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ANNUAL REPORT, 1875-76

OF THE

CHIEF SIGNAL-OFFICER.

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Annual Report of the Chief Signal Officer, U.S. Army Signal Corps

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REPORT

OF THE

CHIEF SIGNAL-OFFICER OF THE ARMY.

WAR DEPARTMENT,
OFFICE OF THE CHIEF SIGNAL-OFFICER,
Washington, D. C., November 1, 1876.

SIR: The established course of instruction in military signaling and telegraphy, meteorology, and the Signal-Service duties at stations of observation and report, together with the drills of the Signal Service with arms, has continued at the school of instruction and practice at Fort Whipple, Va. The apparatus needed for the study and exercises with instruments for the meteorological duties at stations of observation, the equipment for the drill in field-signaling, the drill with the field-telegraph train, the construction-drill for permanent telegraph-lines, and the duties on signal and telegraph stations, is complete. The duties at the post are conducted under strict military rule. The course at Fort Whipple is intended to furnish a force of enlisted men, selected after examination, disciplined as soldiers, and fitted by special instruction for the special duties of the Signal Service. There have been instructed during the year twenty-three men as assistant observers, and twenty-five for promotion to the grade of sergeant. The reduced strength of the service has rendered it impossible to keep at the post the full force required for all the exercises.

Eight commissioned officers were under instruction during the year ending June 30, of whom seven have completed the full course, and one is still under instruction. (Papers I and II.)

Twenty-five enlisted men who had served the allotted time under instruction on station as assistants have been here instructed for promotion to the grade of sergeant. Of these, twenty-three completed the course, one was dropped from instruction, and one ordered away before passing the course.

Twenty-three men have been under instruction for the position of assistant observer. Of these, one was dropped from the rolls, and two are still under instruction; the remainder are now either on station duty or awaiting orders at the post. (Papers III and IV.) No change has been made in the course of instruction for either officers or enlisted men. The number of enlisted men for duty at Fort Whipple has varied during the year from seventy-seven to forty-eight, and the number of commissioned officers from twelve to six. The average number of men for duty has been fifty-seven.

The morning report of Fort Whipple for June 30, 1876, exhibits sixty-eight enlisted men present for duty, of whom eight were sergeants, fifty-nine privates, and one hospital-steward. Three of the privates were candidates for promotion, and under special instruction.

The force at the post now consists of seven commissioned officers, of whom four are under instruction, and forty two enlisted men.

During the year ending June 30, 1876, First Lieut. R. P. Strong, Acting Signal-Officer, continued in charge of the post, and First Lieut. C. E. Kilbourne, Acting Signal-Officer, of the instruction department, as at the date of last annual report. The quarters for the officers in charge and those for the officers on temporary duty under instruction have been completed, and there is now proper accommodation for both officers and enlisted men. The sanitary condition of the post has steadily improved, as the force there stationed has been thus provided for, and is now excellent.

Changes have been made in the arrangements of the hospital, which have added materially to the comfort of the occupants. Acting Assistant Surgeon L. W. Ritchie remains in charge.

The years of service past have proven the success and the economy assured to the United States by the fact that this post has made it practicable to put on station duty those only who had been taught and tried and so known to be fit for the labors to be required of them. The benefits resulting from it as a school of study have been evidenced throughout the United States.

Meagre reports only have been received of the instruction had elsewhere. There have been no reports from the officer designated as instructor in military signaling and telegraphy at the Military Academy at West Point.

In the Department of the Missouri, Capt. C. S. Ilsley, Seventh Cavalry, was succeeded as instructor, December 3, 1875, by First Lieut. W. J. Volkmar, Fifth Cavalry, who has furnished reports of the instruction of officers and enlisted men regularly since that date.

A form of instruction has been maintained in the Department of Dakota, but no reports of progress are received. Personal reports received from officers at various military posts throughout the United States indicate that instruction is given in some form at most of them; but, as a rule, it is conducted without proper facilities to make it as thorough as it should be.

The officers of the Signal Service pass the course of drill and instruction, and serve regularly at the post of Fort Whipple, before being put upon any other duty. It is recommended that all officers of the Army intended to be instructed as acting signal-officers, or to be temporarily instructors in geographical military departments for the field duties of the Signal Service, be here instructed before being put upon detached duty.

The act approved March 3, 1875, maintaining the Signal Service as then organized, and providing for one hundred and fifty sergeants, thirty corporals, and two hundred and seventy privates, was productive of good results. It fixed the duties and gave the formal sanction of law to the forms and usages of the service. It is hoped the reduction of force under the act approved July 24, 1876, will be only temporary.

The men to be enlisted for the Signal Service are first required to pass a preliminary educational examination before they are accepted for enlistment. After enlistment, they are sent to Fort Whipple to be drilled and instructed. They are then tested by practice and further taught as assistants at stations; instructed later in higher branches at the school of instruction; again examined, and again tested before being intrusted with the management of stations. The plan has furnished a force of soldiers of superior education and good character at the many stations throughout the United States.

The work done at this office has been extensive, covering a wide field of operations, with many and complicated details, each requiring to be carefully elaborated for each day, and each limited for its discharge to fixed and very brief periods of time. The steadily improving experience and organization of the service have permitted each branch of duty to be carried on with regularity.

Bvt. Lieut. Col. Garrick Mallery and First Lieut. (now Captain) Henry Jackson, acting signal-officers, have remained on duty as assistants to the Chief Signal-Officer, and in charge, respectively, of records, general correspondence, orders, and enlistments, and of the property division, together with other duties specially assigned them, as mentioned in the last annual report, during the year ending June 30, 1876, and up to the dates at which they were relieved from duty in this office. Bvt. Lieut. Col. Mallery was relieved from duty August 17, 1876, by Special Orders, Adjutant-General's Office, No. 166, and Captain Jackson August 12, 1876, by Special Orders, Adjutant-General's Office, No. 139.

The aggregate of office correspondence has become of large amount, embracing many thousands of communications, exclusive of publications and telegrams, sent and received. The record is herewith. (Paper V.) The office is in communication with numerous foreign correspondents, having now official relations with scientists and the chiefs of meteorological services of nearly every prominent power on the northern hemisphere. It has become the acknowledged centre for meteorological information on this continent.

The preparation of statistics and reports, upon special requests, for the uses of individuals or institutions, has become a work of magnitude, while the numerous applications for information on various subjects, many of them only indirectly connected with the duties of the office, have required of themselves much attention.

The work in the property division of the office has been carefully systematized. It has become extensive with the increasing duties of the service.

A number of valuable maps and charts have been prepared in the map-room of the office.

Two hundred and seventy-eight dollars and twenty-nine cents have been received during the year from the sale of maps and other office publications, in accordance with the act of Congress, approved March 3, 1874, authorizing such sales.

Two hundred and twenty-four instruments have been purchased for station use since last report, and four hundred and two issued. The experiment of sending instruments by mail, under the special arrangement for this purpose made with the Postmaster-General, to which reference has been made in a previous report, has proved successful, and the percentage of loss from breaking in transmission has been materially reduced. The superintendent of the railway mail-service has shown marked interest in this work, and much of its success is due to his personal supervision.

The library of the office now contains three thousand three hundred and ten bound volumes, and five hundred and eighty-nine pamphlets, being an increase during the year of two hundred and ninety-eight bound volumes and one hundred and nineteen pamphlets. Many of these additions have been obtained without expense to the United States from foreign societies and associations in exchange for office publications. Paper VI exhibits a list of the documents so received.

Bvt. Capt. H. W. Howgate, acting signal-officer and assistant, continued to have general charge of instruction and general supervision of

non-commissioned officers and assistants on station duty, the receipt, record, and publication of weather reports during the year ending June 30, 1876, together with other duties especially assigned him. The following is the record of stations for this period reported by this officer:

ALBANY, NEW YORK.

[*Official number*, 16.]

Latitude	42° 40′
Longitude	73° 45′
Mean barometer for the year ending June 30, 1876	29.989
Mean temperature for the year ending June 30, 1876	46°.7
Amount of rain-fall for the year ending June 30, 1876,	41.82 inches.

The location of office remains unchanged, and Sergeant A. Donhauser continues in charge. On August 9, 1875, two of the assistants were relieved, but since that date no change has been made in the working force, although a further reduction is proposed at an early date. The conduct of the men on duty has been uniformly good.

Canal navigation was not closed officially until December 10, although it was practically closed for the season December 1, as during the previous night the canal was covered with ice and a number of boats frozen in.

The daily newspapers continue to publish the tabulated reports and other data as furnished. Standard time has been given daily to the New York Central Railroad and to the telegraph offices, as in the previous year. The station was inspected in March, 1876, and found in good order. Four hundred and seventy post-offices are supplied daily with the farmers' bulletin from this station, and during the session of the State legislature a copy is furnished daily to each member.

NUMBER OF STATION PUBLICATIONS.

Farmers' bulletins issued during the year ending June 30, 1876	113,539
Bulletins issued during the year ending June 30, 1876	9,453
Forms 15 (manifold) issued during the year ending June 30, 1876	1,287
Forms 22 issued during the year ending June 30, 1876	104
Total	124,383

ALPENA, MICHIGAN.

[*Official number*, 85.]

Latitude	45° 5′
Longitude	83° 28′
Mean barometer for the year ending June 30, 1876	29.931
Mean temperature for the year ending June 30, 1876	40°.8
Amount of rain-fall for the year ending June 30, 1876,	48.68 inches.

Sergeant William Baber and his assistant were relieved October 13, 1875, and succeeded by Sergeant William H. Ray, who still remains, and has performed the station duties alone and in a satisfactory manner. The office was removed July 30, 1875, to another room on the same floor in the building then occupied. No change was made in the elevation of the several instruments by this removal.

Twenty-nine cautionary signals were ordered for this station during the year, of which number seventeen are reported by the observer as justified and twelve not justified at the station. In reference to their display, the sergeant remarks as follows:

September 16 *and* 17, 1875.—Storm unusually severe on the lake. The steamer Dove remained in port all day. Very many vessels took refuge in Thunder Bay. One

schooner went ashore at Presque Isle Thursday night, 18th; proved a total wreck. Her captain regretted not having visited the signal office at Escanaba.

September 19 *and* 20, 1875.—Steamer Dunlap remained in port on account of signal. The propeller St. Paul attempted to go out, but had to put back.

October 14, 15, *and* 16, 1875.—The steamer Dove left the port on the a. m. of the 14th, but the weather was so rough she had to put back.

October 29 *to November* 1, 1875.—The steamers St. Joseph and Dove left port on the morning of the 29th, but were compelled to return; steamer Dunlap arrived eight hours behind time, and remained in port until signal was lowered. Sailing-vessels loaded with lumber remained in port.

November 28 *and* 29, 1875.—During gale six schooners were blown ashore near Cheboygan; also one at Bay City, which proved a total wreck. This harbor frozen over.

May 14 *to* 17, 1876.—The steamer Dunlap and the United States mail-boat remained in, missing one trip on account of signal. All sailing-vessels remained in port. Heavy rain prevailed during display.

June 17 *and* 18, 1876.—Several captains of sailing-vessels called at the office on the night of the 17th and stated that, although in readiness to leave port, they would remain in on account of signal. No vessel left port during display, and no disasters reported.

The sergeant reports that captains of sailing-vessels in port invariably call at the signal-office during every display of cautionary signals to examine the instrumental indications, and frequently call at other times for the purpose of comparing instruments.

Navigation closed November 29, 1875. The last vessel that left port was the Marine City, (steamer,) on November 28, and the last vessel that arrived was the steam-barge Saginaw, on the 4th of December, after having labored three days cutting her way through the ice in the bay. The first vessel arriving, spring of 1876, was steamer Wenona, cargo merchandise and passengers, April 19, 1876. The steamer cut her way through the ice in the bay, which was about seven inches thick.

Reports from other stations not being received here, there are no station publications except of the local observations, which are printed weekly in the local press.

ATLANTIC CITY, NEW JERSEY.

[*Official number*, 116.]

Latitude	39° 22′
Longitude	74° 25′
Mean barometer for the year ending June 30, 1876	30.045
Mean temperature for the year ending June 30, 1876	51°.5
Amount of rain-fall for the year ending June 30, 1876	36.09 inches.

No change has been made in location of office since last report. Sergeant C. Cramer remains in charge, and has one assistant. Two men were relieved during the year—one for promotion and the other transferred to duty elsewhere.

Fifty-four cautionary signals have been ordered during the year, of which number thirty-one are reported as fully, and three as partly, justified, and twenty as not justified at the station.

No serious marine disasters occurred in the vicinity of the station since last report.

The station has not been inspected during the year.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 20, 1876	908
Forms 15 (manifold) issued during the year ending June 30, 1876	1,283
Forms 22 issued during the year ending June 30, 1876	13
Total	2,204

AUGUSTA, GEORGIA.

[*Official number*, 23.]

Latitude	33° 28
Longitude	81° 54
Mean barometer for the year ending June 30, 1876	30.088
Mean temperature for the year ending June 30, 1876	64°.9
Amount of rain-fall for the year ending June 30, 1876,	40.31 inches.

Sergeant Henry Bessant remains in charge, and has two assistants, one of whom is a printer. One man was transferred to duty elsewhere, and another ordered in for promotion during the year, being the only changes made in the working force. Eighty-three post-offices are supplied daily with the farmers' bulletin.

A daily report of the condition of the Savannah River, at this point, has, at the request of the business men of Savannah, been made as a part of the regular afternoon station-report since September 3, 1875.

The station was inspected in April, 1876, and found in fair condition. The location of the office continues to be objectionable, and the exposure of thermometers unsatisfactory, but all efforts to secure a better location have been, so far, unsuccessful.

The local interest in the service continues unabated, and frequent applications are made for additional information and reports, especially from the cotton district.

NUMBER OF STATION PUBLICATIONS.

Farmers' bulletins issued during the year ending June 30, 1876	33,221
Bulletins issued during the year ending June 30, 1876	3,860
Maps issued during the year ending June 30, 1876	1,502
Local reports issued during the year ending June 30, 1876	468
Forms 15 (manifold) issued during the year ending June 30, 1876	636
Forms 22 issued during the year ending June 30, 1876	52
Total	39,739

BALTIMORE, MARYLAND.

[*Official number*, 18.]

Latitude	39° 18′
Longitude	76° 38′
Mean barometer for the year ending June 30, 1876	30.065
Mean temperature for the year ending June 30, 1876	55°.4
Amount of rain-fall for the year ending June 30, 1876	48.44 inches.

Sergeant R. J. Bell has been in charge of station since December 18, 1875, on which date he succeeded Sergeant Kabernagle, relieved for neglect of duty.

There are three assistants on duty, and it is not believed that the work can be satisfactorily performed with a less number. Two assistants were relieved during the year for discharge, two transferred to duty elsewhere, and one ordered in for promotion.

Twelve cautionary signals have been displayed, of which number six are reported as justified, and six not justified, at the station. The sergeant remarks as follows in reference to some of these displays:

October 30 *and* 31, 1875.—Two houses in the northwestern portion of the city were damaged to the amount of $200.

February 1 *and* 2, 1876.—This warning was given five or six hours in advance of the most destructive storm of the season, or, in fact, for a number of years. Upward of three hundred and fifty houses were unroofed, and a great amount of damage done to other property in the city and in the harbor. Loss estimated at $75,000. The gale was

especially severe on the bay and in the harbor. Sea-captains unite in saying that they never encountered such a storm in port, and rarely ever on the ocean. Very many of them visited the office to ascertain the maximum force of the wind, and all had their stories to tell of adventures of the previous night. Timely warning was given to the shipping in the harbor and on the bay. The display was very highly praised by the press and commercial interests of the city. No loss of life has been reported.

March 20 *and* 21, 1876.—Some damage done, amounting to two or three hundred dollars. On the bay heavy easterly gales prevailed, and at White Mill Point, about fifty miles south of this station, a schooner was wrecked, and will prove a total loss.

March 28 *to* 30, 1876.—Damage in the city amounts to about $600.

April 30 *and May* 1, 1876.—Damage by the storm, in various parts of the city, amounts to $500. One man killed by falling window-shutter.

Reports of passing vessels continue to be received here from Cape Henry, and have proved of much interest to merchants and ship-owners. The duplication of day-signals at the Marine Observatory on Federal Hill has also been continued, and with good results.

In addition to the issue of bulletins of reports received by telegraph at the station, fifty maps have been sent daily from the central office for distribution at the hotels and to merchants and other interested parties.

The location of the office is an excellent one, so far as access to the business interests of the city is concerned, but the roof-exposure for instruments is unsatisfactory. Efforts have been made to secure a more desirable exposure at a reasonable rent, but without success.

The station has not been formally inspected during the year; but several informal inspections have been made, with satisfactory results.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	5,220
Local reports issued during the year ending June 30, 1876	2,252
Forms 15 (manifold) issued during the year ending June 30, 1876	3,796
Forms 22 (manifold) issued during the year ending June 30, 1876	113
Total	11,381

BANGOR, MAINE.

[*Official number*, 111.]

Sergeant John T. Downes was relieved August 13, 1875, and transferred to other duty, leaving the station in charge of Corporal J. W. Buck, who performed the station duties alone until his relief, November 23, 1875, on which date he was succeeded by Corporal E. D. McKenna, who still remains, and has given satisfaction.

The work of the station is limited to the issue of farmers' bulletin, with which an average number of one hundred and seventy-five post-offices are supplied daily.

The office was removed December 18, 1875, from No. 12 to No. 4 Main street.

The station has not been inspected during the year.

NUMBER OF STATION PUBLICATIONS.

Farmers' bulletins issued during the year ending June 30, 1876	55,203

BARNEGAT, NEW JERSEY.

[*Official number*, 115.]

Latitude	39° 48′
Longitude	74° 9′
Mean barometer for the year ending June 30, 1876	30.034
Mean temperature for the year ending June 30, 1876	52°.1
Amount of rain-fall for the year ending June 30, 1876	49.88 inches.

Sergeant W. H. Ray was succeeded, September 21, 1875, by Sergeant C. M. Hobbs, who was in turn succeeded, January 3, 1876, by Sergeant R. J. Lewis, who remains in charge. One change of assistant was made during the year. Both men at present on duty are fair telegraph-operators.

Fifty-seven cautionary signals have been ordered during the year, of which number forty-nine are reported as justified, and eight not justified, at the station.

The following marine disasters were reported at the station during the year:

September 12, 1875.—A schooner, name unknown, in tow of a steamer going north, sank, and was abandoned, in about nine fathoms of water, opposite Barnegat lighthouse.

November 5, 1875.—The pilot-boat James W. Elwell No. 7 went ashore on North Beach at 4.30 a. m., and was abandoned. Everything of value was saved, but in bad condition.

March 17, 1876.—Brig Ontario sunk about five miles north of station by colliding with another vessel.

May 22, 1876.—Bark Rebecca Carona, of New York, N. Y., Captain Thomson, 400 tons, loaded with staves, struck on the bar opposite Beach Haven; got off on the 25th without loss. The sergeant cut the coast wire at this point and kept the captain in communication with the owners of vessel and cargo.

The station has not been inspected during the year. The special meteorological report for use of the Philadelphia press continues to be made during the summer months.

BOSTON, MASSACHUSETTS.

[*Official number*, 13.]

Latitude	42° 21′
Longitude	71° 4′
Mean barometer for the year ending June 30, 1876	29.990
Mean temperature for the year ending June 30, 1876	47° 4′
Amount of rain-fall for the year ending June 30, 1876	43.39 inches.

Sergeant George H. Rohe assumed charge of the station July 1, 1875, and still remains. There are three assistants on duty, two of them being printers. One assistant was ordered in as a candidate for promotion October 1, 1875, and his place filled by another instructed man. Sergeant J. O Barnes was ordered to the station April 12, 1876, to take charge during the temporary absence of Sergeant Rohe, and was relieved upon the return of the latter.

The office was removed to the Equitable Life Assurance building August 14, 1875, and since that date the local interest in the service has increased

Forty-five cautionary signals have been displayed, of which number thirty-two are reported as fully and one as partly justified, and twelve as not justified, at the station. The sergeant makes the following remarks in reference to some of these displays:

September 10 *and* 11, 1875.—No damage reported; this is probably due to the fact of the signal having been heeded.

