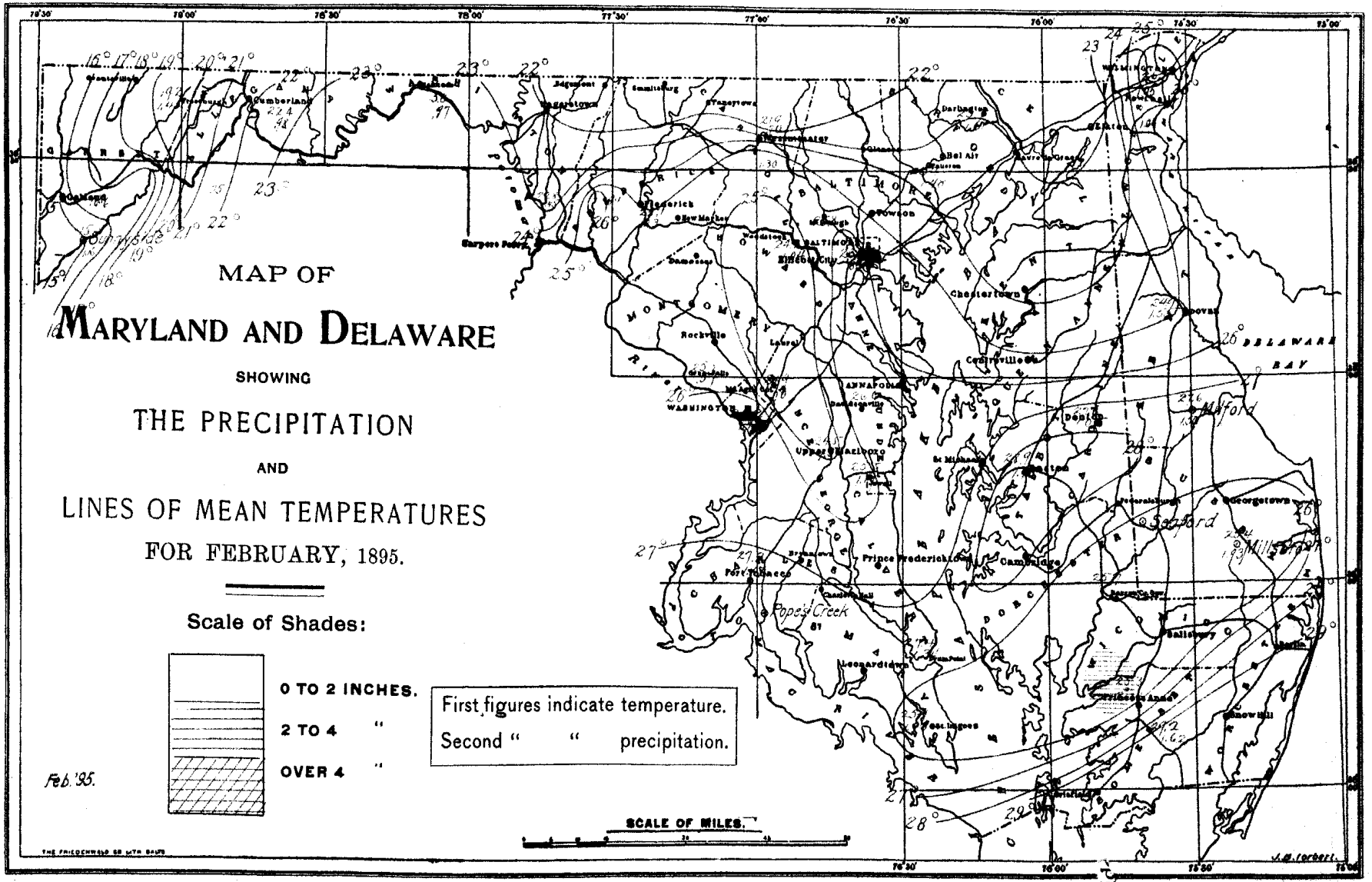
Pocomoke City.—Pocomoke river closed by ice from 6th to 23rd.

Seaford.—7th, severe snowstorm; heavy drifts; railroad trains delayed for 4 days and country roads blocked for a week or more.