October 6 *and* 7, 1875 —Lower portion of the city damaged by rain. Steamer Bristol smashed her paddle-box while making her dock. A very large fleet of schooners and smaller craft sought safety in the harbor during the storm.

October 26 *and* 28, 1875.—Slight damage done by lightning. Two schooners collided in the harbor; damage slight.

November 10 *and* 11, 1875.—Several small vessels ashore on the coast east of this station. The bark Starr King went ashore at Race Point, Cape Cod, on Thursday, at 6 p. m.

November 16 *and* 17, 1875.—Highest velocity on record at this station; several schooners and small crafts have been reported ashore along the coast, but no definite information of serious loss has been received.

November 29 *to December* 1, 1875.—Considerable damage done in the city. A number of disasters to shipping on the northeast coast. The warning was heeded by the shipping in port. Highest velocity on record at the station.

February 1 *to* 3, 1876.—A number of small vessels reported ashore on the northeast coast. Considerable damage done by the wind in the city and throughout the State.

February 14 *to* 16, 1876.—Considerable damage reported, especially from Worcester, in the interior, and Gloucester and New Bedford, on the coast. At this point the signal was generally heeded, and no casualties are reported.

March 16, 17, *and* 18.—The schooner E. L. Marts went ashore on Race Point, Cape Cod, and the schooner General Taylor struck a rock in Portsmouth Harbor and was sunk. The general observance of the warning at this port renders the list of disasters in this immediate vicinity very small.

March 20, 21, *and* 22.—Very many disasters reported along the northeast coast. This display probably saved half a million of dollars' worth of property along the New England coast, which would have been destroyed had not the warning been given. Seamen and others concur in stating that the storm was the most severe on the New England coast since 1851.

March 24 *to* 27, 1876.—The snow and succeeding rain were very heavy, causing disastrous floods throughout the New England States. Washouts occurred on a number of railroads, delaying trains, &c. Dams were swept away, mills destroyed, and a number of lives lost. The schooner Sarah Ann was wrecked off York Harbor, Maine, on the 26th instant. Two other schooners are reported lost at the same place. The brig A. Porter went ashore on Lunging Island, Isles of Shoals, at 8 a. m. of the 26th, and is a total loss. Ten lives were lost on this vessel. Schooner Carrie Forrester went ashore at Swampscott on the 21st, and is a total wreck. The signal was generally heeded.

March 28 *and* 30, 1876.—No reported damage to marine interests. The warning generally heeded. The display favorably commented upon.

April 4 *and* 5, 1876.—Very severe snow and rain storm. But few disasters reported along the coast. Signal generally observed.

April 30 *to May* 2.—Warning generally heeded by the shipping.

The following extracts are made from the semi-annual reports of the sergeant in charge of this station:

The addition of the foot-note to the daily issue of the farmers' bulletin, showing the relation between the direction of the wind and the occurrence of rain, is looked upon by intelligent farmers and others as a decided advance, and all with whom I have talked upon the subject express themselves pleased with the efforts of the Chief Signal-Officer to continually add to the practical as well as to the scientific value of the signal-service reports. Considerable attention is being paid by the physicians of this city and State to the reports and manner of working in the signal-service. The relation between the death and sickness rate on the one hand, and the presence or absence of certain meteorological conditions on the other, is fully recognized by the board of health of Boston, and by the accomplished gentlemen composing the State board of health of Massachusetts; the former publish a weekly abstract of meteorological observations furnished from this office with their weekly mortality report, while the latter have adopted the style of the synopsis in publishing their weekly bulletin of the diseases prevalent throughout the State. * * * * Perhaps the most striking evidence of the value of the "cautionary signal" was afforded by the results of the display of March 20, 23, and of March 24 to 27, 1876. In a private letter from a resident of Thatcher's Island, which I was kindly permitted by the recipient to see, it was stated that the saving of property at that place alone, by the signal of the 20th March, "demonstrated the fact that in future sailors could not afford to do without the United States signal system." It may be assumed that the general observance of this signal along the northeast coast resulted in a saving of property to the value of half a million of dollars.

Six hundred and sixty-two post-offices have been supplied with the farmers' bulletin regularly during the year. The station has not been inspected since the date of last report.

NUMBER OF STATION PUBLICATIONS.

Farmers' bulletins issued during the year ending June 30, 1876	228,205
Bulletins issued during the year ending June 30, 1876	10,631
Maps issued during the year ending June 30, 1876	4,453
Local reports issued during the year ending June 30, 1876	1,902
Forms 22 issued during the year ending June 30, 1876	246
Total	245,437

BRECKENRIDGE, MINNESOTA.

[*Official number*, 82.]

Latitude	46° 11
Longitude	96° 17′
Mean barometer for the year ending June 30, 1876	29.957
Mean temperature for the year ending June 30, 1876	37°.0
Amount of rain-fall for the year ending June 30, 1876	13.15 inches.

Sergeant H. Frey was relieved September 15, 1875, for neglect of duty in failing to forward his mail reports promptly, and was succeeded by Sergeant M. L. Hearne, who still remains and performs the station duties without assistance. His term of service expired in February, and during his absence for the purpose of re-enlisting, Sergeant D. O'Leary attended to the station work.

The office was removed November 25, 1875, to the corner of Main street and Michigan avenue.

No inspection has been made of the station during the year.

Telegraph reports from other stations are not received here, and no publications have been made.

BURLINGTON, IOWA.

[*Official number*, 122.]

Corporal H. Pennywitt remains in charge of this station, and has discharged his duties satisfactorily. The office was moved January 1, 1876, to 412 North Main street.

Meteorological reports are not made from this station. One hundred and seventy-three post-offices are supplied regularly with the farmers' bulletin, the total issue during the year being fifty-eight thousand one hundred and forty copies. Only one failure to issue occurred during the year, and that was caused by the sickness of the observer, and his inability to get help in time to do the work.

The station was inspected in July, 1875, and found in good condition.

BURLINGTON, VERMONT.

[*Official number*, 45.]

Latitude	44° 29′
Longitude	73° 15′
Mean barometer for the year ending June 30, 1876	29.978
Mean temperature for the year ending June 30, 1876	44°.9
Amount of rain-fall for the year ending June 30, 1876	29.37 inches.

Sergeant W. A. Chapman remains in charge and has given satisfaction, having performed all the station duties since March 2, 1874, without assistance.

The station has not been inspected since last report.

Reports from other stations are not received here, and the only publications are of the local observations in the weekly press.

The sergeant reports that navigation in Lake Champlain closed February 9, 1876.

BUFFALO, NEW YORK.

[*Official number*, 33.]

Latitude	42° 53′
Longitude	73° 15′
Mean barometer for the year ending June 30, 1876	29.956
Mean temperature for the year ending June 30, 1876	44°.9
Amount of rain-fall for the year ending June 30, 1876	37.79 inches.

Sergeant James Mitchell was transferred to duty elsewhere March 6, 1876, and succeeded by Sergeant B. M. Purssell, who still remains. Two assistants have been ordered from station for discharge during the year, and one transferred to other duty. There are at present three assistants on duty, and it is not believed that the work can be performed with a less number, as this is a printing station, and three hundred post-offices are supplied daily with the farmers' bulletins.

The monthly summaries furnished the press continue to form an interesting feature, and a generous amount of space is given for their publication in the newspapers.

Thirty-two cautionary signals have been displayed, of which number fourteen are reported as justified, and eighteen as not justified, at the station.

In reference to some of these displays the sergeant remarks as follows:

August 1 *to* 3, 1875.—The signal was not justified by the velocity of wind at this station, but very heavy weather was experienced on Lake Erie, and several minor disasters are reported by the press.

September 11, 1875.—Much comment on the low velocity of wind at Buffalo. High winds reported both on Lake Erie and Ontario. Vague rumors of numerous disasters.

September 19 *to* 21, 1875.—An eminent success; gave timely warning. No vessel left port on the 20th. Very severe storm on the lake; vessels out making for ports.

September 29 *and* 30, 1875.—Owing to the timely warning given, as the observer learned from the shipping-offices and numerous captains who visited the office, the greater part of a large fleet of vessels was prevented from leaving port, and a large majority of those which had left prior to the hoisting of the signal was compelled to return. Only a few vessels left port.

October 1, 1875.—Several vessels delayed clearance. Many captains were anxious to leave, but dreaded to do so while the signal was flying.

October 6 *and* 7, 1875.—Numerous vessels left port during the display, a few of which had to return. Several captains delayed clearance.

October 10 *and* 11, 1875.—Many vessels left port during the display, a few of which had to return.

October 14 *to* 16, 1875.—The United States revenue-cutter Perry encountered such a heavy sea on the morning of the 15th, in her efforts to reach Dunkirk, that she was forced to return to port.

October 25 *to* 28, 1875.—Many vessels remained in port on account of the signal. The storm was unusually disastrous on the lakes, though none serious occurred in the vicinity of the station. Two vessels reported ashore on Lake Erie. Timely display generally commended.

October 29 *to November* 1, 1875.—The warning was generally heeded, and gave universal satisfaction. Few vessels left port. Two schooners were forced to return. Many disasters are reported on the upper lakes and on Ontario. Three vessels are reported ashore on Lake Erie; one at Erie and two on the Canadian shore.

November 14, 1875.—Heavy weather experienced at lower end of the lake on the morning of the 14th.

November 28 *and* 29, 1875.—No vessel left port during display; some which left before the signal was ordered returned to port on account of the rough weather.

April 7, 1876.—The display favorably commented upon by the citizens in general. A furious snow-storm set in at 11.55 a. m., and lasted several hours; this alone made the display satisfactory to all.

May 6, 7, *and* 8, 1876.—One vessel which left port returned upon seeing the signal; vessels were deterred from leaving port by the ice.

June 7, 1876.—Many vessels remained in port on account of signal, and it was considered justified by lake-men, as the weather was very threatening all day, and much rain fell; the wind was thought to be severe on the lake.

The greater number of signals reported not justified at the station were really fully justified by the heavy winds reported from the lakes at the time they were displayed.

The following extracts are made from the semi-annual reports of the sergeant:

The members of the meteorological committee, also, are always ready to co-operate in the promotion of its interests. Their chairman, Alonza Richmond, esq., continues

to give the service an unusual amount of attention and study, and is ever zealous to aid in anything tending to its advantage. Navigation may be said to have closed at this port on November 30, as, owing to the high rates of insurance after that date and comparatively low charges for freight, but few vessels were out afterward The latest arrivals at port, so far as known, occurred on the 7th and 9th of December. Ice had not materially affected navigation in the lake December 31, 1875, as, with the exception of from December 17 to December 21, vessels would have found little difficulty in forcing a passage. The canal was officially closed on December 10, though from November 29 up to that date ice retarded and occasionally closed navigation thereon. Boats continued to leave, however, up to late in the month.

* * * * * * *

Lake captains invariably call at the office for information, previous to leaving, while the cautionary is "up."

* * * * * * *

During the last session of the legislature of this State a law was passed making the records of the signal-service legal and conclusive evidence in all cases at law on which they may have any bearing.

* * * * * * *

First arrival, spring, 1876. Propeller Waverly, Captain Pratt, (May 5,) of Union Steamboat Line. Cargo, grain, flour, &c.

Signals are duplicated on the roof of the Ætna Insurance Building, through the agency of Capt. E. P. Dorr, who has taken a lively interest in the subject.

The station was inspected in March, 1876, and records and instruments found in excellent condition.

NUMBER OF STATION PUBLICATIONS.

Farmers' bulletins issued during the year ending June 30, 1876	104,064
Bulletins issued during the year ending June 30, 1876	9,254
Maps issued during the year ending June 30, 1876	3,091
Local reports issued during the year ending June 30, 1876	3,131
Forms 15 (manifold) issued during the year ending June 30, 1876	483
Forms 22 issued during the year ending June 30, 1876	86
Total	120,109

BENTON, MONTANA TERRITORY.

[*Official number*, 71.]

Latitude	47° 52′
Longitude	110° 30′
Mean barometer for the year ending June 30, 1876	29.976
Mean temperature for the year ending June 30, 1876	43°.4
Amount of rain-fall for the year ending June 30, 1876	21.83 inches.

Sergeant William McGillivray was transferred to Salt Lake City October 18, 1875, and succeeded by Sergeant J. F. Tenney, who still remains.

The telegraph-line has not been working to this station during the year, and all reports have therefore been forwarded by mail, with such regularity as the mail-facilities of the frontier would permit.

On December 29, 1875, the water in the river at the gauge was 20 inches below the low-water mark of 1872.

The station has not been inspected during the year.

BISMARCK, DAKOTA TERRITORY.

[*Official number*, 104.]

Latitude	46° 48′
Longitude	100° 38′
Mean barometer for the year ending June 30, 1876	29.865
Mean temperature for the year ending June 30, 1876	37°.9
Amount of rain-fall for the year ending June 30, 1876	25.69 inches.

Sergeant J. H. Smith remains in charge of the station, and has performed all its duties without assistance. No change has been made in the location of the office, nor has the station been inspected during the year.

This being a reporting station only, no reports are received from other stations, and consequently the publications are limited to the local observations printed in the Bismarck Tribune weekly.

CAIRO, ILLINOIS.

[*Official number*, 53.]

Latitude	37° 00′
Longitude	89° 12′
Mean barometer for the year ending June 30, 1876	30.024
Mean temperature for the year ending June 30, 1876	58° 3′
Amount of rain-fall for the year ending June 30, 1876	68.65 inches.

Sergeant Thomas Jones was relieved October 30, 1875, for neglect of duty, and was succeeded by Sergeant J. M. Watson, who still remains. No change has been made in the assistant since last report.

Reports from all other river stations, regular and special, are received here during the season of high water, and the information this gives to the merchants and shipping interests has proved of practical value in many instances.

The station has not been inspected during the year, but an officer is now *en route* to inspect it.

Highest water in river, 46 feet 5 inches, April 6, 1876; lowest water, 5 feet 10 inches, November 7, 1875. Measurements made from low water of December, 1871.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	4,300
Local reports issued during the year ending June 30, 1876	521
Forms 22 (manifold) issued during the year ending June 30, 1876	69
Forms 26 (manifold) issued during the year ending June 30, 1876	4,060
Total	8,950

CAPE HATTERAS, NORTH CAROLINA.

[*Official number*, 123.]

Latitude	35° 14′
Longitude	75° 30′
Mean barometer for the year ending June 30, 1876	30.033
Mean temperature for the year ending June 30, 1876	62°.4
Amount of rain-fall for the year ending June 30, 1876	52.97 inches.

Sergeant George Onslow continues in charge, and has one assistant, who has been on duty since May 20, 1876, at which date his predecessor was transferred to duty elsewhere. Both the men on duty are fair operators, and able to transmit and receive telegraphic reports.

Fifty-four cautionary signals have been displayed during the year, of which number thirty-eight are reported as justified, and sixteen as not justified, at the station. Many of the signals were received too late to be of value, owing to breaks in the line between the station and Cape Henry. The line follows the beach, and some portion of it gives way at every severe storm, either by washing out of the poles or their destruction by lightning. When originally built, the line was not properly provided with lightning-rods; but this defect is being remedied gradually,

as the line is repaired from time to time. The line has proved of service at this station in procuring speedy assistance to wrecked and disabled vessels along the coast from Hatteras to New Inlet, a distance of 50 miles.

Assistance or information has been procured for nine vessels during the year, as follows:

September 11, 1875.—The schooner H. W. McColley, of New York, 110 tons burden, bound from Washington, N. C., to Philadelphia, and loaded with juniper shingles, ran aground at 6 p. m. of September 11 on south side of Hatteras Inlet during heavy northeast gale.. She had a crew of five, and three passengers. None lost; taken off by the pilots at Hatteras Inlet at 8 a. m., September 12.

September 24, 1875.—Steamship Rebecca Clyde broke down in Hatteras Inlet. From Wilmington, bound to Baltimore. Assistance sent from Baltimore, and steamer saved.

November 28, 1875.—The British bark Edwin, of Windsor, Nova Scotia, from Dublin, bound to Baltimore in ballast, went ashore at 4 p. m. 13 miles north of Hatteras light; wreckers at Norfolk promptly notified, and station opened near wreck; fifteen persons on board, including the captain's wife and two children; all saved.

February 3, 1876.—Schooner Clara Davidson, Garwood master, from South Mills, N. C., to Philadelphia, sunk at Hatteras Inlet; loaded with lumber; crew of seven; no lives lost.

March 21, 1876.—The schooner Lottie Lee, J. H. Lee master, of Philadelphia, from Savannah, with lumber, and the schooner Shiloh, Hubbard master, from Demarara, South America, with cargo of sugar and molasses, bound to Baltimore, were both wrecked 6 miles south of station; both vessels and cargoes total loss. The Shiloh lost two men; all the rest saved. At time of disaster, wind was blowing 72 miles per hour southeast.

April 14, 1876.—The schooner Sandolphin, of Pembroke, Me., with cargo of ice from Rockport, Mass., bound to Roanoke Island, North Carolina, ran aground in Hatteras Inlet, and sank in eight feet of water. She had a crew of five, all told; no passengers; none lost.

April 27, 1876.—On the 25th, the schooner Emma M. Fox, R. P. Vansant master, encountered gale of wind 116 miles east of Hatteras light; sprang aleak, which gained so fast she had to be put into Hatteras Inlet, where she went ashore; cargo of coffee and molasses consigned to Huntington & Co., Norwich, Conn., from the West Indies; no one lost.

May 1, 1876.—The schooner L. Warren, L. B. Howland master, from Beaufort, N. C., bound to New York, went ashore 6 miles north of Hatteras light-house at 3 a. m. to-day. She was 54 tons burden; she had a cargo of naval stores, part of which were saved; crew of five and two passengers; all saved.

May 14, 1876.—Schooner L. Sturdevant, Adams master, from New Berne bound to Philadelphia, with shingles, ran in from sea at Hatteras and sank; no lives lost.

The sergeant remarks as follows in reference to these disasters:

In every case the assistance rendered or the information given has been through the use of the Government telegraph-line, and had there been no line, or had the line been out of working order, the losses would have been much greater and the condition of the wrecked sailors more distressing.

The repair section, for which the sergeant in charge of the station is responsible, extends from the south side of New Inlet to the north side of Hatteras Inlet, a distance of 50 miles.

The station has not been inspected since the date of last report.

CAPE HENRY, VIRGINIA.

[*Official number*, 118.]

Latitude	36° 56′
Longitude	76° 00′
Mean barometer for the year ending June 30, 1876	30.070
Mean temperature for the year ending June 30, 1876	59°.9
Amount of rain-fall for the year ending June 30, 1876	57.79 inches.

Sergeant William Stein continues in charge, and has been on the station since December 9, 1873. Until September 27, 1875, he had two assistants, but on that date the force was reduced one man. Three other changes in the assistants have been made during the year, to pro-

mote the interests of the service. Both men now on duty are fair telegraph-operators.

Fifty-one cautionary signals have been displayed, of which number thirty-three are reported as justified, and eighteen as not justified, at the station.

In addition to the regular work of observations and reports, and the maintenance of the telegraph-line within their district, the men on this station report passing vessels for the information of Baltimore merchants and shippers. This duty is, perhaps, the most laborious one with which they are charged, as it requires almost constant watchfulness.

The only disaster reported as occurring during the year near this station was on July 3, 1875, when the bark Emilio Burabino, Thompson master, from Liverpool, consigned in ballast to Edward Biglow & Co., Baltimore, Md., went ashore one mile south of station. Assistance was promptly called for by telegraph, and she was got off without serious damage.

No change has been made in the location of station. One of the standard portable instrument-shelters was put up April 28, 1876, and the instruments moved into it without changing their elevation.

The repair section of this station extends from south side of Lynn Haven Bay to Knott's Island, a distance of 34 miles.

The station was inspected April 3 and 4, 1876, and found in good condition.

CAPE MAY, NEW JERSEY.

[*Official number*, 54.]

Latitude	38° 56′
Longitude	74° 58′
Mean barometer for the year ending June 30, 1876	30.052
Mean temperature for the year ending June 30, 1876	53°.1
Amount of rain-fall for the year ending June 30, 1876	49.41 inches.