Glyndon.—3rd, lunar halo with three stars within the circle. This is said to be a sign that falling weather will occur within three days. In this case it came true, as rain fell on the 3rd and snow on the 6th. The same phenomenon was observed on the 6th with six stars within the circle, and the adage was again verified, as snow fell on the 12th and 13th. 8th, this day will be long remembered as one of the most severe in the State. The observer came near being lost in a huge drift about 100 yards from his house. The wind was estimated to be blowing between 40 and 50 miles per hour. 13th, a tangent arc and parhelic circle observed during the day.

Mardela Springs.—16th, mean temperature from 3rd to 16th, inclusive, 13°; snow to the amount of 1 inch fell yesterday, making about 4 inches on the level, which is badly crusted; drifts in many places from 3 to 6 feet high. All work is at a standstill, except gathering firewood, and that in many places is difficult, unless the woods are close at hand.

Philadelphia, Pa.—This was the coldest February with one exception—that of 1885—in the past 24 years. 1875, however, was practically equal to it, being only one-tenth of a degree warmer. There was not so much intensely cold weather during the month just closed, but it was uniformly cold. The severest spell was from the 5th to the 9th, with the mercury on two mornings from 1° to 3° below zero. And during this period, on the 7th and early morning of the 8th, there was a severe snowstorm accompanied by a gale, which piled the snow in great drifts, completely blocking most of the railroads and country roads. The Delaware river, for many days, was one field of heavy ice and would have been solidly closed but for the vigilance of the iceboats. No rain fell until the 27th, and the total precipitation for the month was less than half the usual amount.


MAP OF
MARYLAND AND DELAWARE
SHOWING
THE PRECIPITATION
AND
LINES OF MEAN TEMPERATURES
FOR FEBRUARY, 1895.
Scale of Shades:
0 TO 2 INCHES.
2 TO 4 "
OVER 4 "
First figures indicate temperature.
Second " " precipitation.
Feb. '95.
SCALE OF MILES.
DELAWARE BAY
Pope's Creek

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	Allegany	F. F. Brown.	
Bradshaw	Baltimore		B. F. Taylor.
Buckeystown	Frederick		A. W. Nicodemus.
Burkittsville	Frederick	J. P. Slifer.	
Cambridge	Dorchester		Samuel Lehman.
Charlotte Hall	St. Mary's	J. Francis Coad.	
Cherryfields	St. Mary's	J. Edwin Coad.	
Chestertown	Kent	Hon. M. deK. Smith.	
Cumberland	Allegany	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.	
Flintstone	Allegany		N. T. Downes.
Frederick	Frederick	McClintock Young, W. A. Lantz,	"The News."
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.
Hancock	Washington	Dr. J. S. Diehl.	
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	Allegany		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	Somerset.	Jas. R. Stewart	L. F. Wilson.
Pocomoke City	Worcester	R. M. Stevenson	R. M. Stevenson.
Pope's Creek	Charles.	George Dent.	
Receiving Reservoir, D. C.		Col. G. H. Elliot.	
Rising Sun	Cecil		Dr. L. R. Kirk.
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	Allegany	Prof. O. H. Bruce.	
West Friendship	Howard		Postmaster.
Westminster	Carroll	Prof. Roland Watts.	
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.	
*Birdsnest, 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.*

DAILY PRECIPITATION FOR FEBRUARY, 1895.