Sergeant Theodore F. Townsend continues in charge of this station, and has performed all its duties promptly and satisfactorily, with the aid of one assistant. Two assistants have been transferred to duty elsewhere during the year. The station has not been inspected since the date of last report. The office was removed May 11, 1876, to Sea Grove, and is located in the second story of a building on Beach avenue, on the point of the Cape, about fifteen yards from the water, facing the bay, with a good view of both bay and ocean. The instrument-shelter is in a bay-window, specially planned for the purpose, with double blinds.

The anemometer is supported by the telescopic rod passing through a frame-work designed for the purpose, and so arranged as to make access to it easy and safe. The wind-vane is central over the observatory and office, and the vane-rod passes through and indicates the direction of the wind by an arrow in the office. The flag-staff is one hundred and twenty-three feet in height, and located immediately in front of the office, giving signals, when displayed, an elevation above all surrounding objects.

Fifty-five cautionary signals have been displayed, of which number thirty-four are reported as fully and three as partly justified, and eighteen as not justified, at the station.

The sergeant makes the following remarks in reference to some of these displays:

October 16 *and* 17, 1875.—The wrecked schooner Chimo broken up; no other results known.

February 1, 2, *and* 3, 1876.—Houses blown down and unroofed; bark Hanna driven ashore and abandoned; seven vessels forced ashore on Cape Henlopen, and several vessels driven to sea.

The following casualties to shipping are reported as having occurred in the vicinity of this station:

October 3, 1875.—Schooner David Collins, Captain Joseph Townsend, from New York to Washington, sank at station 34, and schooner Chimo, of and from Bangor, Me., bound to Charleston, S. C., Capt. E. B. Lansit, with cargo of hay, brick, and potatoes, went ashore 3 miles north of Townsend's Inlet; both vessels went to pieces.

May 5, 1876.—Schooner Emeline McLain, Capt. L. J. Young, from Quincy Point to Philadelphia, loaded with stone, went ashore on North Bar, off Townsend's Inlet.

June 22, 1876.—Schooner Ellen, from Porto Rico to New York, with cargo of sugar and molasses, went ashore at Hereford's Inlet.

Information of these disasters has in all cases been given the press, and, when possible, to the owner of vessel and cargo.

The repair section of this station extends from Cape May to south side of Great Egg Harbor, a distance of 30 miles.

NUMBER OF STATION PUBLICATIONS.

Local reports issued during the year ending June 30, 1876	182
Forms 15 (manifold) issued during the year ending June 30, 1876	73
Forms 22 (manifold) issued during the year ending June 30, 1876	28
Total	283

CAPE LOOKOUT, NORTH CAROLINA.

[*Official number*, 136.]

Latitude	34° 36′
Longitude	76° 36′

Sergeant E. F. Brady was ordered March 8, 1876, to open this station, and on May 14, 1876, made his first report.

Cape Lookout is an island, being cut off from the main-land by Cove Sound and Old Topsail Inlet, and the station is located in the house of the light-keeper, eleven miles from Beaufort, the nearest post-office. The office is on the second floor of the building and faces north, and the exposure of instruments is reported good by the sergeant.

The station has not yet been visited by an inspecting officer. It is fully equipped for making meteorological reports, and those, by mail, have been regularly received. The telegraph-line has not been in working order, owing to the washing-out of the cable at Oregon Inlet.

Four cautionary signals have been ordered, of which number two are reported as justified and two not justified, at the station.

The repair section of this station extends from one-half way to Portsmouth to one-half way to New River, a distance of sixty-two miles.

CHARLESTON, SOUTH CAROLINA.

[*Official number*, 21.]

Latitude	32° 45′
Longitude	79° 55′
Mean barometer for the year ending June 30, 1876	30.105*
Mean temperature for the year ending June 30, 1876	66°.6*
Amount of rain-fall for the year ending June 30, 1876	45.02 inches.

Sergeant M. L. Hearne was relieved August 20, 1875, by Sergeant T. S. Collins, who remained until February 28, 1876, when he was succeeded by Sergeant M. McGauran, who is now in charge, and has one assistant. Four assistants have been relieved for neglect of duty during the year.

*Observation of 2 p. m., March 10, not taken.

No change has been made in the location of the office since last report, nor is any considered necessary at this time.

Ten cautionary signals have been displayed during the year, of which number five are reported as justified and five as not justified, at the station.

The sergeant makes the following remarks in reference to some of these displays:

September 14, 15.—Steamer City Point delayed her departure until satisfied by the afternoon reports of no danger. Much attention paid to the warning.

September 18, 19.—The captain of an English steamer sent to the office for information relative to the storm. Captain Fitzgerald, of steamer City Point, called at 10 p. m., inquiring as to the possible direction of wind during the gale, as he desired to move his vessel to a more secure place if there was a change. The benefits derived from the display are, that it gave to shippers and commercial men about twelve hours warning of what proved to be a very injurious gale off the coast. Fortunately, there were no vessels ready to depart. Several of the committee of Chamber of Commerce desire to express their opinion as considering the warning a timely one.

March 20 *and* 21, 1876.—Many people interested in navigation called at the office to ascertain the state of weather at the several stations along the coast. Many remark that they will not leave the harbor, when the weather looks threatening, without first consulting the office.

March 28 *and* 29, 1876.—No vessel left the harbor while the signal was flying, the steamer City Point leaving as soon as the signal was lowered. No casualties reported

The station was inspected in May, 1876, and found in good condition.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	7,426
Maps issued during the year ending June 30, 1876	2,718
Local issued during the year ending June 30, 1876	259
Forms 15 (manifold) issued during the year ending June 30, 1876	2,477
Forms 22 issued during the year ending June 30, 1876	70
Total	10,960

CHEYENNE, WYOMING TERRITORY.

[*Official number*, 68.]

Latitude	41° 12′
Longitude	104° 42′
Mean barometer for the year ending June 30, 1876	29.943
Mean temperature for the year ending June 30, 1876	44°.1
Amount of rain-fall for the year ending June 30, 1876	12.85 inches.

Sergeant A. C. Dobbins has been in charge since last report, with the exception of the time from August 13 to September 9, 1875, during which he was absent for the purpose of re-enlistment, and the station work was done by Sergeant J. T. Downes. No change has been made in the location of the office, nor has the station been inspected since last report. There is no assistant on duty, nor is one considered necessary.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	2,042
Forms 22 (manifold) issued during the year ending June 30, 1876	16
Total	2,058

CHICAGO, ILLINOIS.

[*Official number*, 37.]

Latitude	41° 52′
Longitude	87° 35′
Mean barometer for the year ending June 30, 1876	29.950
Mean temperature for the year ending June 30, 1876	49°.4
Amount of rain-fall for the year ending June 30, 1876	43.62 inches.

Sergeant W. S. Kaufman remained in charge of station until May 1, 1876, when he was discharged, his term of service having expired. He was succeeded by Sergeant C. E. Brinsmade, who still remains.

There are four assistants on duty, one of whom is a printer. Six assistants have been relieved during the year, four of them being transferred to duty elsewhere, one ordered in for medical treatment, and one for misconduct.

Six hundred and seventy-five post-offices are regularly supplied with the farmers' bulletins, and an average of ninety maps has been printed daily, with the exception of Sundays. No change has been made in the location of the office.

Twenty-six cautionary signals have been displayed, of which number eight are reported as fully and two as partly justified and sixteen as not justified at the station; in some of these latter cases, high winds are known to have prevailed on the lakes. The following remarks are made by the sergeant in reference to these displays:

September 16 *and* 17, 1875.—One vessel wrecked near the city, and a number of others more or less injured. A number of vessels remained in harbor on account of the signal.

October 1, 1875.—Although the velocity at station did not exceed eighteen miles, it is reported blowing heavily on the lake, and a number of vessels, which left port early in the night and during the day, were obliged to return; nearly one hundred anchored inside the breakwater, fearing to venture out. The severe storms of last month have made vessel-owners and captains very careful.

October 25 *and* 27, 1875.—The storm was a very severe one, but being from the southwest, no disasters occurred in the vicinity of station, though they were numerous on other parts of the lake. Vessel-men visited the office in numbers during the display.

April 4 *to* 6, 1876.—No casualties. Three vessels remained in port on account of signal; the captains of these vessels so reported.

May 6, 7, *and* 8, 1876.—The city was visited at 5.10 p. m. of the 6th instant by a violent tornado, which, lasting but two or three minutes, did damage in and about the city, estimated at a quarter of million dollars.

The course of the tornado was from southwest to nearly northeast, having a swift rotary motion from right to left, and bounding along like a ball. As near as can be ascertained, it struck the ground but two or three times, and then ascended again. Nearly all the vessels in the harbor were injured to some extent.

The signals are duplicated from the roof of the Central Hotel building, on which, in September, 1875, a large stationary lantern, lighted by gas, was erected. The light thus obtained is visible at a much greater distance than that from the old form of lantern.

The sergeant reports that, during the display of signals, the office is frequently visited by vessel-owners and others in search of information; also that he is indebted to the various post-office officials for numerous courtesies in aiding the proper and prompt transmission of the farmers' bulletins.

The official close of navigation occurred December 1; but the sergeant reports that vessels continued to clear for ports on Lake Michigan throughout the entire month.

The following extracts are made from the semi-annual reports of the sergeant:

* * * * * * *

The first vessel arriving, spring of 1876, was schooner Felicitous, March 1; cargo, 350 tons ice. Navigation not considered open until vessels can pass through the Straits of Mackinac, which are still closed with ice.

* * * * * * *

On the 28th of April a number of vessels succeeded in forcing their way through the ice in the Straits of Mackinac, the propeller St. Albans in the lead; this event practically opens navigation.

* * * * * * *

The board of trade of this city, in session April 11, passed very flattering resolutions

recognizing the usefulness and benefits derived from the service in the saving of life and property.

Probably the most interested parties in the service during the last three months of the year have been the ice-dealers, and shippers of oysters, and meat, and fruits of various kinds, that require either cold weather or ice to ship safely. The former have paid the closest attention to the reports, and parties from various parts of the State have requested to be furnished with the reports.

The reports still continue to be utilized by the railroad companies and by the several courts, and on several occasions the records of the office have been used in cases of claims for damages from causes produced by the effects of the weather.

The station was inspected in April, 1876, and found in good condition.

NUMBER OF STATION PUBLICATIONS.

Farmers' bulletins issued during the year ending June 30, 1876	264,100
Bulletins issued during the year ending June 30, 1876	10,797
Maps issued during the year ending June 30, 1876	27,462
Local reports issued during the year ending June 30, 1876	2,426
Forms 22 issued during the year ending June 30, 1876	161
Total	305,126

CINCINNATI, OHIO.

[*Official number*, 65.]

Latitude	39° 6′
Longitude	84° 26′
Mean barometer for the year ending June 30, 1876	29.978*
Mean temperature for the year ending June 30, 1876	56°.3*
Amount of rain-fall for the year ending June 30, 1876	53.26 inches.

Sergeant S. S. Bassler remains in charge, and has performed his duties zealously and faithfully. There are four assistants on duty, one of whom is a printer. During the year seven assistants have been transferred to duty elsewhere, five relieved for misconduct, one for discharge, and one for medical treatment, making fourteen changes in all.

Five hundred and eighty post-offices have been supplied regularly with the farmers' bulletin, and eighty-seven maps issued and distributed daily.

No change has been made in the location of the office since last report

The daily press gives a liberal amount of space to the publication of the reports. The monthly abstracts furnished by the sergeant are interesting and valuable.

The following office regulations, in force at this station, are given to show how fully the time of the men on duty is occupied, and the systematic division of time and work:

The day-assistant will be on duty from 8 a. m. to 4 p. m. He will report promptly at 8 a. m. at the telegraph office, and bulletin the a. m. reports, change the weather map at the board of trade and chamber of commerce, take the mid-day and 2 p. m. observation, read the anemometer at noon, take the river observation, and address the entire list of wrappers. The night-assistant will be on duty from 4 to 7 p. m., and from 9 p. m. until the weather-map is corrected, averaging 2 a. m. He will take the 4.05 p. m. observation, make out the afternoon bulletins, and distribute them. In the evening he will take the 9 and 10.30 p. m. observation, and do the usual night-work, leaving after having carefully read proof. The printers will distribute their forms during the afternoon, with the use of as little gas as possible. They will be on duty promptly from 12 m. until the work is done, averaging 4.30 a. m., assisting each other in folding, wrapping, and composition, if necessary.

The station was inspected in July, 1875, and again in April, 1876, and found in excellent condition on both occasions.

* Observation of 9 p. m., May 20, 1876, not taken.

High-water in the Ohio, at this point, occurred August 6, 1875, when the gauge-reading was 55 feet 5 inches; low-water September 18, 1875, when it was 4 feet and 1 inch.

NUMBER OF STATION PUBLICATIONS.

Farmers' bulletins issued during the year ending June 30, 1876	220,959
Bulletins issued during the year ending June 30, 1876	10,445
Maps issued during the year ending June 30, 1876	36,100
Local reports issued during the year ending June 30, 1876	1,237
Forms 15 (manifold) issued during the year ending June 30, 1876	4,537
Forms 22 issued during the year ending June 30, 1876	154
Forms 26 issued during the year ending June 30, 1876	3,466
Total	276,898

CLEVELAND, OHIO.

[*Official number*, 34.]

Latitude	41° 30′
Longitude	81° 47′
Mean barometer for the year ending June 30, 1876	29.988
Mean temperature for the year ending June 30, 1876	48°.9
Amount of rain-fall for the year ending June 30, 1876	40.99 inches.

Sergeant Will Stromberger continues in charge, and has one assistant. Two assistants have been relieved during the year for misconduct, and one for medical treatment.

No change has been made in the location of office, nor is one considered necessary at present.

Thirty-two cautionary signals have been displayed, of which number twenty are reported as justified, and twelve as not justified, at the station. In reference to some of these displays, the following remarks are made by the sergeant:

September 10, 1875.—One three-masted schooner went ashore off Rocky River Point. The propeller Pacific was the only vessel which left port during the display.

September 16 *and* 17, 1875.—All vessels remained in port during the display. Several put in for safety.

September 19 *and* 21, 1875.—No sail-vessel left port; neither steamers Northwest nor City of Sandusky left until assured the gale was over.

October 6 *and* 7, 1875.—The steamers City of Sandusky and Northwest, and the schooners La Petite S. Neelor, (British,) Cecilia Jeffery, (British,) and the scow Florence remained in port on account of signal. The captain of the schooner Trenton disregarded the signal and cleared, but was compelled to come to anchor outside the "crib," and there remain during the entire storm; received no injury except the loss of a part of his deck load.

October 17 *and* 18, 1875.—Three schooners and two scows remained in port on account of the signal.

October 25 *to* 27, 1875.—Several vessels remained in port on account of signal. The propellers Benton and Pacific and tug Gladiator attempted to leave port, but were compelled to put back. The steam-barge Tempest was anxious to go out, but afraid to venture in the face of the signal.

April 7, 1876.—The schooner John Jewett, loaded, for Detroit, remained in port until satisfied that the gale had passed, although ready to leave on the morning of the 7th. This is the first clearance of the season.

June 16 *and* 17, 1876.—No casualties or injuries. The schooners Massillon and Sherwood remained in port until danger was over, influenced to do so by the warning.

The following extracts are made from the semi-annual reports of the sergeant:

Navigation closed virtually on the 9th of December, 1875, but the light-house service was not discontinued until the 15th of December, 1875.

The first vessel arriving spring of 1876 was side-wheel steamer R. N. Rice, April 4, 1876; miscellaneous cargo and a few passengers.

The station was inspected in June, 1876, and found in excellent condition.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	8,667
Maps issued during the year ending June 30, 1876	4,035
Local reports issued during the year ending June 30, 1876	2,235
Forms 15 (manifold) issued during the year ending June 30, 1876	6,832
Forms 22 issued during the year ending June 30, 1876	52
Total	21,821

CORSICANA, TEXAS.

[*Official number*, 107.]

Latitude	32° 05′
Longitude	96° 30′
Mean barometer for the year ending June 30, 1876	30.017
Mean temperature for the year ending June 30, 1876	65°.8
Amount of rain-fall for the year ending June 30, 1876,	42.48 inches.

Sergeant W. D. McChesney was in charge until June 23, 1876, when he was transferred to other duty, and succeeded by Sergeant J. W. Smith. There is no assistant at this station. It was inspected on the 2d of April, 1876, and found in fair condition.

NUMBER OF STATION PUBLICATIONS.

Local reports issued during year ending June 30, 1876	471
Forms 15, (manifold,) issued during year ending June 30, 1876	42
Total	513

COLORADO SPRINGS, COLORADO TERRITORY.

[*Official number*, 109.]

Latitude	38° 55′
Longitude	104° 58′
Mean barometer for the year ending June 30, 1876	29.945
Mean temperature for the year ending June 30, 1876	47°.8
Amount of rain-fall for the year ending June 30, 1876	19.48 inches.

Sergeant P. J. Huneke was relieved August 13, 1875, Sergeant Costello October 26, 1875, and Sergeant George Feller March 8, 1876. At the latter date Sergeant Hobbs, of the summit station, was placed in charge of both stations.

There is one assistant on duty, and two have been relieved during the year, one for duty elsewhere and the other for drunkenness.

No change has been made in the location of the office, nor has the station been inspected since last report.

The station is maintained as a base of supplies for that on the summit, of which it really forms a part, and the meteorological work is therefore made subsidiary to that of getting up supplies and repairing the telegraph-line. The only reports received here are from the summit for transfer.

DAVENPORT, IOWA.

[*Official number*, 51.]

Latitude	41° 32′
Longitude	90° 38′
Mean barometer for the year ending June 30, 1876	29.984
Mean temperature for the year ending June 30, 1876	49°.8
Amount of rain-fall for the year ending June 30, 1876	48.21 inches.

Sergeant S. S. Ruthven was transferred to Duluth July 22, 1876, exchanging stations with Sergeant R. R. Martin, who remains in charge

and has given satisfaction. The station has an assistant, who has been on duty since June 3, 1873.

No change has been made in location of office during the year, nor is one considered necessary.

The station was inspected in July, 1875, and found in good condition.

The highest water during the year occurred April 16, 1876, when it was 13 feet and 9 inches on the gauge. Lowest water, November 27, 1876, when it was 2 inches on the gauge. The zero of gauge is low water of 1863.

The following extracts are made from the semi-annual reports of the sergeant:

The season of navigation closed November 23. The steamer Savannah left for winter-quarters on that date, being the last boat of the season; the stage of water being very low, and the river obstructed by floating ice. The river did not entirely close until December 17, when it was frozen across; but the ice commenced running again the next day, 18th. On December 21 the river at this point was entirely clear of ice, and remained in that condition until the 27th, when floating ice again made its appearance and continued to the 30th, when the river was again clear of ice, and continued to the end of the month.

The steam ferry-boat that plies between Davenport and Rock Island having gone into winter-quarters on December 16, resumed regular trips on the 29th, and continued until the close of the month.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	4,818
Forms 22 issued during the year ending June 30, 1876	70
Total	4,888

DENVER, COLORADO TERRITORY.

[*Official number*, 76.]

Latitude	39° 45′
Longitude	105° 4′
Mean barometer for the year ending June 30, 1876	29.995
Mean temperature for the year ending June 30, 1876	50°.0
Amount of rain-fall for the year ending June 30, 1876	24.28 inches.

Sergeant Henry Fenton was relieved July 3, 1875; Sergeant George Feller, October 26, 1875; and Sergeant C. J. Costello, February 11, 1876. Since the latter date, Sergeant J. A. Barwick has been in charge, and performed the station duties without assistance.

The office was removed November 30, 1875, from Woodward's Block to McClintock's Block, on Sixteenth, between Holiday and Larimer streets. The new building being higher than the one previously occupied, gives a better exposure for the roof instruments. Observations on ozone were commenced June 1, 1876, for the territorial board of health. These observations are also published in the daily newspapers of the city.

The station has not been inspected since the date of last report.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	1,102
Local reports issued during the year ending June 30, 1876	24
Forms 22 issued during the year ending June 30, 1876	98
Total	1,224

DETROIT, MICHIGAN.