STATIONS.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Tot
Sunnyside	...	.10	...	.02	...	.08	.48	...	...	...	...	.04	.04	.04	...	...	...	..	T	T	.07	T	.04	...	T	...	T	.25	1.16
Oakland	...	.10	...	.09	T	.08	.33	.12	.20	...	...	.11	.07	.02	.02	...	...	T	T	...	.10	T	.01	...	...	...	.01	.32	1.61
Deer Park	..	...	...	...	...	...	.60	..	...	...	...	...	...	...	...	...	...	...	...	...	.01	...	.02	..	..	...	...	.27	.90
Grantsville	...	...	...	.20	...	.20	.60	...	...	...	...	...	.10	...	...	...	...	...	...	...	.10	...	...	...	...	...	...	.25	1.45
West'nport	.05	...	...	...	...	..	.70	...	...	...	...	...	...	...	...	...	...	...	...	...	...	T	T	...	...	...	...	...	.75
Boettcherv	...	.10	...	...	..	T	1.00	...	...	...	...	.20	...	...	...	...	...	...	...	...	T	...	...	...	...	...	...	T	1.30
Cumb. (a)	.05	...	...	T	...	.60	†	...	...	...	.05	.13	...	...	...	...	...	...	...	...	.05	...	...	...	...	...	...	.05	93
Cumb. (b)	.10	...	...	...	...	...	.50	...	...	...	...	.20	...	...	...	...	...	...	...	...	.05	...	...	...	...	...	.13	...	.98
Hancock	...	.14	...	...	...	...	†	.70	...	...	...	...	.05	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.08	.97
Sharpsburg	...	.12	...	T	...	T	1.00	...	..	...	...	...	.24	...	...	...	...	...	...	...	T	...	...	...	...	...	...	.09	1.45
Burk'tsvle	...	...	...	.12	.02	...	.55	...	...	...	...	.13	...	...	...	...	...	...	...	...	T	...	.01	...	...	...	...	.11	.94
Mt.St.M'y's Col	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Fred'k. (a)	...	.15	..	.	...	†	†	.70	...	...	...	†	.20	...	...	...	..	...	...	...	...	...	...	...	...	...	†	.18	1.23
Fred'k. (b)	...	.10	...	...	...	.45	.45	...	...	...	...	†	.20	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	1.20
Taneytown	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bach. V'y	...	.15	...	...	...	T	.55	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	T	.70
W'stminst'r	T	...	...	...	...	...	1.00	...	...	...	...	.30	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1.30
Glyndon	...	.21	...	T	...	T	1.15	...	T	...	...	.25	.05	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1.66
Woodst. Col	...	.42	...	...	...	...	.40	...	...	...	...	...	.20	...	...	...	...	...	...	.01	...	...	.01	...	...	...	...	T	1.04
Baltimore	...	.29	...	T	...	T	.33	.05	...	...	...	T	.06	...	...	...	...	...	...	...	...	...	T	...	...	...	...	.10	.83
Fallston	...	.11	...	T	...	...	.91	...	...	...	...	.36	...	...	...	...	...	...	...	T	...	...	T	...	...	...	...	.10	1.48
Darlington	...	.40	...	...	...	...	.80	...	...	...	...	.15	...	...	...	...	...	...	...	...	T	...	...	...	...	...	...	.26	1.61
Great Falls	...	.05	...	.04	...	...	...	.34	..	...	...	...	.14	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.57
Annapolis	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jewell	...	.35	...	...	...	...	†	.50	...	..	...	.20	...	...	...	.10	...	...	...	...	...	...	...	...	...	...	†	.02	1.17
Dist. R., D.C	...	.08	.05	...	...	...	.07	.09	...	...	...	...	.05	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.05	.39