[*Official number*, 36.]

Latitude	41° 21′
Longitude	83° 7′
Mean barometer for the year ending June 30, 1876	29.957
Mean temperature for the year ending June 30, 1876	47°.8
Amount of rain-fall for the year ending June 30, 1876	42.16 inches.

Sergeant William Finn was relieved July 3, 1875, by Sergeant Henry Fenton, who was succeeded, August 13, 1875, by Sergeant T. V. Van Heusen, who still remains. There are three assistants on duty, one of whom is a printer. Three assistants have been relieved during the year, one for transfer to office duty, and two for misconduct. No change has been made in the location of the office, nor is any considered desirable at present.

An average number of three hundred and fifty post-offices have been supplied regularly with the farmers' bulletin.

Twenty-eight cautionary signals were ordered during the year, of which number fifteen are reported as justified at the station. The sergeant remarks as follows in reference to these displays:

August 1 *to* 3, 1875.—Storm not very severe at this station, but severe on Lake Erie; no injury reported.

September 3 *and* 4, 1875.—Although light wind at this point, high winds were reported from the lakes.

September 10, 1875.—Shipping remained in port during the display. No damage reported in this vicinity. The display was beneficial, inasmuch as it detained several vessels in port, and induced others which were passing through the river to remain in this harbor until the wind moderated. If it had not been for the warning, several vessels would have proceeded on their course; the low velocity of wind at this place leading their navigators to form erroneous estimates as to the strength of the gale on the lakes.

September 16 *and* 17, 1875.—Storm preceded by variable westerly and southerly winds and rapidly falling barometer forty-eight hours in advance. No disastrous results of the storm reported in this vicinity. On the lakes, the wind blew with great violence, equaling in severity, for a short time, the gale of last week. Much satisfaction expressed at the timely warning.

September 29 *and* 30, 1875.—Owing to the display, several vessels remained in port and a number sought the harbor refuge. The usual daily trip of the Cleveland steamer Jay Cooke was postponed. No injuries of a serious nature are reported in this vicinity. The office was frequently visited by interested parties in search of information.

October 6 *and* 7, 1875.—No vessel left port during the display, and the lake steamers sought harbors of refuge during the storm, and a number of small craft put into port for safety.

October 14 *to* 16, 1875.—A few vessels put into port, with the loss of sails, &c.

October 17 *and* 18, 1875.—Gale reported very severe on the lakes, especially on Lake Huron. Schooner Shotwell went ashore at the foot of Belle Isle, but got off safely.

October 25 *to* 27, 1875.—No vessels left or passed by the port during the display, though several ran in for safety. The utmost confidence was exhibited in the signal. The record of disasters is unusually large for the port and vicinity. One schooner wrecked, total loss; one steamer capsized; one schooner beached; three schooners ashore; and one unknown vessel abandoned and sunk. No lives known to have been lost.

October 29 *to November* 1, 1875.—The storm was very severe, being accompanied by rain, snow, and sleet at intervals, with thunder and lightning on the 30th. Many vessels detained at lake ports, being unable to make head against the wind. No vessels left port during the display, and none passed.

November 28 *and* 29, 1875.—Warning given thirty hours in advance. No disasters reported. Gale very severe at other points.

December 12 *to* 14, 1875.—No disasters reported. Navigation practically closed.

Day and night signals continue to be duplicated by Messrs. J. P. Donaldson & Co. on their building at the foot of Woodward avenue, and day-signals are duplicated by M. S. Smith & Co. at the corner of Jefferson and Woodward avenues.

The following extracts are made from the semi-annual reports of the sergeant:

The press of the city has at all times given due prominence to the reports of this office, and has, editorially and otherwise, dealt with the service in the kindest manner.

* * * * * * *

Weekly records of observations have been regularly furnished to the Michigan State Board of Health. This association attaches an especial value to them in determining the influence of the atmospheric condition in the dissemination of diseases, and upon the public health in general.

* * * * * * *

Fruit and oyster dealers limit their consignments in accordance with the nature of the predicted and expected weather; consequently, having no spoiled goods on their hands, the losses on which would have to be met by increasing the price of those that remained in good condition, they are enabled to put their wares upon the market at reduced rates, by which all classes are, in a measure, benefited.

* * * * * * *

Disputes between master mechanics and their laborers as regards the time lost on certain days by the occurrence of rain, &c., are amicably adjusted by their accepting the records of this office as to the commencement, duration, and ending of rain, &c. The records of the station are also frequently consulted by lawyers engaged in civil suits for damages, &c., resulting from the visitation of storms of wind and rain, and such records are at all times admitted as evidence in the courts.

* * * * * * *

On the 27th of January, a meteorological committee was appointed in connection with the board of trade, and to the exertions of its chairman, Mr. Theodore P. Hall, the service is indebted for much of its popularity among the business-men of this city.

The advantages to be derived from a daily study of the weather are well understood by many of the board, particularly those engaged in wheat transactions, and their interest in our reports has become so great that at certain seasons of the year the morning probabilities are secured from the Associated Press, and this office is visited tri-daily, at the hours at which the bulletins are prepared.

The station was inspected in April, 1876, and found in excellent condition.

NUMBER OF STATION PUBLICATIONS.

Farmers' bulletins issued during the year ending June 30, 1876	116,016
Bulletins issued during the year ending June 30, 1876	8,987
Maps issued during the year ending June 30, 1876	3,012
Local reports issued during the year ending June 30, 1876	789
Forms 22 issued during the year ending June 30, 1876	92
Total	128,896

DULUTH, MINNESOTA.

[*Official number*, 40.]

Latitude	46° 48′
Longitude	92° 8′
Mean barometer for the year ending June 30, 1876	29.953
Mean temperature for the year ending June 30, 1876	38°.8
Amount of rain-fall for the year ending June 30, 1876	30.11 inches.

Sergeant R. R. Martin exchanged stations with Sergeant Ruthven, at Davenport, July 22, 1875. Sergeant Ruthven was relieved April 18, 1876, for discharge, and was succeeded by Sergeant T. S. Collins, who still remains. There was one assistant on duty until June 10, 1876, when, after three years' service, he was relieved for drunkenness, and the work of the station has been done by the sergeant alone since that date.

Twenty-two cautionary signals were ordered during the year, of which number seven are reported as justified and fifteen not justified at the station. Referring to these signals, the sergeant remarks:

A number of warning signals which were ordered for this station were valueless, inasmuch as they were received late, the telegraph in such cases not being in working order.

* * * * * *

October 21 *to* 26, 1875.—The propeller St. Paul put out about two hours prior to the hoisting of the signal, and must have encountered the full force of the storm before reaching shelter. The propeller Annie S. Craig arrived in port at 5 a. m. of the 25th, with loss of topmast and some minor damage. The steamer Cumberland is ashore at Silver Inlet, and propeller Phil Sheridan ashore east of Marquette.

April 9 *and* 10, 1876.—The signal ordered at 12.45 a. m. of the 9th instant was not received until 8 a. m. of the 10th instant, the telegraph-lines being down. No damage reported.

May 13 *to* 16, 1876—Steamer Quebec remained in port on account of signal. No other vessel in the harbor. Storm filled the harbor full of ice, preventing the steamer from leaving on the 18th instant.

The following extracts are made from the semi annual reports of the sergeant:

On December 2, the steam-barge Mary Groh left port for Ashland, being the last departure of the season. Navigation closed on that date.

May 17, 1876.—First arrival; spring 1876, the steamer Mary Groh, from Ashland, Wis., May 10, loaded with cattle, hay, and flour. First departures, the steamers Manistee and D. W. Rust, May 9.

The station has not been inspected since the date of last report, nor has any change been made in the location of the office.

NUMBER OF STATION PUBLICATIONS.

Local reports issued during the year ending June 30, 1876	798
Forms 22 (manifold) issued during the year ending June 30, 1876	49
Total	847

DODGE CITY, KANSAS.

[*Official number*, 106.]

Latitude	37° 39′
Longitude	100° 8′
Mean barometer for the year ending June 30, 1876	29.631
Mean temperature for the year ending June 30, 1876	55°.1
Amount of rain-fall for the year ending June 30, 1876	14.29 inches.

Sergeant M. L. Landers was relieved for misconduct October 4, 1875, and succeeded by Sergeant J. J. Weinberg, who still remains, and has worked the station without an assistant. The office was removed June 5, 1876, to a new building, at the corner of Walnut street and Second avenue, where it is convenient to the telegraph-office, and where the exposure for instruments is reported to be good. The station has not been inspected since last report. Telegraphic communications with this office have been frequently interrupted during the year, but never for any great length of time. No publication of reports is made at the station, but weekly summaries are furnished to several papers in adjoining towns, and published regularly.

DUBUQUE, IOWA.

[*Official number*, 65.]

Latitude	42° 30′
Longitude	90° 44′
Mean barometer for the year ending June 30, 1876	29.968
Mean temperature for the year ending June 30, 1876	49°.0
Amount of rain-fall for the year ending June 30, 1876	46.02 inches.

Sergeant R. J. Bell was relieved on account of ill-health October 30, 1875, and succeeded by Sergeant Thomas Jones, who was relieved January 14, 1876, by Sergeant D. M. Kennedy, who still remains, and performs the duties of the station without assistance.

The station has not been inspected since the date of last report.

High water occurred June 27–28, 1876, when it was 16 feet and 5 inches on gauge; low water, November 30, 1875, 1 foot and 4 inches on gauge. Zero of gauge is at low-water mark of 1864.

The sergeant reports that a gratifying amount of interest is felt in the service by the citizens, and that the river reports especially are valued by merchants and others concerned in the river trade. Repeated applications have been made by the citizens for reports from other stations, but the financial condition of the service has not justified compliance up to this date.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	2,100
Local reports issued during the year ending June 30, 1876	951
Forms 22 issued during the year ending June 30, 1876	78
Forms 26 issued during the year ending June 30, 1876	880
Total	4,009

EASTPORT, MAINE.

[*Official number*, 94.]

Latitude	44° 55′
Longitude	66° 54′
Mean barometer for the year ending June 30, 1876	29.929
Mean temperature for the year ending June 30, 1876	40°.2
Amount of rain-fall for the year ending June 30, 1876	57.29 inches.

Sergeant Thomas A. Taylor remains in charge, and has one assistant. Both men have given satisfaction, and reports have been made with regularity.

Forty-six cautionary signals were ordered during the year, of which number thirty are reported as justified, and sixteen not justified at the station. The sergeant remarks as follows in reference to some of these displays:

September 10 *and* 11, 1875.—Although wind only brisk at this point, high winds and heavy sea outside.

September 16 *to* 18, 1875.—All shipping remained in port during the display. Steamer City of New York, of the International Steamship Company, Captain Winchester, returning from Saint John, N. B., decided to hold over on the strength of the warning signal, remained in port ten hours, expressed himself fully satisfied of the utility of the service and the influence of the system of warning signals. This signal was of great benefit * * * being the means of saving a large amount of property and very many lives.

October 6 *and* 7, 1875.—All sailing-vessels and steamers remained in harbor from 7 a. m. of the 7th until the next morning. The steamers City of Brunswick and William Stroud, though advertised to sail, remained in port. During the storm numerous captains of vessels called at the office for the latest reports. The storm was very severe off Grand Menan, and drove most of the fishing-vessels to this port for refuge.

October 30 *to November* 1, 1875.—All vessels remained in port during the display. The yacht Afton had her bottom stove in, and several small boats were sunk.

November 10 *and* 12, 1875.—Owing to the ample warning, all shipping in this port was secured, and no disasters occurred. One schooner, loaded with lumber, lost all her masts and sails in Quoddy Bay during the gale of the 11th instant.

November 29 *and* 30, 1875.—All shipping remained in port during the entire gale. Two schooners collided, having broken adrift, and several more lost anchors, &c.; without doubt the most useful display, except one, of the season, and was warmly praised by sea-captains and others.

January 18 *to* 21, 1876.—The signal of the 18th was not justified by the wind until the 20th instant, but was justified by the dense fog which prevailed. All shipping remained in port; no known damage.

January 29 *and* 30, 1876.—No vessels in port; the fishermen saved their nets by the timely warning given.

February 14 *to* 16, 1876.—All vessels remained in port; a number of schooners driven ashore on the coast of Maine.

March 16 *to* 19, 1876.—Two vessels remained in port. Several which left during the display were wrecked off the coast of Maine; the schooner Olive Clark lost on Baker's Island.

March 20 *to* 22, 1876.—Vessels remained in port during the display, with the exception of the schooner Knight, which, leaving on the 21st, was driven ashore on the morning of the 22d, and badly damaged; much damage in town. The schooners Sam Knight and Olive Clark, the latter lost during the gale of the 16th and 17th, were owned by the same parties.

March 29 *and* 30, 1876.—The disasters of the gales of the 16th and 20th, caused by neglecting the warnings, have been of great benefit to the service at this place, and have evidently produced a lasting impression on ship-owners, and the general remark is, that if more attention was paid to the cautionary signals fewer wrecks would be reported.

* * * * * * *

Most of the cautionary signals displayed during the past six months have been successful, and in the case of the International Steamship Company, Captains Winchester and Pike, also the agent, Mr. Hays, have frequently stated to me that, by these signals alone, much property and probably lives have been saved to their line. On the strength of the display of November 29, 1875, Mr. French informed me that ninety Cape Ann fishing-vessels remained in port, also smaller crafts and steamers, and some two hundred nets were saved by cautious fishermen who paid attention to the warning, while others, who did not, lost all. Had not the vessels remained in port during the display of the 10th of November, it is more than probable that some would have shared the fate of the Hattie Anna, which was wrecked off Quoddy Bay, and two lives lost. The wind on this occasion registered 55 miles per hour. In the storm of October 26 one small fishing-vessel was badly damaged by parting anchors, and being driven on a wharf. Had the captain of this vessel taken warning, as some twenty others did, and let out sufficient cable, he would, as all the vessels, have received no damage.

No change has been made in location of office since the date of last report, nor has the station been inspected.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	5,944
Local reports issued during the year ending June 30, 1876	32
Forms 22 issued during the year ending June 30, 1876	76
Total	6,052

ERIE, PENNSYLVANIA.

[*Official number*, 97.]

Latitude	42° 7′
Longitude	80° 10′
Mean barometer for the year ending June 30, 1876	29.963
Mean temperature for the year ending June 30, 1876	48°.9
Amount of rain-fall for the year ending June 30, 1876	48.68 inches.

Sergeant E. F. McComas has been continuously in charge since May 13, 1873, and has one assistant. One assistant was ordered to Fort Whipple as a candidate for promotion, August 13, 1875.

Thirty-two cautionary signals have been ordered during the year, of which number twenty-one are reported as justified, and eleven as not justified at the station.

The following remarks in reference to these displays are made by the sergeant:

September 19 *to* 21, 1875.—No vessel left port during display. Several were compelled to take refuge in this harbor; heavy winds reported on the lake on the night of the 19th; great reliance in cautionary display at this station, and the service commented upon favorably.

October 1, 1875.—The propeller Sparta and schooners Page and Donaldson remained in port on account of signal, and their captains called at the office for information. The lake was so rough during the forenoon that it was impracticable for vessels to leave the harbor.

October 10 *and* 11, 1875.—No vessel left the harbor during the display; several were compelled to take refuge in the harbor.

October 14 *to* 16, 1875.—Two schooners remained in port on account of the display, the captains of which and many citizens called for information. The Gazette of the 17th says: "Tug Relief abandoned a raft containing a million feet of pine lumber. Tugs and wrecking steamer, and several Buffalo tugs are engaged in relieving stranded vessels."

October 29 *to November* 1, 1875.—No vessel left port during the display. No less than eleven vessels sought shelter in the harbor during the first day of the display, among which were propellers, schooners, and barges. The water in the bay was higher than it has been for years, flooding the docks and carrying away portions of the wharves. Many disasters on the lakes.

November 28 *and* 29, 1875.—No vessel left during display. Several captains called at the office for information. Would add, in this connection, that it is now becoming a rule with the captains, or many of them, to call at the office before leaving.

December 12 *to* 15, 1875.—Navigation closed. The display favorably commented upon by every one, as is usually the case.

The sergeant reports that—

While navigation virtually closed, by the vessels running to this port and laying up, on or before the 10th of December, yet navigation would have been possible up to the close of the year.

The first vessel arriving, spring of 1876, was schooner F. W. Gifford, April 14, 1876, and first departure, propeller Salina, with barge in tow, coal for Detroit, on April 12, 1876.

The station was inspected in June, 1876, and found in good condition. No change was made in location of office during the year.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	7,257
Maps issued during the year ending June 30, 1876	3,201
Local reports issued during the year ending June 30, 1876	411
Forms 15 issued during the year ending June 30, 1876	3,950
Forms 22 issued during the year ending June 30, 1876	78
Total	14,897

ESCANABA, MICHIGAN.

[*Official number*, 49.]

Latitude	45° 46′
Longitude	87° 14′
Mean barometer for the year ending June 30, 1876	29.949
Mean temperature for the year ending June 30, 1876	30°.2
Amount of rain-fall for the year ending June 30, 1876	53.68 inches.

Sergeant S. W. Naylor continues in charge, and has one assistant at the present time. He worked the station alone from November 2, 1875, to March 18, 1876, when his health failed and assistance was supplied him.

Twenty-seven cautionary signals have been ordered during the year, of which number eleven are reported as fully and four partly justified, and twelve as not justified, at the station. No items of interest in connection with these displays are reported by the sergeant.

The following extracts are given from the semi-annual report of the sergeant:

During the latter part of navigation masters of vessels would not leave port without calling at the office to ascertain the changes in the barometer, and on indications of approaching bad weather, very often they have delayed their departure on account of cautionary signals.

Navigation closed here December 1, 1875. There has been but one arrival and two departures since the above date. The bay froze up on the night of the 7th.

The office was removed July 26, 1875, into a new room at the corner of Luddington and Dousman streets. The station has not been inspected during the year. Reports from other stations not being received here, no publications are made other than of the local observations.

EVANSTON, ILLINOIS.

[*Official number*, 132.]

Latitude	42° 2′
Longitude	87° 42′

This station was established August 31, 1875, in the Northwestern University, for purposes of instruction, the office being located in the cupola of the Repository building, with Sergeant E. D. Holbrook in charge until December 27, 1875, when he was succeeded by Sergeant Wm. Finn.

The station is fully equipped with instruments, and full observations are made for transmission by mail to the Central Office in the usual manner.

On January 21, 1876, the office was changed to a more suitable room in the same building, without changing the position of the instruments. Hourly observations were taken during the months of February and March, but were discontinued on account of the inability of the students to attend to the work. Five students have received instruction in the use of the instruments and reports, and one in that portion of Loomis's Meteorology studied in the Signal Service. All those instructed have acquired an intelligent understanding of the use of the instruments and reports. Meteorology has been made one of the studies in the scientific course.

The station has not been inspected since its establishment.

FORT GIBSON, INDIAN TERRITORY.

[*Official number*, 93.]

Latitude	35° 43′
Longitude	95° 16′
Mean barometer for the year ending June 30, 1876	29.979*
Mean temperature for the year ending June 30, 1876	60° 6*
Amount of rain-fall for the year ending June 30, 1876*	44.29 inches.

Sergeant T. S. Collins was relieved July 27, 1875, and Sergeant R. O. Trent June 5, 1876—the former for transfer to other duty, and the latter for neglect of duty. Sergeant D. O'Leary is at present in charge, and has no assistant.

No change has been made in the location of office, but in July, 1875, permission was obtained from the Department of Justice to occupy an additional room in the same building. Owing to the poor condition of the wire connecting this station with the main line, telegraphic communication has been frequently interrupted, and reports delayed in consequence. Efforts are now being made to secure an office at the railroad station, which, if successful, will insure the regular transmission of reports.

The station has not been inspected during the year.

* Twenty-four observations missed from September 20th to 28th, inclusive, through sickness of observer.

FORT SULLY, D. T.

[*Official number*, 83.]

Latitude	44° 39
Longitude	100° 40
Mean barometer for the year ending June 30, 1876	29.946*
Mean temperature for the year ending June 30, 1876	40°.5*
Amount of rain-fall for the year ending June 30, 1876*	72.11 inches.