Rec. R., D.C	...	.12	...	...	...	...	...	...	...	...	...	...	.08	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.09	.29
Wash., D. C.	...	.30	...	...	...	T	.45	.14	...	...	...	.02	.12	...	...	T	...	...	...	...	...	...	T	...	...	...	...	.07	1.10
Col. Park	...	.20	...	...	...	...	.50	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	T	.70
Up. Marlb.	...	.30	...	...	...	...	.40	...	...	...	T	.15	...	...	...	.25	...	...	...	...	...	T	...	...	...	...	...	...	1.10
M'rsh'll H'll	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
La Plata	...	...	...	...	...	...	1.00	...	...	..	...	.25	...	...	...	.20	...	...	...	...	...	...	...	...	...	.02	...	...	1.47
Bel Alton	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Pope's Cr'k	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Solomon's	...	.56	T	...	...	T	.38	...	...	...	...	.27	...	...	...	.11	...	...	...	...	T	...	...	...	...	...	...	.02	1.34
Charl. Hall	...	.35	...	...	...	...	.50	...	...	...	...	...	.20	...	...	.30	...	...	...	...	...	...	...	...	T	...	.03	...	1.38
Cherryfields	...	.18	.10	...	...	...	T	.30	...	...	...	.30	...	...	...	...	.20	...	...	...	...	...	...	...	...	...	...	T	1.78
Chestert'n	..	.50	...	...	...	...	.60	...	...	...	..	...	.25	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1.35
Denton	...	.30	...	...	...	..	.40	...	...	...	...	...	.20	...	...	.01	...	...	...	...	...	T	...	...	...	...	.14	...	1.05
Easton	...	.41	...	...	...	...	...	1.16	...	...	...	.12	...	...	...	.10	...	...	...	...	...	...	...	...	...	...	.19	...	1.98
Mardela Sp.	...	.46	...	...	...	...	.53	...	...	...	...	.80	...	...	...	...	.10	...	...	...	...	...	...	...	...	...	...	.13	2.02
Pri'cess An.	...	1.02	...	...	...	...	.50	...	...	...	...	†	.38	...	...	.15	...	...	...	...	T	...	...	...	...	...	...	.09	2.14
Poc'm'k Cit	...	.54	...	...	...	...	.31	.22	...	...	...	...	.31	...	...	.18	...	...	...	...	...	...	...	...	...	...	...	.06	1.62
Wilm't. Del.	...	.73	...	.03	...	...	.70	...	...	...	...	..	.18	...	...	...	...	...	...	...	.09	T	T	...	...	...	...	.22	1.95
Newark, Del.	..	.24	...	...	...	...	†	.50	...	...	...	...	...	...	...	...	...	...	...	...	.10	...	T	...	...	...	†	.24	1.08
Dover, Del.	...	.38	...	...	...	...	.70	...	...	...	...	†	.20	...	...	...	...	...	...	...	...	...	...	...	...	...	†	.27	1.55
Milford, Del	..	.48	...	...	...	...	†	.90	...	...	...	...	...	...	...	T	...	...	...	...	T	...	T	...	...	...	†	.12	1.50
Seaford, Del	...	.70	...	...	...	...	†	.60	...	...	...	†	.22	...	...	.02	...	...	...	...	T	...	...	...	...	...	...	.11	1.63
Millsb'o. Del	...	.82	...	.01	...	...	.27	.43	...	...	...	...	.17	...	...	.10	...	...	...	...	...	...	...	...	...	...	...	.13	1.93
B'dsn'st, Va.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Norfolk, Va	.01	.91	T	T	T	...	.57	.01	...	...	...	.16	.04	...	...	.78	.05	...	.01	.01	T	...	...	...	...	...	...	.07	2.62
Warsaw, Va	...	...	.30	...	...	...	.30	...	...	...	...	...	.30	...	...	.25	...	...	...	...	...	...	...	...	...	...	...	...	1.15
Phila. Pa	...	.27	T	T	...	...	.30	.43	...	...	...	...	.10	...	...	...	...	...	...	...	.03	T	...	...	...	...	...	.26	1.39