Sergeant C. E. Brinsmade was relieved for discharge on account of expiration of term of service, August 9, 1875, and his successor, Sergeant J. McCann, for misconduct, November 20, 1875. Since the last-named date the station has been in charge of Mr. S. V. Clevenger, who renders all reports promptly and satisfactorily. The assistant on duty at last report was relieved November 12, 1875, and the repair of the telegraph-line left to the company owning it. The office was removed September 28, 1875, from the band building to a private house about 300 yards northwest of post headquarters. Orders were given to transfer the station, April 1, to Fort Pierre, from which point a telegraph-line to the Black Hills was proposed; but as the project of building the line was abandoned by the company, the order to remove station was countermanded, and observations resumed May 1.

High water in the Missouri at this point occurred June 13, 1876, and low water November 14, 1875, the depth of water being 12 feet 10 inches and 4 feet 10 inches, respectively.

The following extracts are made from the semi-annual reports of the observer:

Considerable interest is taken in the towns, Indian agencies, and forts down the river, as frequent inquiries are telegraphed each day by steamboat-men, railroad superintendents, citizens, military, &c.

Usually, twice each day, I overhear and copy the "Washington Probabilities for the Upper Mississippi and Lower Missouri Valleys," and report them to the inquirers below. Although these predictions are for the country in general, when they are taken in connection with the readings of instruments and condition of the weather here they afford those who wish to know ample information as to forthcoming weather.

The station at present seems to be gaining in general estimation, judging from the frequent visits of officers, citizens, and their families.

Navigation closed on the Missouri River November 16, 1875, by the river freezing over.

* * * * * * *

Captain Grant Marsh informed me that, during May last, Commodore Coulson referred daily to my reports, telegraphed informally to him, and loaded Marsh's steamer, the Western, very heavily, in expectation of a rise reported here, although the river was quite low and falling at Yankton.

The station has not been inspected since the date of last report.

GALVESTON, TEX.

[*Official number*, 55.]

Latitude	29° 18′
Longitude	94° 50′
Mean barometer for the year ending June 30, 1876	30.050
Mean temperature for the year ending June 30, 1876	70°.9
Amount of rain-fall for the year ending June 30, 1876	70.59 inches.

Sergeant Robert Reeder was relieved, for neglect of duty, May 18, 1876, and succeeded by Sergeant C. A. Smith. There has been no assistant allowed this station since October 2, 1875.

* For eleven months only. No observations made in April, 1876.

Twenty-three cautionary signals have been displayed, of which number nineteen are reported as justified, and four not justified, at the station.

The sergeant remarks as follows in reference to some of these displays:

October 30, 1875.—Signal excited considerable alarm among the inhabitants, and prevented some small boats from leaving the harbor. "Northers" are not considered dangerous at Galveston.

February 21 *and* 22, 1876.—Several houses blown down, and a large vessel lying in port was badly damaged.

March 11 *and* 12, 1876.—Several ship-captains called at the office to find out whether a "norther" was approaching, in order to leave the wharves before it reached here; but for the signal they would have been compelled to remain at the wharves until the storm was over.

March 17 *to* 19, 1876.—Captain Punnington, of the steamship San Antonio, and several other captains, called at the office to learn the character of the storm, whether a norther or not, as they wanted to leave the wharves in case the former was approaching; but for the warning they would have been detained until the storm was over. No knowledge of any injury.

March 19 *and* 20, 1876.—The wharf company's dredge-boat blown on sand-bar; gotten off with but little damage. One of the Morgan steamships left for Brashear, La., on the evening of the 20th, but was obliged to return.

March 27 *to* 29, 1876.—Gale unusually severe. No disasters heard of.

April 12 *to* 14, 1876.—Warning given eleven hours in advance of the storm. No disasters heard of.

The approach of a "norther" is announced at this station, by orders from the central office, by the display of a white flag with a red centre, instead of the regulation cautionary flag, which is reserved for storms of a general nature.

Reports from the stations opened on the telegraph-line, in the interior of the State, are sent here each afternoon.

The following extracts are made from the semi-annual reports of the sergeant:

* * * * * * *

A monthly table or summary of the weather, compiled from reports received from over twenty different stations throughout the cotton-producing States, is furnished the exchange about the 10th of each month. The secretary of the exchange informs me that this report is of great value, enabling accurate calculations of the crop prospects to be made. Much interest is taken by the exchange in the frontier telegraphic reports, particularly the rain-fall report, and the desire is expressed that several new stations be added to the list from the more central and agricultural regions of the State. The members with whom I have conversed speak in high terms of the benefits derived from the service, and express the desire that the system be extended and increased, and that the full complement of reports be received at this station and published in the same manner as at the larger cities east of the Mississippi River.

* * * * * * *

Considerable interest is manifested in the service by sea-faring men in this vicinity, the office being visited by large numbers of inquirers of this class, especially during the winter months, when the cautionary signal is frequently displayed. * * * Their inquiries generally relate to the character of the storm expected, the probable direction of the wind, &c., and are always answered in as positive and satisfactory manner as the data at hand will permit. * * * The display of the special "norther" signal (a white flag with red center) with which this office is now provided will make the cautionary displays much more satisfactory as soon as the distinction becomes generally understood.

The station was inspected in April, 1876, and the office found neat and clean, but the records in such bad condition that the inspector recommended the relief of the sergeant in charge. No change has been made in the location of office.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	242
Local reports issued during the year ending June 30, 1876	553
Forms 22 issued during the year ending June 30, 1876	52
Total	847

GRAND HAVEN, MICHIGAN.

[*Official number*, 48.]

Latitude	43° 5′
Longitude	86° 18′
Mean barometer for the year ending June 30, 1876	29.950
Mean temperature for the year ending June 30, 1876	47°.1
Amount of rain-fall for the year ending June 30, 1876	44.63 inches.

Sergeant J. M. Frantz continues in charge, and has been without an assistant since October 10, 1875. All reports have been forwarded promptly and satisfactorily. No change has been made in the location of office.

Fifty-eight cautionary signals have been displayed, of which number forty-two are reported as justified, and sixteen as not justified, at the station. At the special request of the proprietors of the Detroit and Milwaukee line of steamers, the display of signals was not suspended at this station during the winter months. The following remarks are made by the sergeant in reference to some of these displays:

September 3 *and* 4, 1875.—Several vessels remained in harbor until signal was lowered.

September 16 *and* 17, 1875.—Several small vessels came into this harbor, and remained until gale had subsided. The Chicago and Milwaukee steamers did not leave on regular time, owing to the storm.

September 19 *and* 20, 1875.—One small coaster was beached one mile south of harbor. Several vessels sought shelter in this harbor, and no vessel left during the display. People interested in marine matters have called at the office the past few days, seeking local information of the weather. I find they manifest a great interest in the service.

October 3–4, 1875.—The south to southwest winds produced a heavy sea. A man washed overboard from a dredging-machine and was drowned. The steamer Muskegan left on regular time, but returned, reporting heavy sea.

* * * * * * *

October 13 *to* 15, 1875.—Sky perfectly clear when the order was received. The storm was preceded by an unusual moaning of the lake. Ten vessels loaded with lumber remained in the harbor until after the signal was lowered.

* * * * * * *

October 16 *to* 18, 1875.—Several vessels remained in harbor until after the signal was lowered.

* * * * * * *

October 25 *to* 27, 1875.—The gale was the most severe that has occurred at the station for the past year, accompanied by rain and sleet, and grave fears of serious disasters on the lakes were entertained.

* * * * * * *

November 15 *to* 17, 1875.—No vessel left during display. The steamer Muskegan arrived from Chicago several hours late, and reports a very heavy sea.

November 26 *and* 27, 1875.—No damage so far as known. Several vessels loaded with lumber remained in the harbor during the display. The office frequently visited by parties interested in shipping, &c.

November 28 *and* 29, 1875. The bark Paranee left this port, towed by the tug New Era. During the gale she was cut loose, became water-logged, and abandoned at sea.

December 15 *and* 16, 1875.—The gales during the week temporarily obstructed navigation by forming a sand-bar at entrance of the harbor, to such an extent that large vessels cannot make an entrance. It is believed that when the sea subsides the natural channel current will cut away the sand.

March 14 *to* 17, 1876.—Telegraph-line down. Propeller Charles Reitz, from Chicago to Manistee, put into this port for safety. No vessels left this port during the display.

March 27 *to* 29, 1876.—No vessels left port during the display. All railroads leading from this place were blockaded with snow, causing a delay in the running of trains. The signal was displayed twelve hours in advance of the storm, giving ample time for taking the necessary precautions.

The first vessel arriving, spring of 1876, was the schooner Ottawa, March 15. Navigation practically open all winter, the steamers of the Detroit and Milwaukee line running regularly.

The station was inspected in May, 1876, and found in excellent condition.

INDIANAPOLIS, INDIANA.

[*Official number*, 43.]

Latitude	39° 47′
Longitude	86° 6′
Mean barometer for the year ending June 30, 1876	29.988
Mean temperature for the year ending June 30, 1876	54°.0
Amount of rain-fall for the year ending June 30, 1876	60.63 inches.

Sergeant C. F. R. Wappenhans was given a furlough, August 6, 1875, for three months, and during his absence the station was in charge of Sergeant William Finn.

In April, 1876, the assistant was granted three months' furlough, and replaced by another instructed man, who still remains. No change has been made in the location of the office during the year.

The station is still economically managed, the expenses being kept below the average cost of stations.

The following extracts are made from the semi-annual reports of the sergeant:

Copies of both issues of probabilities are furnished to the superintendent of the Cincinnati, Chicago, Cleveland and Indianapolis Railroad, and that part relating to this part of the country is sent over the wire of this road to its principal depots.

Since the beginning of December a circuit of the Gold and Stock Telegraph Company has been arranged in this city, connecting by wire the business houses. After the receipt of the morning and afternoon weather-reports, the state of the weather, temperature, and wind and part of the probabilities are sent and printed on the several telegraphic instruments on this circuit. Business men have expressed great satisfaction at this arrangement, especially grain-merchants and pork-packers.

* * * * * * *

Pork-packers at Marion, Indiana, authorize this office to telegraph each day the probable temperature, until either a settled temperature prevails or until, if necessary, to the end of the season.

* * * * * * *

By request of the council, the city engineer is furnished with daily data of observations, taking especial note of duration of rain, and amount; these are entered in a book of record furnished by the city.

* * * * * * *

The interest taken in the Signal Service and its results is maintained by all classes. It would only be a repetition of former reports to dwell at length, as instances are in proof thereof, which are almost of daily occurrence; the good opinion of the merchants of this city has found repeatedly public expression.

The station has been twice inspected during the year—once in July, 1875, and again in May, 1876, and has been found in excellent condition on both occasions.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	8,736
Local reports issued during the year ending June 30, 1876	1,025
Forms 15 (manifold) issued during the year ending June 30, 1876	8,611
Forms 22 issued during the year ending June 30, 1876	144
Forms 26 issued during the year ending June 30, 1876	227
Total	18,743

INDIANOLA, TEXAS.

[*Official number*, 84.]

Latitude	28° 32′
Longitude	96° 38′
Mean barometer for the year ending June 30, 1876	30.054
Mean temperature for the year ending June 30, 1876	71°.2
Amount of rain-fall for the year ending June 30, 1876	37.54 inches.

Sergeant C. A. Smith was transferred May 18, 1876, to Galveston, and succeeded by Sergeant Isaac R. Birt, who remains in charge. The assistant on duty at last report was ordered in for promotion November 16, 1875, since which date the work has been done by the sergeant alone.

Twenty-one cautionary signals have been displayed, of which number seventeen are reported as justified, and four as not justified, at the station. Here, as at Galveston, the approach of a "norther" is announced by the display of a white flag with a red centre instead of the regulation cautionary-signal flag.

The sergeant remarks as follows upon some of these displays:

November 28 *to* 30, 1875.—The display caused quite a panic among the citizens, some going so far as to make preparation to leave town; extra warnings were carried to the shipping by agents and others interested, and general precautionary measures taken. On the winds backing to the north, at 11 p. m., with indications of an ordinary "norther," fears very much subsided.

December 26 *and* 27, 1875.—Signal displayed nearly twelve hours in advance of a "norther." One vessel left port during the display, and one remained in harbor on account of signal. No known casualties.

January 9 *and* 10, 1876.—The display of signal on the 9th instant was followed by a series of gales, which, though doing no material damage, caused heavy sea, rendering it dangerous for vessels to leave port.

February 28, 1876.—Owing to the near approach of the equinoctial season, the signal caused unusual anxiety, and numbers of seafaring men called at the office in quest of information. They were most anxious to learn the character of the anticipated storm.

March 17 *to* 19, 1876.—Signals displayed six hours and thirty-five minutes in advance of gale. No casualties heard of.

March 19 *to* 21, 1876.—The most severe "norther" ever experienced; four or five bay boats were blown ashore. A large warehouse was blown off its blocks. But little damage done.

April 5 *and* 6, 1876.—Signals well-timed and favorably commented upon. Very many signal-orders have been rendered valueless, as the orders up and down were received together or too late, caused by telegraphic interruption.

The town was nearly destroyed by the cyclone of September 15 and 16, 1875, but the office escaped with the loss of the anemometer, which was blown away at 5 p. m. of the 16th. A description of the storm, forwarded by Sergeant Smith, is given in the appendix, paper XXIII.

The station was inspected in April, 1876, and found in good condition.

Daily afternoon reports, from stations on the Government telegraph line in the interior of the State, are received and bulletined regularly.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	2,926
Local reports issued during the year ending June 30, 1876	19
Forms 22 issued during the year ending June 30, 1876	28
Total	2,973

JACKSONVILLE, FLORIDA.

[*Official number*, 73.]

Latitude	30° 24′
Longitude	80° 40′
Mean barometer for the year ending June 30, 1876	30.101
Mean temperature for the year ending June 30, 1876	69°.8
Amount of rain-fall for the year ending June 30, 1876	47.91 inches.

Sergeant R. McLaughlin continues in charge, and has attended to all the station duties alone since January 5, 1876, when his assistant was transferred to duty elsewhere. Nine cautionary signals have been displayed during the year, of which number four have been justified, and

five not justified, at the station. The following remarks are made by the sergeant in reference to some of these displays:

September 14 *and* 15, 1875.—No knowledge of any injury. Off the coast, and as far south as Mosquito Inlet, the wind blew, as estimated by Captain Dougherty, 60 miles per hour.

September 18 *and* 19, 1875.—The weather was very threatening for a time on the night of the 18th, and denoted a severe storm.

February 1 *and* 2, 1876.—The signal was not justified here, but on Lake George, 145 miles south of here, the wind was very severe; trees reported blown down, &c. No other injury known to have been done.

March 20 *and* 21, 1876.—The warning gave shippers ample time to secure their vessels, so that no damage was done, except the blowing down of some fences in this vicinity. Captain Vogee, of the steamer Dictation, reports the gale very severe, and a square-rigged vessel blown ashore at Dobay. Impossible to learn her name.

March 24 *to* 26, 1876.—On account of the timely warning mariners were able to secure their vessels. Can learn of no injury.

[From the Florida Union of date March 28, 1876.]

Everybody was pretty well assured by the storm-flag flying from the signal-office last week, Monday, and by the unusual temperature here, that a storm was raging in other parts. We now get accounts of it.

* * * * * * *

The signal of March 20 gave the shipping ample time to secure their vessels, and if they had not had the warning several would have been destroyed, and the same of the signal of March 25. * * * * *

The shipping universally adopt the warnings, and never go to sea until the signal is lowered. The steamers plying between here and Charleston have made an arrangement to have the up and down signals telegraphed them at Fernandina, and in the office of the agents of the underwriters there is a notice forbidding all vessels to go to sea while the signal is flying. During the winter the probabilities are received here, and the forecasts of the approach of frosts, which would injure the orange-trees in blossom and early vegetables, are eagerly watched, and the proper steps taken to prevent its injuring them, which is done by orange-growers building large fires of fat pine, the smoke settling around the groves, thus preserving their groves. This alone is worth to Florida hundreds of thousands of dollars annually.

The station was inspected in May, 1876, and found in excellent condition. No change has been made in the location of the office during the year.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	511
Local reports issued during the year ending June 30, 1876	303
Forms 22 issued during the year ending June 30, 1876	88
Total	902

KEOKUK, IOWA.

[*Official number*, 47.]

Latitude	40° 23′
Longitude	91°. 25′
Mean barometer for the year ending June 30, 1876	29.951
Mean temperature for the year ending June 30, 1876	52° 2
Amount of rain-fall for the year ending June 30, 1876	52.96 inches.

Sergeant William Black continues in charge, and has one assistant. One man was relieved during the year for misconduct. No change has been made in the location of office since the date of last report. The station was inspected in July, 1875, and found in good condition.

The following extracts are made from the semi-annual report of the sergeant:

* * * * * * *

The engineers in charge of the Des Moines rapid improvement here have continued

a gratifying interest in the daily river bulletins, examining them daily, in view of a sudden flooding of the extensive excavation operations which have been prosecuted.

* * * * * * *

During the November term of the circuit court, Judge Drayer, held here, in a case in which the state of the weather, some two years ago, was involved, abstracts of the station-records were put into evidence, and were accepted as the only reliable testimony on the point. On November 21, the first ice commenced running in the river, and for several days increased in density, with shore-ice forming, so that by the end of that month all the boats which run during the season had been drawn off and put in winter-quarters, owing to the probability of the river closing, as well as the extreme low stage of water.

In December the river was sufficiently clear of ice for boats to run, except on the 9th, 10th, 17th, and 18th, on which dates heavy floating ice filled the current; but, on account of extreme low water, navigation did not resume until the 23d, when a rise of 3 feet occurred, and most of the vessels which had been drawn off returned to their regular trade, making regular trips throughout the month.

The "danger-line and range of the Mississippi," dated office Chief Signal-Officer, March 12, 1875," has been of much value to some railroad improvements in this vicinity, forming a true line of grade above high-water mark; and it is believed that if the office would prepare and distribute for the benefit of navigation a similar paper, showing the danger line or lines of low water, or minimum navigation lines, the circular would be well received by steamboatmen, as giving the lowest stage of water at which vessels of different tonnages and cargoes could navigate, without danger from obstructions, the character of the obstructions to be noted.

High water occurred April 17, 1876, when the gauge-reading was 17 feet 3 inches, and low water August 28 to September 1, 1875, when it was 2 feet and 2 inches. The zero of gauge is at low-water mark of 1873.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	1,922
Local reports issued during the year ending June 30, 1876	317
Forms 22 issued during the year ending June 30, 1876	26
Forms 26 issued during the year ending June 30, 1876	2,027
Total	4,292

KEY WEST, FLORIDA.

[*Official number*, 25.]

Latitude	24° 32′
Longitude	81° 48′
Mean barometer for the year ending June 30, 1876	30.086
Mean temperature for the year ending June 30, 1876	77°.7
Amount of rain-fall for the year ending June 30, 1876	39.23 inches.

Sergeant M. J. Shanefelter continues in charge, and had an assistant until October 1, 1875, since which date he has attended to all the station duties alone, and in a satisfactory manner.

Two cautionary signals have been displayed during the year, one of which is reported as justified, and the other not justified, at the station.

The frequent interruption in telegraphic communication between this station and the central office renders the display of signals at this station of questionable value.

The station was inspected in June, 1876, and found in excellent condition. The inspector reports that the sergeant gives more than ordinary attention to the care of the public property for which he is responsible.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	1,051
Local reports issued during the year ending June 30, 1876	109
Forms 22 issued during the year ending June 30, 1876	41
Total	1,211

KITTYHAWK, NORTH CAROLINA.

[*Official number*, 129.]

Latitude	36° 0′
Longitude	75° 23′
Mean barometer for the year ending June 30, 1876	30.081
Mean temperature for the year ending June 30, 1876	60°.1
Amount of rain-fall for the year ending June 30, 1876	71.95 inches.

Sergeant D. D. Stansell continues in charge, and has one assistant. Sergeant Stansell was granted a furlough June 16, 1875, for one month, and during that time Sergeant E. E. Clements attended to the station duties. Two assistants have been relieved for misconduct, and one transferred to duty elsewhere.

Forty-six cautionary signals have been displayed, of which number thirty-three are reported as justified, and thirteen not justified, at the station. Owing to the isolated position of the station, it is impossible to give the results of these displays.

The following disasters are reported as having occurred near this station during the year:

March 1, 1876.—Italian bark Nuova Ottavia, in ballast, for Baltimore, went ashore 20 miles north of Kittyhawk. The crew consisted of thirteen men, nine of whom were drowned. Life-saving crew from station No. 4 lost in attempting to board the vessel.

April 1, 1876.—Schooner Henry G. Fay, Captain Filbert, master, from Jamaica to New York, with cargo of logwood, went ashore 10 miles north of Kittyhawk; crew all saved; vessel total loss.

The repair-section of this station extends from Knott's Island to the north side of New Inlet, a distance of 70 miles.

The station has not been inspected since the date of last report.

KNOXVILLE, TENNESSEE.

[*Official number*, 41.]

Latitude	35° 56′
Longitude	83° 58′
Mean barometer for the year ending June 30, 1876	30.069
Mean temperature for the year ending June 30, 1876	56°.8
Amount of rain-fall for the year ending June 30, 1876	59.55 inches.

Sergeant J. K. Payne continues in charge of the station, and since September 15, 1875, has had no assistant.

No change has been made in the location of the office, nor has the station been inspected since the date of last report.

Nothing of especial interest has occurred at the station during the year.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	1,198
Forms 22 issued during the year ending June 30, 1876	82
Total	1,274

LA CROSSE, WISCONSIN.

[*Official number*, 87.]

Latitude	43° 48′
Longitude	91° 23′
Mean barometer for the year ending June 30, 1876	29.957
Mean temperature for the year ending June 30, 1876	46°.7
Amount of rain-fall for the year ending June 30, 1876	43.25 inches.

Sergeant J. G. Lynch remains in charge, and has no assistant. The station has not been inspected during the year.

High water occurred May 23, 1876, when it was 9 feet and 4 inches above bench-mark, and low water August 24 to 27, 1875, when it was 1 foot and 5 inches below the bench-mark. Reports from other river stations have been received here during the season of high and low water.

The following extracts are made from the semi-annual reports of the sergeant:

* * * * * * *

The amount of public interest taken in the service has largely increased. The reports received here have supplied a want long felt by river-men, merchants and speculators.

* * * * * * *

Navigation closed on November 22, 1875, at 1 p. m., seven days earlier than last year.

* * * * * * *

Navigation opened April 7, 1876, same date as last season.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	2,116
Local reports issued during the year ending June 30, 1876	1,911
Forms 22 issued during the year ending June 30, 1876	40
Total	4,067

LEAVENWORTH, KANSAS.

[*Official number*, 52.]

Latitude	39° 19′
Longitude	94° 58′
Mean barometer for the year ending June 30, 1876	29.950
Mean temperature for the year ending June 30, 1876	54°.1
Amount of rain-fall for the year ending June 30, 1876	45.77 inches.

Sergeant E. McGovern continues in charge, and has one assistant, who was on duty at date of last report. Three men were relieved in succession for drunkenness during the year, and in consequence of these numerous changes the working-force was reduced one man, with good results.

An average number of two hundred and seven post-offices have been supplied daily during the year with farmers' bulletins.

Reports from other river stations have been received here each afternoon, but will be discontinued at an early date, as it is reported that no use is made of them.

The station has not been inspected during the year.

The river-gauge at this station has given a great deal of trouble, as, owing to its position, and the constant washing away of the banks, it is impossible to make it permanent. At every high water it is displaced, and requires re-adjustment and graduation before it becomes serviceable again. When the station-gauge is out of order the one at the fort is used.

The following description of a severe whirlwind is from the journal of the sergeant

May 6, 1876.—A severe whirlwind passed over this city at 3.15 a. m., destroying three buildings and unroofing ten. Sidewalks, signs, chimneys, &c., were scattered in all directions, and several stores were damaged by being flooded. Great excitement prevailed among the citizens, and many exaggerated accounts of the losses sustained and the severity of the storm were given, but all claim that it was the most severe storm this city ever experienced. From 10 p. m. of the 5th, and up to the hour of the whirlwind, a terrific thunder-storm raged, attended with an incessant fall of rain, southeast

winds, and slowly-rising temperature. The lightning was so rapid and intense as to give the heavens an uninterrupted illumination for three hours, while the almost continual crash of thunder gave the awe of numerous earthquake-shocks. Those conditions continued without diminution up to 3 a. m., at which time a sudden high wind sprang up from the southwest, giving a sensible chill to the atmosphere and temporarily suspending the long electrical display and copious rain preceding it.

The wind blew for fifteen minutes at the rate of thirty miles per hour, at which interval the heavens were an inky pitch of darkness.

The horizon was covered with a heavy mass of low, surging clouds, which, not at the time being illuminated, prevented all eyes from seeing the approach of the whirling storm-cloud.

Some claim that they saw the cloud, and that it approached due east, and at times appeared on the ground, and again would be seen higher than the houses. However, all claim to have heard a noise for at least five minutes before the gale reached them, and that the noise ceased immediately after the gust had passed over, and was likened to the noise of a train of cars passing over a bridge. Almost the entire city population were awakened by the severe lightning and thunder that prevailed all night; and, being unable to sleep, got up and awaited the terminus of the storm. Owing to the darkness prevalent at the time, no person distinctly saw the whirl-cloud, and, therefore, but little knowledge could be obtained as to the conditions and formation of the storm-cloud. The fallen trees and scattered *débris* of buildings show that the gale approached from the southwest, for, with but few exceptions, all *débris* was hurled in a northeastern direction.

At no time was the gale very violent, and I doubt whether at any point it reached a velocity of 75 miles. The principal damage was done to tin-roofed buildings, sidewalk signs, and chimneys. The storm passed over several small frame buildings without doing any injury, while brick buildings directly in front were unroofed.

The dimensions of the storm, or the space in which damage was done, embraced three city blocks in width and six blocks in length, and no reports of any damage outside of this limit have been received. During the day heavy rain continued to fall, and at 3 p. m., the time of its cessation, 2.45 inches had fallen, the largest daily fall yet recorded. Owing to the rain, I was prevented from going over the track of the storm until late in the afternoon, at which time workmen were employed on all damaged buildings, and had removed many evidences of the storm's peculiarities, but enough wreck was left to show that the storm was very erratic in its course, and indicated a strong whirl, having an up-and-down movement, and, being confined within itself, injured only the objects it struck. As the storm happened at 3.15 a. m., none of us were in the office at the time, Bryce having mailed the bulletins for that day and retired at 2.30 a. m. I was awakened by my window being blown in, and, dressing hastily, came down to the hotel-office, and shortly afterward proceeded to the office and read the instruments. I found the barometer quite low and still falling, and read 29.60, a fall of .2 since 10 p. m. of the 5th. The temperature changed suddenly from 57° to 48°, and had risen again to 53° at 4 a. m., and wind southeast. In examining the anemometer-sheet I found the gust to be almost instantaneous, lasting scarcely two minutes, and, immediately after the passage of the whirl, the wind subsided to gentle. The office was besieged all day with visitors, in consequence of the rumor that another storm would strike the city at 4 p. m., and that Professor Tice had telegraphed to that effect. I tried to calm their fears by assuring them nothing of the kind would happen, but, having so much faith in Professor Tice, from the fact that he predicted the storm of this morning, they were not all convinced that the worst was over.

Southeast winds and falling barometer continued up to 6 p. m., at which time the barometer read 29.40. At this hour the wind veered to the southwest and the barometer began to rise, with wind increasing to brisk, and cloudy with warmer weather.

High water occurred June 30, 1876, and low water December 2, 1875, when the gauge-readings were 15 feet and 9 inches, and 3 feet and 3 inches, respectively.

NUMBER OF STATION PUBLICATIONS.

Farmers' bulletins issued during the year ending June 30, 1876	74,588
Bulletins issued during the year ending June 30, 1876	2,572
Local reports issued during the year ending June 30, 1876	2,282
Forms 22 issued during the year ending June 30, 1876	108
Total	79,55

LEXINGTON, KENTUCKY.

[*Official number*, 90.]

Latitude	38° 8′
Longitude	84° 33′
Mean barometer for the year ending June 30, 1876	30.051
Mean temperature for the year ending June 30, 1876	54°. 6
Amount of rain-fall for the year ending June 30, 1876	47.35 inches

Sergeant W. S. Jewell was transferred to another station August 12, 1875, and succeeded by Sergeant E. Lloyd, who still remains.

The station has never been inspected, and it is proposed to abandon it at an early date.

The instruction in meteorology was resumed at the commencement of the second term of the university, and the course pursued was the same as that taught at the beginning of the first session. The amount of interest displayed by the few students who were in the class has been quite satisfactory, and the final examination was passed very creditably by them. The number instructed was five.

Reports from other stations have not been received here, and no publications have been made.

LOGANSPORT, INDIANA.

[*Official number*, 124.]

Corporal Lloyd Prather was transferred to other duty July, 1876, and succeeded by Corporal C. B. Whiting, who remains and attends to his work promptly and satisfactorily.

This being a printing station only, meteorological reports are not made. One hundred and eighty-eight post-offices have been regularly supplied with the farmers' bulletins—the total issue during the year having been sixty-three thousand seven hundred and twenty copies. No change has been made in location of office.

The station has been twice inspected since the date of last report, once in July, and again in May, 1876, and was found in good condition on both occasions.

LONG BRANCH, NEW JERSEY.

[*Official number*, 113.]

Latitude	40° 18′
Longitude	73° 59′
Mean barometer for the year ending June 30, 1876	30.037
Mean temperature for the year ending June 30, 1876	51°.8
Amount of rain-fall for the year ending June 30, 1876	68.82 inches.

Sergeant E. D. Holbrook was relieved August 2, 1875. His successor, Sergeant J. R. Williams, was reduced to the ranks as a private soldier October 25, 1875, and the station left in charge of the assistant, Corporal I. T. Shadle, who still remains, and has one assistant. One assistant was relieved for discharge during the year. Fifty-seven cautionary signals have been ordered, of which number fifty are reported as justified and seven as not justified, at the station.

The following extracts are made from the reports of the observer:

September 18 *to* 20, 1875.—Schooner Mable Thomas, of New Haven, from Providence to Baltimore, came ashore 3 miles north of station, at 11 a. m. of the 19th; crew saved.

December 24 *and* 25, 1875.—Two schooners driven ashore; one at Seabright and the other at Deal. No lives lost.

March 16 *to* 18, 1876.—Schooner (name unknown) went ashore 3 miles north of this station. No crew on board. No other results known.

March 20 *and* 21, 1876.—Four cabin-doors and a figure-head were picked up on the beach. A three-masted schooner is sunk about 5 miles east of this station; her hulk is entirely under water, and pieces of sail can be seen flopping about the rigging. The wind too strong for the crew at this station to venture out. The storm was a severe one along the coast.

The station has not been inspected during the year, and will probably be abandoned at an early date.

LOUISVILLE, KENTUCKY.

[*Official number*, 64.]

Latitude	38°
Longitude	85° 52
Mean barometer for the year ending June 30, 1876	30.018
Mean temperature for the year ending June 30, 1876	57°.3
Amount of rain-fall for the year ending June 30, 1876	66.01 inches.

Sergeant J. H. Marsh was relieved August 19, 1876, by Sergeant E. E. Clements, who still remains, and gives satisfaction. One assistant has been ordered in for promotion and one relieved for misconduct during the year.

No change has been made in the location of the office, although it is desirable that one should be made as soon as it can be effected without loss to the Government.

The station has been twice inspected since the date of last report, once in July, 1875, and again in May, 1876. Its condition was such at the date of the first inspection as to lead to the relief of the sergeant in charge. At the last inspection matters were found greatly improved.

High water in the Ohio at this point occurred January 29, 1876, when the gauge-reading was 31 feet, and low water September 22–23, 1875, when it was 3 feet—both above bench-mark.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	11,427
Local reports issued during the year ending June 30, 1876	1,605
Forms 22 issued during the year ending June 30, 1876	66
Forms 26 issued during the year ending June 30, 1876	6,911
Total	20,009

LYNCHBURG, VIRGINIA.

[*Official number*, 44.]

Latitude	37° 30′
Longitude	79° 2′
Mean barometer for the year ending June 30, 1876	29.981
Mean temperature for the year ending June 30, 1876	57°.3
Amount of rain-fall for the year ending June 30, 1876	38.91 inches.

Sergeant H. U. Jones remains in charge of this station, and has no assistant. No change has been made in the location of the office. The station was inspected in August, 1876, and found in excellent condition. The only reports received here are those from Knoxville tri-daily.

Local reports issued during year ending June 30, 1876	743
Forms 22 issued during year ending June 30, 1876	43
Total	786

MALONE, NEW YORK.

[*Official number*, 131.]

Latitude ..... 44° 50′
Longitude ..... 74° 20′

The station was opened August 1, 1875, by Sergeant Penton Belville, who has been in charge since that date. The office is located in the third story of the First National Bank building, at the corner of Main and Mill streets, and has three windows facing north and one facing west. The instrument-shelter is of the standard pattern, and projects from the middle window facing north. The anemometer and wind-vane have a good exposure, and the other instruments are well located.

The station has not been inspected since its establishment.

The morning observation only is telegraphed daily to the central office, but full observations are taken and forwarded by mail regularly.

The midnight probabilities have been received here and posted daily, except Sundays, since September 1, 1875.

MARQUETTE, MICHIGAN.

[*Official number*, 50.]

Latitude ..... 46° 33′
Longitude ..... 87° 36′
Mean barometer for the year ending June 30, 1876 ..... 29.951
Mean temperature for the year ending June 30, 1876 ..... 39°.8
Amount of rain-fall for the year ending June 30, 1876 ..... 37.28 inches.

Sergeant W. H. Clendenon remains in charge, and has performed the station duties alone since October 27, 1875, on which date his assistant was relieved for discharge.

Twenty-four cautionary signals were displayed, of which number eight are reported as justified and sixteen as not justified, at the station.

The sergeant remarks as follows, in reference to some of these displays:

October 2 *to* 4, 1875.—Warning observed by vessel-captains generally.

October 6, 1875.—A number of vessels were detained by the warning, although ready to leave port.

October 9 *and* 10, 1875.—But few vessels in port, and those paid attention to the signal—so their masters state.

October 13 *to* 15, 1875.—The warning was generally observed. Officers of vessels who came into port during the storm report it as being very heavy on the lake.

October 16 *and* 17, 1875.—Although the velocity of the wind did not exceed 16 miles per hour, yet its long continuance raised a sea which, combined with rainy and thick weather, made navigation dangerous. The signal display was generally observed by sailing-vessels.

October 25 *to* 27, 1875.—The warning was generally observed by vessels in port, although two or more of them left port some hours before the signal was lowered, which act was considered unwise by other masters of vessels who visited the office.

October 29 *to* 31, 1875.—The warning was generally observed by vessels in port. The masters of vessels report the storm much more severe on the lake than at this station. No disasters reported.

May 11 *and* 12, 1876.—Navigation opened to-day, 11th. No results known.

The following extracts are made from the semi-annual reports of the sergeant:

* * * * * * *

The last boats for the lower lakes passed through the Sault Ste. Marie Canal during the last week in November, just in time to escape being caught by the ice, which latter soon after effectually blocked the way. On December 2 the steam-barge City Port of Huron left this port for Grand Island, with iron-ore, returning on the 6th to be tied up for the winter, all others having been previously so disposed of.

May 12, 1876.—First arrival, spring of 1876, steam-barge H. B. Tuttle, (May 11, 1876,) of Cleveland, having in tow the schooner George E. Ely, the former being lightly laden with brick, the latter empty.

The station has not been inspected since the date of last report, nor has any change been made in the location of the office.

MEMPHIS, TENNESSEE.

[*Official number*, 62.]

Latitude	35° 7′
Longitude	90° 7′
Mean barometer for the year ending June 30, 1876	30.064
Mean temperature for the year ending June 30, 1876	61°.6
Amount of rain-fall for the year ending June 30, 1876	62.93 inches.

Sergeant H. M. Ludwig remains in charge, and has one assistant. The number of assistants was reduced from two to one on May 19, 1876.

During the year one man has been relieved for discharge, one for promotion, one for misconduct, and one transferred to duty elsewhere.

This is a printing station, and fifty post-offices have been regularly supplied with the farmers' bulletins. No change has been made in the location of office, but one will be made as soon as a suitable room can be found at a reasonable rent. The station has not been inspected since the date of last report, but an officer is *en route* to inspect it.

The following extract is made from the semi-annual report of the sergeant:

* * * * * * *

The interest of the surrounding people in the service has remained unabated, and we receive many grateful messages thanking us for the valuable river reports and bulletins so generally distributed through this station during the now famous overflow of last August. While these reports and warnings do not now, of course, prevent or delay the dangerous swells of the river, they, by their timely warning, have often enabled the levee commissioners and builders to prepare weak points and low places for the otherwise unexpected rush of the waters, and have thus, as can be demonstrated in many instances, averted vast destruction of property, and especially growing crops, in the low lands. In many instances the planters themselves, thus reliably forewarned, have, by their unaided exertions, built temporary barriers sufficient to keep out the encroaching floods until substantial aid could be obtained. These reports are deemed more especially valuable since stations were, in compliance with the request of the people, established by the Department on the Tennessee River, a stream long considered to be the main source of the woes of the subordinate low lands. During the floods of last August every outgoing steamer from this port—and they left almost daily—carried a number of our river bulletins, which were posted at every landing for several hundred miles above and below, and were eagerly sought after and studied by the planters. If a single packet failed to convey the bulletins, long and earnest were the complaints made by the watchers below.

High water in the Mississippi at this point occurred April 7, 1876, and low water November 9, 1875, when the gauge-readings were 35 feet and 5 feet 2 inches, respectively.

NUMBER OF STATION PUBLICATIONS.

Farmers' bulletins issued during the year ending June 30, 1876	20,505
Bulletins issued during the year ending June 30, 1876	6,335
Local reports issued during the year ending June 30, 1876	637
Forms 22 issued during the year ending June 30, 1876	194
Forms 26 issued during the year ending June 30, 1876	5,963
Total	33,634

MANHATTAN, KANSAS.

[*Official number*, 135.]

Latitude	39° 41′
Longitude	96° 32′

The station was established December 21, 1875, with Sergeant H. F. McFarland in charge, who still remains.

The office is located in one of the buildings of the Kansas State Agri-

cultural College, the roof of which affords a good exposure for the instruments. A class of students for instruction in practical meteorology was formed at the beginning of the college term, and the progress made has been satisfactory.

No telegraphic reports are received at or sent from this station, nor has it been inspected since its establishment.

MILWAUKEE, WISCONSIN.

[*Official number*, 38.]

Latitude	43° 3′
Longitude	87° 54′
Mean barometer for the year ending June 30, 1876	29.986
Mean temperature for the year ending June 30, 1876	44°. 3′
Amount of rain-fall for the year ending June 30, 1876	46.57 inches.

Sergeant S. W. Rhode has been continuously in charge since date of last report, and gives satisfaction by the promptness and regularity with which all reports have been forwarded.

The working force of this station has been reduced during the year, and at present there is only one assistant on duty.

Fifty-five cautionary signals have been displayed during the year, of which number thirty-eight are reported as justified and seventeen as not justified at the station. The following remarks are made by the sergeant in reference to some of these displays:

September 3, 1875.—A number of vessels lost their canvas.

September 10, 1875.—This storm very severe, causing loss of life and property, which cannot be estimated.

September 19 *and* 20.—The careful attention given to the display of cautionary signals at this port no doubt prevented a large list of disasters. No damage reported on land.

October 6, 1875.—A number of vessels came into the harbor and anchored until after the signal was lowered.

October 13 *to* 15, 1875.—The Chicago and Grand Haven boats delayed their departure on the evening of the 14th until after midnight. No disasters occurred at or near the port.

October 16 *to* 18, 1875.—A number of vessels that left port on the 16th were compelled to return in the evening and anchor in the bay until the 18th. Quite a number of disasters occurred, which are enumerated in the newspapers.