NOTE.—"T" indicates a trace of rain or melted snow. † Dates on which rain fell, but not measured until next observation.

MONTHLY SUMMARY OF REPORTS FOR FEBRUARY, 1895.

STATIONS.	COUNTIES.	Altitude above sea in ft.	Latitude.	Longitude.	TEMPERATURE. Monthly Mean.	Mean of Max.	Mean of Min.	Max. Degrees	Max. Date.	Min. Degrees	Min. Date.	Monthly Range.	Total Precipitation.	Total Snow-fall.	Clear Days.	Fair Days.	Cloudy Days.	Rainy Days. (.01 in. or more)	Prevailing Winds.
WESTERN MARYLAND.																			
Sunnyside	Garrett	2440	39°20′	79°21′	15.0	25.0	5.0	49	28	—15	8	64	1.16	11.3	10	8	10	10	S. W.
Oakland	Garrett	2380	39 24	79 18	16.6	26.2	7.1	47	28	—12	3	59	1.61	12.0	6	10	6	14	S. W.
Deer Park	Garrett	2457	39 25	79 13	16.7	28.5	4.9	48	28	—18	6	66	.90	6.3	....	....	....	....	.....
Grantsville	Garrett	....	39 45	79 10	19.2	27.1	9.2	48	28	—12	6	60	1 45	12.0	6	14	8	6	W.
Westernport	Allegany	....	38 28	79 2	21.6	30.9	12.2	56	28	—5	7	61	.75	7.5	...	....	....	....	.....
Boettcherville	Allegany	....	39 39	78 48	22.6	.....	.....	60	28	—10	3, 8	70	1.30	13.0	....	....	....	....	.....
Cumberland (*a*)	Allegany	650	39 39	78 46	28.2	37.2	19.2	64	28	—3	7	67	.93	8.8	....	....	....	....	N.W.
Cumberland (*b*)	Allegany	700	39 39	78 45	22.4	30.1	15.5	54	28	—3	6	57	.98	9.5	12	10	6	3	.....
Hancock	Washington	....	39 40	78 10	23.8	35.5	12.5	58	25, 27, 28	—8	3	66	.97	9.5	7	18	3	4	W.
Sharpsburg	Washington	....	39 25	77 45	22.8	32.0	13.5	56	28	—6	3	62	1.45	14.0	15	7	6	4	N.W.
NORTHERN-CENTRAL MD.																			
Burkittsville	Frederick	....	39 25	77 35	d26.0	d33.8	d18.3	72	28	—3	6, 8	75	.94	8.3	...	...	....	....	W.
Mt. St. Mary's Col	Frederick	720	39 43	77 20	.....	.....	.....	....	.....	....	....	....	....	....	....	....	....	....	.....
Frederick (*a*)	Frederick	280	39 24	77 18	25.1	32.9	17.3	61	28	—4	3	65	1.23	10.2	....	....	....	5	.....
Frederick (*b*)	Frederick	280	39 24	77 18	26.0	34.1	17.8	60	28	—1	8	61	1.20	12.0	21	4	3	4	N.W.
Taneytown	Carroll	....	39 40	77 9	...	....	.....	....	.....	....	....	....	....	....	....	....	....	....	.....
Bachman's Val	Carroll	....	39 37	76 55	21.9	....	.....	49	28	—3	6	52	.70	7.0	10	11	7	2	N.W.
Westminster	Carroll	....	39 35	77 0	25.2	33.2	17.2	57	25	—4	6	61	1.30	12.0	17	7	4	6	W. N.W.
‡Glyndon	Baltimore	660	39 27	76 41	k15.0	k23.3	k 6.8	38	17	—11	8	49	1.66	13.7	....	....	....	....	.....
McDonogh	Baltimore	535	39 23	76 44	d25.8	d33.8	d17.8	59	28	—6	7	65	.....	....	....	....	....	....	.....
Woodstock Col	Baltimore	392	39 20	76 49	24.2	34.2	14.1	60	28	—7	3	67	1.04	10.4	17	6	5	4	N.W.
Baltimore	.....	179	39 17	76 36	26.4	33.2	19.6	62	28	1	6	61	.83	9.3	11	5	2	5	N.W.
Johns Hopkins Hos	.....	...	39 17	76 36	25.5	33.8	17.2	63	28	—1	8	64	.....	....	....	....	....	....	.....
Fallston	Harford	450	39 31	76 24	24.0	.....	.....	58	28	—3	6	61	1.48	12.5	13	12	3	4	W.
Darlington	Hartord	300	39 39	76 14	23.7	33.0	14.4	58	28	—6	6	64	1.61	13.5	22	2	4	4	N.W.
Great Falls	Montgomery	...	39 0	77 14	25.8	....	.....	63	25	—1	3	64	.57	....	....	....	....	....	.....
SOUTHERN MARYLAND.																			
Annapolis	Anne Arund'l	20	39 58	76 30	26.6	34.3	19.0	63	28	—1	8	64	.....	....	22	0	6	....	N.W.
Jewell	Anne Arund'l	....	38 44	76 36	25.8	33.9	17.7	62	28	—2	8	64	1.17	11.5	19	4	5	5	N.W.
Dist. Res., D. C.	.....	....	38 52	77 0	25.6	.....	....	63	25	—3	3	66	.39	....	....	....	....	....	.....
Rec. Res., D. C.	.....	....	38 52	77 0	25.5	.....	.....	62	25, 28	—2	3	64	§.29	....	....	....	....	....	.....
Washington, D. C.	.....	112	38 52	77 0	26.2	34.1	18.3	67	28	0	3	67	1.10	....	14	9	5	6	N.W.
College Park	Pr. George's	....	38 58	76 56	24.9	34.9	14.8	63	28	—7	3	70	.70	7.5	....	....	....	2	.....
Upper Marlboro	Pr. George's	....	38 47	76 45	24.5	34.4	14.6	65	28	—7	3	72	1.10	12.0	19	5	4	5	N.W.
Marshall Hall	Charles	....	38 42	77 8	....	....	....	....	.....	....	....	....	....	....	....	....	....	....	.....
La Plata	Charles	...	38 32	77 0	27.2	35.6	18.9	66	28	2	7	64	1.47	14.5	...	...	....	...	.....
Bel Alton	Charles	....	38 26	77 1	.....	.....	.....	....	.....	....	....	....	....	....	....	....	....	....	.....
Pope's Creek	Charles	..	38 22	77 1	.....	....	.....	....	.....	....	....	....	.....	....	....	....	....	....	.....
Solomon's	Calvert	20	38 19	76 27	27.4	35.6	19.1	65	28	3	8	62	1.34	11.8	9	9	10	5	N.W.
Charlotte Hall	St. Mary's	....	38 28	76 48	25.8	35.4	16.3	65	28	—5	6	70	1.38	13.5	20	4	4	5	N.W.
Cherryfields	St. Mary's	....	38 11	76 24	25.9	....	....	....	.....	....	.....	....	1.78	10.0	15	8	5	6	N.W.
EASTERN MD. AND DELAWARE.																			
Chestertown	Kent	80	39 13	76 4	23.8	31.7	15.8	58	28	0	6, 8	58	1.35	13.5	20	6	2	3	N.W.
Denton	Caroline	42	38 47	75 41	27.6	39.6	15.7	60	28	—2	6	62	1.05	9.1	....	....	....	....	.....
Easton	Talbot	35	38 42	76 6	28.9	38.9	18.9	64	28	2	8	62	1.98	17.0	21	2	5	5	N.W.
Mardela Spr.	Wicomico	25	38 30	75 39	25.7	34.3	17.1	61	28	2	8	59	2.02	10.0	14	8	6	5	N.W.
Princess Anne	Somerset	....	38 10	75 35	25.3	33.2	17.4	61	28	3	8	58	2.14	13.0	10	14	4	5	N.W.
Pocomoke City	Worcester	37	38 5	38 38	29.3	37.5	21.1	64	28	2	8	62	1.62	13.5	17	5	6	6	N.W.
Wilmington, Del	Newcastle	115	39 44	75 33	26.5	35.6	17.4	57	28	—2	6	59	1.95	11.7	12	15	1	7	N.W.
Newark, Del	Newcastle	....	39 40	75 37	22.5	30.9	14.1	56	28	—4	6	60	1.08	12.0	14	8	6	4	N.W.
‡Kirkwood, Del	Newcastle	....	39 35	75 41	20.6	.....	.....	....	.....	....	....	....	.....	....	....	....	....	....	.....
Dover, Del	Kent	40	39 10	75 30	24.9	33.0	16.8	56	28	—1	6	57	1.55	12.0	17	7	4	6	W. N.W.
Milford, Del	Kent	....	38 45	75 25	27.6	37.6	17.8	62	25	1	6, 8	61	1.50	11.5	18	4	6	4	N.W.
†Seaford, Del	Sussex	....	38 40	75 35	25.3	34.6	16.0	61	28	—2	6	63	1.63	12.5	....	....	....	....	.....
Millsboro, Del	Sussex	....	38 44	75 15	25.4	35.1	15.8	62	28	—1	6	63	1.93	8.0	17	7	4	7	N.W.
‡VIRGINIA.																			
Birdsnest	Northampton	....	.....	.....	.....	.....	.....	....	.....	....	....	....	.....	....	....	....	....	....	.....
Norfolk	.....	....	.....	.....	31.9	39.4	24.4	68	28	2	8	66	2.62	10.8	18	6	4	11	N.W.
Warsaw	Richmond	....	.....	.....	26.4	36.5	16.3	68	28	0	8	68	1.15	11.5	15	9	4	4	N.
‡PENNSYLVANIA.																			
Philadelphia	.....	....	.....	.....	25.4	32.3	18.6	53	28	—3	6	56	1.39	11.4	10	11	7	6	N.W.
AVERAGES	Western Maryland	....	.....	.....	20.9	30.3	11.0	....	.....	....	.....	63.2	1.15	10.4	9.3	12.2	6.5	6.8	S. W. W. N.W.
	Northern-Cent'l Md.	....	.....	.....	25.0	33.5	17.1	...	.....	...	.....	63.3	1.09	10.6	15.9	6.7	4.0	4.9	N.W.
	Southern Maryland	....	.....	.....	26.1	34.8	17.7	...	.....	....	.....	66.3	1.17	11.5	16.5	5.6	5.8	4.8	N.W.
	East. Md. and Del	....	.....	.....	26.1	35.2	17.1	....	.....	....	.....	60.1	1.62	11.9	16.0	7.6	4.4	4.7	N.W.
	Entire territory	....	.....	.....	24.5	33.4	15.7	....	.....	....	.....	63.2	1.26	11.1	14.4	8.0	5.2	5.1	N.W.

* 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:
[1] Mean of 7 a. m. + 2 p. m. + 9 p. m. + 9 p. m. ÷ 4. [2] Mean of 8 a. m. + 8 p. m. ÷ 2. [3] 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. § Record incomplete.