October 25 *to* 27, 1875.—Gale, accompanied by heavy rain and severe, vivid discharges of electricity, with heavy, rolling thunder. A dwelling-house on the grounds of the Soldiers' Home, near the city, was struck by lightning, and several of the inmates severely injured. Several stables were also struck, and one horse killed. The Northwestern Telegraph Company report heavy earth-currents on the line north and northwest of the station. Immediately after the signal was hoisted, the harbor was crowded with shipping seeking shelter from the gale. Heavy snow fell at intervals during the afternoon of the 26th. The propeller Amazon was out in the storm, and arrived eight hours behind time. The captain characterized it as one of the worst storms he had ever encountered for many years. Many disasters occurred.

October 27 *to* 29, 1875.—No disasters have been reported. Very little shipping out, the greater portion not having recovered from the severe gale of the 25th and 26th.

October 29 *to* 31, 1875.—The steamers for Chicago, Sheboygan, Grand Haven, and Manistee went out on the evening of the 29th, but were compelled to return; so also were a number of sailing-vessels. Many disasters are reported on the lake, and much property damaged on land.

November 16, 1875.—Very little damage reported, owing to the fact that vessel-owners and others were aware of the approach of the storm by coming constantly to this office and consulting the reports. No vessel left port, and very little shipping was out on the lake.

November 27 *and* 28, 1875.—The regular steamers for Grand Haven and Chicago delayed their departure until the evening of the 29th.

December 12 *and* 13, 1875.—No damage reported. All the sailing-vessels and most of the steamers have gone into winter-quarters. The Grand Haven steamers delayed their departure until 11 p. m. of the 13th instant.

December 25 *to* 27, 1875.—No damage reported. The Grand Haven boat delayed departure until the morning of the 27th.

January 1 *and* 2, 1876.—The cups of the anemometer blown away. Wind perfectly terrific. No damage reported from the lake. Several steamers were going out in the afternoon, but remained in port on account of signal. A large number of minor damages in the city. Wind's velocity estimated at 70 miles per hour.

January 31 *to February* 2, 1876.—No damage reported. The Grand Haven steamers delayed their departure until after the signal was lowered. The steamer Minneapolis left for Grand Haven at 6 a. m. of the 2d instant, but after going out a few miles, was forced to return by the heavy sea.

February 26 *to* 28, 1876.—Branches broken off trees, telegraph-poles blown down, and signs unhinged. No vessels left port during the display. No damage reported from the lake.

March 24 *and* 25, 1876.—Heavy snow fell during the afternoon and evening of the 24th, which prostrated telegraph-lines south of this station, stopped the street-cars, and impeded travel in general. A heavy easterly gale prevented vessels from leaving this port. The Grand Haven steamers delayed their departure until after the signal was lowered.

March 27 *to* 29, 1876.—The schooner H. Rand, in endeavoring to make Chicago harbor, was driven against the breakwater and damaged to the amount of one thousand dollars. The scow Blue Bell sunk at Kenosha on the 28th. Several other minor disasters. The Grand Haven steamers remained in port until after the signal was lowered.

April 4 *and* 5, 1876.—A scow was sunk at Kewaunee; several buildings in the city blown down. No vessels left port during the display.

May 13 *to* 16, 1876.—A heavy rain fell during the day and night of the 15th instant. Wind forced the river back, which, with the rain that fell, overflowed the cellars along the docks, doing considerable damage to property stored therein. On the lake-shore several breakwaters were washed away and the Chicago and Northwestern Railroad track damaged. Two marine disasters reported, but the damage not great. Many vessels were prevented from sailing by the display of the signal, which may account for the small number of disasters.

The display of signals was continued during the winter months at the request of the proprietors of the Detroit and Milwaukee line of steamers. A new and large cautionary-signal lamp, lighted by gas, was completed September 6, 1875, and gives good results. The light is now visible from the outer edge of the bay, several miles from the office.

An instrument-shelter of the standard roof-pattern was completed in August, 1875, and the exposure of the instruments is now satisfactory.

The following extracts are made from the semi-annual reports of the sergeant:

* * * * * * *

The meteorological committee evince a great interest in the service, and have rendered valuable assistance in the discharge of duties at this station. The thanks of this office are especially due Messrs. Hathaway and Merrill, of the meteorological committee, and Mr. William Langston, secretary of the chamber of commerce, for courtesies rendered.

* * * * * * *

Navigation on Lake Michigan not closed during winter; Mackinaw Straits still closed by ice, April 18, 1876.

May 6, 1876.—First arrival through the straits, the steamer Garden City, May 2, of the Northern Transit Company's line; cargo consists of iron and general merchandise. Captain reports heavy ice and freezing weather in the straits.

The station was inspected in May, 1876, and found in good condition.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	6,104
Maps issued during the year ending June 20, 1876	4,335
Local reports issued during the year ending June 30, 1876	83
Forms 15 (manifold) issued during the year ending June 30, 1876	3,983
Forms 22 issued during the year ending June 30, 1876	106
Total	14,611

MOBILE, ALABAMA.

[*Official number*, 27.]

Latitude	30° 42′
Longitude	87° 59′
Mean barometer for the year ending June 30, 1876	30.094
Mean temperature for the year ending June 30, 1876	67°.4
Amount of rain-fall for the year ending June 30, 1876	57.00 inches.

Sergeant D. O'Donoghue remains in charge, and has one assistant, who has been on duty since August, 1874. Five cautionary signals have been displayed of which three are reported as justified and two as not justified at the station. No change has been made in the location of office during the year. The station was inspected in June, 1876, and found in excellent condition. The local interest in the service continues undiminished. Additional reports are desired from the cotton districts by the merchants and cotton agents who are especially interested in the rain-fall.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	5,621
Forms 15 (manifold) issued during the year ending June 30, 1876	2,118
Forms 22 issued during the year ending June 30, 1876	92
Total	7,831

MONTGOMERY, ALABAMA.

[*Official number*, 26.]

Latitude	32° 22′
Longitude	86° 23′
Mean barometer for the year ending June 30, 1876	30.103
Mean temperature for the year ending June 30, 1876	66°. 4
Amount of rain-fall for the year ending June 30, 1876	63.37 inches.

Sergeant W. J. Evans continues in charge of the station, and since March 16 has had no assistant. Previous to that date he had two, one of them being a printer. Four assistants have been relieved during the year.

Sergeant W. Finn was in charge of the station in the month of December, 1875, during the illness of Sergeant Evans.

One hundred and two post-offices have been regularly supplied with the farmers' bulletins; but the lateness of the hour at which they are received renders the issue of less than the average importance, and it will be suspended at an early date.

No change has been made in the location of the office.

The station was inspected in June, 1876, and found in good condition.

The following extracts are made from the sergeant's reports:

A Mr. Goldstecker, engaged in the green-grocery and fish business, assures me that he examines carefully every day the reports published at this station, and is governed entirely by them in giving instructions to his correspondents in regard to the shipping of fish, oysters, and other perishable goods, thereby preventing the loss of many hundreds of dollars' worth of goods each season.

* * * * * * *

A gentleman by the name of Mr. Halfman, who is engaged in the horticultural and florist business, and who daily receives a copy of the farmers' bulletin, says that on several occasions the knowledge he has gained from this source has been the means of saving for him several hundred dollars' worth of rare and delicate plants and flowers that would have been destroyed by frost had he not been forewarned by these reports.

NUMBER OF STATION PUBLICATIONS.

Farmers' bulletins issued during the year ending June 30, 1876	23,114
Bulletins issued during the year ending June 30, 1876	5,330
Local reports issued during the year ending June 30, 1876	350
Forms 22 issued during the year ending June 30, 1876	31
Total	28,825

MORGANTOWN, WEST VIRGINIA.

[*Official number*, 92.]

Latitude	39° 36′
Longitude	79° 52′
Mean barometer for the year ending June 30, 1876	30.005
Mean temperature for the year ending June 30, 1876	53°.9
Amount of rain-fall for the year ending June 30, 1876	52.44 inches.

Sergeant Lawrence Dunne continues in charge, and has had no assistance during the year. On June 27, 1876, the office and instruments were removed to the top floor in the tower of the new hall of the university, without expense to the service.

The station has not been inspected since the date of last report.

During the year 22 students of the university have received instruction in signaling, meteorology, and telegraphy, under the direction of the sergeant.

The local reports of observations have been published regularly in the Weekly Post.

Special observations of an interesting nature have been made during thunder-storms, by the sergeant, and reported to the central office from time to time.

Daily observations are made of the changes in the Monongahela River, and during the season of high water there are telegraphed to the Central Office.

High water in the river here occurred August 3, 1875, when the gauge-reading was 24 feet and 11 inches above bench. Low water occurred September 10–15, 1875, when it was 3 inches above bench.

MOUNT WASHINGTON, NEW HAMPSHIRE.

[*Official number*, 46.]

Latitude	44° 16′ 25″
Longitude	71° 16′ 26″
Mean barometer for the year ending June 30, 1876	29.957
Mean temperature for the year ending June 30, 1876	26°.1
Amount of rain-fall for the year ending June 30, 1876	72.28 inches.

Sergeant William Line continues in charge, with Private Charles J. King as his assistant. The station-force was reduced by one man August 31, 1875, being the only change made during the year. The health of the men has been good, and their situation, on the whole, as comfortable as it would be on a lower station. The unusually high velocity of the wind at this station, in connection with the high relative humidity and low temperature, have made it impossible to get a continuous wind-record. The special anemometer, to which reference was made in the last annual report, worked very well for a short time, but was finally swept away. Since its destruction the record has been fragmentary. When the self-register has not been working, the measurements have been made by exposing at each time of observation one of the spare anemometers to

the wind for a fixed number of minutes, and then getting the hourly velocity by simple multiplication. This method, while not strictly accurate, is approximately so, and it is believed that the results can safely be used for ordinary scientific purposes.

The following extracts are made from the journal of the station:

October 31, 1875.—Relative humidity 100 per cent.; wind-velocity increasing from fresh in the morning to storm at 2 p. m. and 5 p. m., decreasing to gale at 9 p. m.; sleet ended during the night and snow commenced. * * Everything on the summit is covered with ice from 3 to 6 inches in depth.

November 17, 1875.—Falling temperature from —3° in the a. m. to —12° at midnight; mean temperature —7°; relative humidity 100 per cent. Wind's direction, northwest; velocity, 120 miles per hour at 7 a. m., 130 at 8 a. m., 150 at 9.30, 132 at 12.22 p. m.; steady at 144 miles per hour from 2 p. m. until 5 p. m., 138 miles at 9 p. m., and 120 miles at midnight.

November 26, 1875.—Humidity 100 per cent. Velocity of wind increasing from 54 miles per hour in the morning to 150 miles at 2 p. m., when the cups of anemometer got out of order.

November 29, 1875.—Falling temperature from 14° in the morning to —35° at last report; mean temperature, —14°; relative humidity, 100 per cent. Velocity of wind increasing from 80 miles per hour in the a. m. to 102 miles at 12.22 p. m., 120 at 2 p. m., 168 at 3.40 p. m., 156 at 5 p. m., 170 at 6 p. m., 132 at 9 p. m., and 90 miles at last observation.

February 2, 1876.—Temperature steady at 20° until 10 a. m. At 12.22 p. m. the thermometer read —22°, a fall of 42° in two hours and twenty-two minutes. The temperature continued to fall until it reached —35° at 9 p. m. Mean temperature —19°.2; humidity, 100 per cent.; velocity of wind, 60 miles per hour in the a. m., 110 miles at 5 p. m., and 100 miles at 9 p. m. and 11.22 p. m.

* * * * * * *

March 15, 1876.—Depot of Mount Washington Railway Company destroyed at 10 a. m. by the wind.

The station has not been inspected during the year. Arrangements have been made to have the station-building strengthened before the winter-storms set in again.

Mr. Walter Aiken, of the Mount Washington Railway Company, and Mr. B. W. Kilburn, of Littleton, N. H., have, during the year, extended many courtesies to the men on station, and to the Central Office, in connection with the station-work.

NASHVILLE, TENNESSEE.

[*Official number*, 63.]

Latitude	36° 11′
Longitude	86° 53′
Mean barometer for the year ending June 30, 1876	30.033
Mean temperature for the year ending June 30, 1876	60°.7
Amount of rain-fall for the year ending June 30, 1876	51.10 inches.

Sergeant A. C. Ford remains in charge of station and has two assistants, of whom one is a printer. One assistant was relieved during the year for discharge, being the only change made in the working-force. Ninety-nine post-offices have been regularly supplied with the farmers' bulletins. No change has been made in the location of the office, nor has the station been inspected since the date of last report.

The following extracts are made from the semi-annual report of the sergeant:

* * * * * * *

During the continuance of the high water in the Mississippi River and its tributaries, in July, thousands of acres of growing crops, and especially cotton, were threatened with destruction. The sergeant has no recollection of any such manifestation of interest in the reports of the service as was displayed in this city during the floods. Every report of the office was eagerly sought, but, most of all, the river-reports. Planters, brokers, merchants, engineers, shippers, and others, whom interest or curi-

osity would prompt to learn the stage of the water in the swollen rivers, congregated each evening at the office, anxious to see or hear the reports. One instance is related by William Woodfalk, of this city, where he, in common with other cotton-planters, was directly benefited by the river-reports of the service. They were warned by the reports of the approaching high water, and strengthened the levees which protected their crops, and thus saved what would have otherwise been destroyed.

* * * * * * *

The officials of the post-office have continued to offer every facility in hastening the delivery of the bulletins.

* * * * * * *

The most marked interest has been taken by the scientific institutions of the city; one school visited the office in a body during the winter. The sergeant has been, during the past two months, making observations of the amount of ozone in the air by means of test-paper and a scale prepared by himself. These observations have attracted some attention from scientific men, and the board of health of the city has formally, by resolution, requested of the Chief Signal-Officer their continuance permanently.

High water in the river, at this point, occurred January 29, 1876, and low water September 13, 1875, when the gauge readings were 34 feet and 6 inches and 1 foot and 6 inches, respectively.

NUMBER OF STATION PUBLICATIONS.

Farmers' bulletins issued during the year ending June 30, 1876	35,364
Bulletins issued during the year ending June 30, 1876	6,959
Local reports issued during the year ending June 30, 1876	394
Forms 15 (manifold) issued during the year ending June 30, 1876	792
Forms 22 issued during the year ending June 30, 1876	196
Forms 26 issued during the year ending June 30, 1876	3,374
Total	47,079

NEW HAVEN, CONNECTICUT.

[*Official number*, 90.]

Latitude	41° 17′
Longitude	72° 57′
Mean barometer for the year ending June 30, 1876	30.024
Mean temperature for the year ending June 30, 1876	50°.8
Amount of rain-fall for the year ending June 30, 1876	52.60 inches.

Sergeant M. F. Tighe remains in charge, and has discharged the station duties without assistance and in a prompt and satisfactory manner.

Forty-six cautionary signals have been displayed, of which number eighteen are reported as fully justified, three as partly justified, and twenty-five as not justified, at the station.

The sergeant makes the following remarks in reference to some of these displays:

October 6 *and* 7, 1875.—Threatening weather; not a vessel could be seen outside the light-house; forty vessels were counted between the light-house and signal-station; the night was dark and threatening.

October 16 *and* 17, 1875.—The storm was very severe on the sound; all vessels remained in port during the display, and other vessels came in for shelter.

October 26 *to* 28, 1875.—The harbor was full of vessels, but none went out; on the morning of the 27th two tugs, with large tows, left the harbor, but were soon compelled to return; one with the loss of her tow, and was in great danger herself. The attention of both these captains was called to the signal, but they did not heed it. The warning is supposed to have been the means of saving life and property, as the gale on the sound is reported as fearful.

October 30 *to November* 1, 1875.—At 7.30 p. m. of the 30th, the harbor was full of vessels—coasting and fishing vessels of every description—and their lights resembled a city after night-fall. None could be seen outside the light-house.

December 6, 1875.—Signal not hoisted, as the blocks and halliards were covered with sleet. Notice of order given through the press.

December 13 *and* 14, 1875.—The Elm City driven ashore in the harbor on her return-trip from New York; several vessels put into the harbor for refuge.

December 24 *and* 25, 1875.—Dense fog and heavy snow. The steamer from New York, due here at 7.45 p. m., was four hours late, having encountered heavy weather on the sound.

February 14 *to* 16, 1876.—The dock superintendent reports that no boats left the harbor, except the regular steamers, and they were very much delayed; also, that the signal was watched all day by captains of schooners which put into the harbor for safety. Several minor disasters reported.

March 16 *to* 18, 1876.—The signal was of great benefit to shippers and builders. The storm was a combination of all kinds of weather—rain, hail, and snow. On the morning of the 17th the third signal-flag had to be brought into requisition, the others having been cut to pieces by the sleet. A dense fog prevailed yesterday morning, which made coasters glad they did not leave the harbor.

March 20 *to* 22, 1876.—This was one of the most severe storms of the season, accompanied by heavy snow and rain. Over fifty coasters took refuge in the harbor on the evening of the 20th, and remained all day of the 21st, with one or two exceptions. The dock superintendent says the warning saved them hundreds of dollars.

* * * * * * *

Very many cautionary signals ordered for this station, and reported not justified, were justified by the high winds and rough weather reported from the sound within a radius of 100 miles.

The station has not been inspected since the date of last report, nor has any change been made in the location of office.

Telegraphic reports are not received here, but a copy of the midnight bulletin, issued at the New York station, has been received, and furnished regularly to the afternoon paper for publication.

NEW LONDON, CONNECTICUT.

[*Official number*, 14.]

Latitude	41° 22′
Longitude	72° 9′
Mean barometer for the year ending June 30, 1876	30.027
Mean temperature for the year ending June 30, 1876	49°.8
Amount of rain-fall for the year ending June 30, 1867	46.65 inches

Sergeant George H. Crane continues in charge, and has one assistant. Two assistants have been relieved during the year, one for discharge and the other transferred to duty elsewhere. No change has been made in the location of office, nor has the station been inspected since the date of last report.

Forty-eight cautionary signals have been displayed, of which number thirty are reported as justified, and eighteen as not justified, at the station. The following remarks are made by the sergeant in reference to some of these displays:

August 2 *and* 3, 1875.—Very heavy sea outside. Signal observed by all sailing-vessels.

September 10 *and* 11, 1875.—Signal well observed by all sailing-vessels; thirty remaining in port for shelter.

October 6 *and* 7, 1875.—Fully one hundred vessels put into port for shelter after the signal was raised, and remained until it was lowered. No disasters have been reported.

October 15, 16, 17, *and* 18, 1875.—About twenty sailing-vessels put into port for shelter. The steamer City of Norwich left port on the evening of 16th, and when only ten miles out, shipped a sea, which stove in her side and obliged her to return to harbor.

October 26 *to* 28, 1875.—All sailing-vessels and the freight-steamers remained in port. About forty sail put into port for shelter.

October 30 *to November* 1, 1875.—Storm very severe, and accompanied by a heavy fall of rain, which finally turned to snow. All sailing-vessels remained in harbor, and a large number came in for shelter.

November 10 *and* 11, 1875.—No casualties in this vicinity. Twenty sailing-vessels remained in port.

November 26 *and* 27, 1875.—All sailing-vessels remained in port, and a few put in after signal was hoisted. No disasters heard of.

November 29 *and* 30, 1875.—No disaster heard of. A large number of sailing-vessels took refuge in the harbor.

December 13 *and* 14, 1875.—Forty sail-vessels and three steamers remained in port for shelter. Steamer City of Norwich put out, but had to return on account of the heavy sea running.

February 1 *to* 3, 1876.—All vessels remained in port. Two schooners were driven ashore at Stonington Harbor, and one three-masted schooner near Watch Hill. From all quarters ashore come reports of trees, fences, and chimneys having been blown down. The lowest tide known for years. No disasters of vessels reported as yet.

February 14 *to* 16, 1876.—Storm very severe. The vessels in the harbor dragged anchors, and one broke from her moorings. No damage done. Fifteen vessels put into port for shelter. All sailing-vessels and steamers remained in port.

March 20 *to* 22, 1876.—All sailing-vessels and steamers remained in port. Numerous minor accidents occurred. One fishing-sloop was beached at Niantic. Three mud-scows broke from a tow and went ashore at Fisher's Island.

March 24 *to* 27, 1876.—Several sailing-vessels and one steamer put into port for shelter. The steamer City of Lawrence remained in harbor six hours on account of signal.

April 4 *and* 5, 1876.—Numerous minor disasters. Two steamers and fifteen schooners put into this harbor for safety.

April 7 *and* 8, 1876.—No disasters heard of. Thirty schooners ran into this port for safety.

May 12 *and* 13, 1876.—One barge and fifteen schooners put into port for shelter. No accidents reported.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	4,632
Forms 15 (manifold) issued during the year ending June 30, 1876	1,566
Forms 22 (manifold) issued during the year ending June 30, 1876	36
Total	6,224

NEW ORLEANS, LOUISIANA.

[*Official number*, 47.]

Latitude	29° 58′
Longitude	90° 7′
Mean barometer for the year ending June 30, 1876	30.076
Mean temperature for the year ending June 30, 1876	69°.5
Amount of rain-fall for the year ending June 30, 1876	80.76 inches.

Sergeant N. Gorom continues in charge, and has two assistants, one of whom is a printer.

Forty-two post-offices have been regularly supplied with the farmers' bulletin.

Nine cautionary signals have been displayed, of which number four are reported as fully justified, one as partly justified, and four as not justified, at the station.

The sergeant remarks as follows, in reference to some of these displays:

September 14 *to* 16, 1875.—Steamers Margaret and Iberia delayed their departures on account of signal; also steamers which would have left Brashear for Galveston and Brownsville were telegraphed to delay departure. The steamer St. Mary encountered the storm, and lost her smoke-stack and wheel-house. The storm caused considerable damage along the shore of Lake Pontchartrain, carrying away small houses, &c. The warning was given about twelve hours in advance of the storm.

March 5 *to* 7, 1876.—No known damage. The steamer Oriole, for the lower coast, left port, but was compelled to return to the city, on account of the heavy sea in the river.

March 19 *and* 20, 1876.—Considerable damage was done to property in the upper portion of the city. During the storm six coal-barges and one loaded with staves were sunk. Considerable damage reported from the cape and gulf coasts. No arrivals or departures during the display. The schooner H. B. Miles sunk in the bayou Saint John, at the lake end. The iron steamer Carondelet reports that, at 9.30 p. m. of the 19th, while lying at Bonnet Carré Point, to await the abatement of a gale, a whirlwind struck her on the starboard side, and lifted that side of the texas cabin clear off the deck, blew it over to the other side of the boat, and there despoiled it, a total wreck. No persons injured. The storm reported to have been very severe at the different watering-places between here and Mobile, carrying away light-houses, wharves, &c.

The following extracts are made from the semi-annual reports of the sergeant:

The members of the cotton exchange are very desirous to obtain information as to the amount of rain-fall daily throughout the cotton region.

* * * * * * *

The market reports are governed, to a certain extent, by our weather reports, like the cotton exchange; the weather map is consulted every morning by nearly all the members. Rain-fall also affects the produce market similar to that of the cotton. The office has been frequently visited during the spring by planters living along the river, to obtain information relative to the different bench-marks, so as to allow them more readily to understand our river reports, which they see in the New Orleans papers. These reports are getting to be a great feature of the Signal Service, and are watched very closely during periods of high water by planters and others living in that part of the country liable to overflow, and now in the Lower Mississippi Valley it is nearly an impossibility for an overflow to occur without the previous knowledge of the planters, and who can have their stocks and perishable articles removed to a place of safety several days in advance of the flood. The number of lives and amount of property annually saved, from the knowledge derived from these reports, cannot be properly estimated.

The station was inspected in May, 1876, and found in good condition. High water at this point occurred May 13, 1876, when the gauge-reading was three feet below bench-mark, and low water occurred November 16, 1875, when it was fourteen feet and ten inches below bench-mark.

NUMBER OF STATION PUBLICATIONS.

Farmers' bulletins issued during the year ending June 30, 1876	17,490
Bulletins issued during the year ending June 30, 1876	12,084
Forms 22 issued during the year ending June 30, 1873	66
Forms 26 issued during the year ending June 30, 1876	6,205
Total	35,845

NEW YORK, NEW YORK.

[*Official number*, 15.]

Latitude	40° 42′ 43″
Longitude	74° 0′ 3″
Mean barometer for the year ending June 30, 1876	30.001
Mean temperature for the year ending June 30, 1876	51°.0
Amount of rain-fall for the year ending June 30, 1876	53.60 inches.

Sergeant F. M. M. Beall was transferred to duty elsewhere September 1, 1875, and succeeded by Sergeant H. J. Penrod, who still remains, and performs his duties satisfactorily and promptly. There are four assistants at present on duty, but it is proposed to reduce the number by one man at an early date in consequence of a reduction in work. During the year one assistant was relieved for discharge, three for misconduct, and two transferred to duty elsewhere.

Forty-nine cautionary signals have been displayed, of which number twenty-seven are reported as justified and twenty-two as not justified at the station.

The following remarks are made by the sergeant in reference to some of these displays:

October 26 *and* 27, 1875.—During the display vessels generally started, but returned and dropped anchor until the flag was lowered.

November 10 *and* 11, 1875.—Vessels started out during the beginning of the storm, but returned inside the bay and anchored for safety.

November 23 *and* 24, 1875.—A number of vessels anchored last night inside Sandy Hook on account of signals displayed.

February 1 *to* 3, 1876.—Vessels generally remained in port on account of the signal, and during the forenoon several ship captains visited the office to obtain information.

February 14 *to* 16, 1876.—The gale caused considerable damage to unfinished buildings, &c. The barometer was the lowest ever recorded at New York.

March 28 to 30, 1876.—The warning gave ample time to make preparations against the most severe and damaging storm of the season.

April 8 and 9, 1876.—The signal was generally observed by the shipping, and the Tribune says over one hundred and fifty vessels remained in port on account of the signal.

The following extract is made from Sergeant Penrod's last semi-annual report:

On May 22, 1876, off the coast of New London, New York contractors were constructing for the Government a light-house on a rock, in a very dangerous and exposed position. The observer in New York was informed of this fact, and requested by the agent of the work to notify them in case a storm approached, as it would be most destructive to them, and probably cost human lives, if they staid on the rock during a storm, especially in the night time. At 1.55 p. m. of the above date, at which time the cautionary signal was ordered up, a message was sent and the workmen warned of the approaching danger.

Seven hundred post-offices have been regularly supplied with farmers' bulletins during the year, and two hundred maps of the midnight report, printed daily (except Sunday) in time for distribution by daylight.

The instrument-shelter and the roof instruments have been removed since last report to another part of the building, and in making this removal without expense to the Government, the officers of the Equitable Life Assurance Company displayed the same generous spirit that has been manifested in all their dealings with this office.

The company has put up in one of the lower halls of their building a fine wall-map of the United States, on which the weather reports are displayed daily by the standard symbols.

The present exposure of the cautionary signals is excellent; the day signal is displayed at an elevation of 235 feet, and the night signal at 195 feet above sea-level, and both are visible from all parts of the harbor.

The station was inspected in March, 1876, and found in excellent condition.

Post-office officials, members of the press, and of the several commercial organizations in the city, have been courteous and untiring in their efforts to aid the service and to promote its efficiency.

NUMBER OF STATION PUBLICATIONS.

Farmers' bulletins issued during the year ending June 30, 1876	273,910
Bulletins issued during the year ending June 30, 1876	10,836
Maps issued during the year ending June 30, 1876	76,838
Forms 15 (manifold) issued during the year ending June 30, 1876	2,088
Forms 22 issued during the year ending June 30, 1876	403
Forms 26 issued during the year ending June 30, 1876	922
Total	364,997

NORFOLK, VIRGINIA.

[*Official number*, 92.]

Latitude	36° 51′
Longitude	76° 19′
Mean barometer for the year ending June 30, 1876	30.074
Mean temperature for the year ending June 30, 1876	59°.8
Amount of rain-fall for the year ending June 30, 1876	47.80 inches.

Sergeant E. W. McGann remains in charge, and has two assistants. During the year two assistants have been transferred to other duty, one ordered in for promotion, and one for discharge. Forty-one cautionary signals have been ordered, of which number seventeen are reported as

fully justified, four as partly justified, and twenty as not justified at the station. The sheltered position of this station protects it from the full force of the wind, and accounts for the large number of non-verified signals—most of these being justified by winds outside.

The sergeant makes the following remarks in reference to some of these displays:

September 18 *and* 19, 1875.—Warning very generally respected by outward-bound sailing-vessels. A schooner, disabled during the gale, put into this harbor.

October 30 *and* 31, 1875.—No vessels left the harbor during the display. The harbor-master and Captain Stark, of the Old Dominion Steamship Company, agree in pronouncing the signal justified.

November 23 *and* 24, 1875.—The steamer General Sedgwick, bound for Florida, remained in port until signal was lowered.

November 29 *and* 30, 1875.—Several collisions occurred in Hampton Roads at 8 p. m., at which time the wind was blowing a gale from the N. N. E. The harbor-master and pilots state that the signal was truly a great success, and that a severe gale prevailed in Hampton Roads and outside the capes.

December 5 *and* 6, 1875.—Very large fleet of vessels in Hampton Roads, waiting for weather to moderate.

February 1 *and* 2, 1876.—A large number of trees and fences, also two houses in course of construction, were blown down. A number of minor disasters in the harbor and river, such as dragging anchors, drifting about, and colliding with other vessels.

March 1 *to* 3, 1876.—No vessels left the port during the display of signal.

March 16 *and* 17, 1876.—Vessels bound out and up the Chesapeake remained in port. Baltimore steamers four hours late on account of heavy gale on the Chesapeake.

March 20 *and* 21, 1876.—The New York and Baltimore steamers, together with all sailing-vessels, remained in port. Several vessels have put in disabled, having lost sails, masts, &c. The signal gave six hours' warning of the approach of the storm.

March 28 *and* 29, 1876.—The Baltimore steamer was compelled to put into Annapolis for shelter. Very large fleet of vessels in Hampton Roads waiting for the gale to abate.

The repair section of this station extends from Norfolk to the north side of Lynn Haven Bay, a distance of twelve miles.

The following extracts are made from the semi-annual reports of the sergeant:

Wreckers inform me that previous to the establishing of the Coast Signal Line, not one in ten of the vessels which ran ashore were saved, while, since its establishment, every vessel which ran ashore, with one exception, has been gotton off and safely towed into harbor. The class of citizens deriving the greatest amount of benefits from the reports and probabilities issued from this office are the oyster-packers, truck-farmers, and sea-captains. The interest manifested by the press and citizens generally is steadily increasing the office being consulted daily by numerous parties concerning the weather.

The station was inspected in March, 1876, and found in good condition.

The signal-lamp is reported as giving insufficient light, and arrangements will be made to put up an improved one at an early date.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	4,638
Maps issued during the year ending June 30, 1876	3,723
Local reports	1,115
Forms 15 (manifold) issued during the year ending June 30, 1876	3,603
Forms 22 issued during the year ending June 30, 1876	51
Total	13,130

NORTH PLATTE, NEBRASKA.

[*Official number*, 105.]

Latitude	41° 8′
Longitude	100° 53′
Mean barometer for the year ending June 30, 1876	29.508
Mean temperature for the year ending June 30, 1876	48° 9′
Amount of rain-fall for the year ending June 30, 1876	9.61 inches.

Sergeant J. B. Campbell remained in charge of station until January 12, 1876, when he was relived on account of ill health, and succeeded by Sergeant E. Garland.

There is no assistant on duty, nor is one considered necessary, so long as the sergeant is in good health.

It became necessary to vacate the school-building June 21, 1876, and the office was on that date removed to the court-house. The room now occupied is on the first floor, in the southwest corner of the building, and contains four windows. The instruments are exposed from the north window of the dome. The anemometer, wind-vane, and rain-gauge are well exposed.

The station has not been inspected during the year.

The interest of the citizens in the service is manifested by their having furnished an office rent-free in the school-building, and given up, at some inconvenience, a room in the court-house.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	3,042
Forms 15 issued during the year ending June 30, 1876	255
Forms 22 issued during the year ending June 30, 1876	52
Total	3,349

NEWPORT, RHODE ISLAND.

[*Official number*, 130.]

Latitude	41° 29′
Longitude	71° 19′

The station was established in July, 1875, with Sergeant L. H. Foster in charge, who began making observations on the morning of August 1st, and has continued them regularly since that date.

The office was located for the first month in the exchange building, when it was removed to the custom-house, where it still remains. The instrument-shelter is of single lattice-work, built from a north window of the building, and the exposure of instruments is reported good. Telegraphic reports are not sent to or from this station, as it was established mainly for the display of cautionary signals.

Forty-six cautionary signals have been displayed, of which number twenty-nine are reported as justified, and seventeen not justified, at the station.

The sergeant makes the following remarks in reference to some of these displays:

September 10, 1875.—The following is an extract from the Newport Mercury: "This is the first signal displayed at this station, and the almost tempest which made its appearance some four hours after fully proved the correctness of 'Old Probabilities'' calculations. Capt. W. W. Sherwood, of the steamer Narragansett, having in tow a number of barges, reported to the sergeant that he would not leave the harbor while the signal was flying. Very dangerous weather off Brenton Reef. Have been congratulated by many citizens on the success of the first signal displayed."

October 6 *and* 7, 1875.—Reported to have the most severe storm on the cost for six years. Steamer Bristol, from New York to Fall River, was delayed; had paddle-box smashed. The signal was taken advantage of by all vessels in harbor, and by such as saw the signal when passing.

October 15 *and* 17, 1875.—Several vessels took warning from the signal, and the bark Greyhound put into port for shelter. Some damage was done in the city; the exact amount could not be learned. Nothing left port from hoisting until after the signal was lowered.

October 26 *to* 28, 1875.—A large fleet of fishermen started out on the a. m. of the 27th, but seeing the signal put back to the harbor. On sight of the signal several passing

vessels put into port and remained until it was lowered. Several vessels sustained more or less damage. The display was considered of great benefit."

October 30 *to November* 1, 1875.—Over one hundred vessels ran into harbor for refuge. The New York steamers could not make a landing Saturday night.

November 10 *and* 11, 1875.—Several vessels avoided probable disaster by remaining in port. Steamer Providence, for New York, went out, but was obliged to put back with her bulwarks stove in and her cabin full of water. Several vessels from Providence saw the signal while passing, and put in here for safety. The signal was displayed six hours before the gale set in.

November 16 *and* 17, 1875.—Several vessels took warning. The signal was of undoubted benefit, as it prevented several vessels from going out; and three barges, going down the river, saw the signal and put in here for safety. Mariners navigating these waters give the signal great attention and faith, and would hardly leave port while it is flying.

November 23 *and* 24, 1875.—Three vessels took warning and remained in port, but the schooner Anthony left for Block Island, and lost both her masts.

December 17 *and* 18, 1875.—Nothing left port. Several vessels ran in. Masters of vessels in the harbor made everything secure for storm, therefore the warning was beneficial.

February 1 *to* 3, 1876.—The signal displayed twelve hours before the gale began; it blew with great fury for fifteen hours. Shutters, signs, scuttles, chimneys, and everything loose, were blown away. The steam ferry-boat and fort launch were obliged to discontinue their trips, and business in the city was almost wholly suspended.

February 14 *to* 16, 1876.—The gale, it is said, exceeded anything since the noted September gale several years ago. Everything movable was blown away. The schooner Western Star left the harbor while the signal was flying, and escaped being a total wreck only by a remarkable piece of good fortune.

March 20 *to* 22, 1876.—Several disasters are reported, among others the collision of the steamers Eolus and Old Colony, the only two boats which tried to run yesterday, those of the American Steamboat Company remaining all day. Forty sailing-vessels took refuge in the harbor, and were influenced so to do by the signal.

The station has not been inspected since its establishment.

NEW RIVER, NORTH CAROLINA.

[*Official number*, 138.]

Latitude	34° 36′
Longitude	77° 23′

This station was opened as a repair station May 18, 1876, by Corporal C. C. Corbin, with one assistant. There being no house or building of any kind within some miles of this point, the men occupied a tent, which has so far answered the purpose, but will be found uncomfortable and inconvenient when the winter season sets in.

The repair-section extends from one-half way to Cape Lookout to the beach opposite Sloop Point, a distance of 52 miles.

The station is supplied with a set of meteorological instruments, and observations are made with as much regularity as the other station-duties will permit.

OMAHA, NEBRASKA.

[*Official number*, 67.]

Latitude	41° 16′
Longitude	96° 0′
Mean barometer for the year ending June 30, 1876	29.938
Mean temperature for the year ending June 30, 1876	49°.4
Amount of rain-fall for the year ending June 30, 1876	34.61 inches.

Sergeant Thomas Cleary remains in charge of station, and has given satisfaction. No change of assistant has been made, nor has the station been inspected during the year.

High water in the Missouri River at this point occurred June 20, 1876, when the gauge-readings were 14 feet 10 inches and 1 foot 10 inches, respectively.

The only reports received here are those passing over the Chicago and San Francisco circuits, and extracts from these are published regularly in the morning newspapers.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during year ending June 30, 1876	5,605
Forms 22 issued during year ending June 30, 1876	50
Total	5,655

OSWEGO, NEW YORK.

[*Official number*, 31.]

Latitude	43° 28′ 32″
Longitude	76° 35′ 5″
Mean barometer for the year ending June 30, 1876	29.996
Mean temperature for the year ending June 30, 1876	46°.7
Amount of rain-fall for the year ending June 30, 1876	36.67 inches.

Sergeant B. F. Hough remains in charge, having re-enlisted in August, 1875. During his absence for this purpose, Sergeant E. F. Brady supervised the station-duty.

One assistant was ordered in for promotion November 8, 1875, since which date the present one has been on duty.

Thirty-one cautionary signals have been displayed, of which number ten are reported as justified, and twenty-one not justified, at the station.

The following remarks are make by the sergeant in reference to some of these displays:

September 10, 1875.—Many vessels remained in port during display, and the office-reports, &c., resorted to by parties interested.

September 20 *and* 21, 1875.—No injury resulting from display; vessels were benefited, remaining in port on account of heavy sea and unfavorable winds.

September 29 *and* 30, 1875.—Vessels that were ready to leave port were detained by the warning, and several captains expressed themselves as being thankful for not being caught out in the high seas that such brisk westerly winds cause.

October 17 *and* 18, 1875.—Several vessels left port during the display of the signal, but were compelled to return on account of the heavy sea they encountered.

October 26 *to* 28, 1875.—Several vessels left port during the display of signal, one of which was compelled to return with her rigging considerably damaged. Others remained in, and left with a fair wind and low sea.

* * * * * * *

November 29, 1875.—Captains and owners of vessels constantly visited the office, posting themselves in regard to the winds on the lakes, &c. The schooner Jenkins was probably lost in this gale, with all on board—eight men and one woman.

The station was inspected in June, 1875, and found in excellent condition.

The midnight probabilities continue to be sent daily along the line of the Lake Shore Railroad as far as Charlotte without expense to the United States, and are bulletined at the different stations for the use of the farming community.

Navigation is reported by the sergeant to have closed at this port December, 1875.

The first arrivals, spring of 1876, were schooners Great Western, Eliza White, and Mary Ann Leyden, April 6, all laden with barley; and the Blazing Star, cargo wheat.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	7,391
Maps issued during the year ending June 30, 1876	3,197
Local reports issued during the year ending June 30, 1876	1,117
Forms 15 (manifold) issued during the year ending June 30, 1876	3,242
Forms 22 (manifold) issued during the year ending June 30, 1876	49
Total	14,996

PECK'S BEACH, NEW JERSEY.

[*Official number*, 117.]

Latitude	39° 11′
Longitude	74° 41′

Sergeant J. O. Barnes and the assistant on duty at date of last report remained until the station was discontinued, February 23, 1876. Previous to this date thirty-four cautionary signals had been displayed, of which number twenty-eight were reported as justified, and six not justified, at the station.

The isolated position of the station rendered it impracticable for the sergeant to collect data in reference to the results of their displays.

PEMBINA, DAKOTA TERRITORY.

[*Official number*, 63.]

Latitude	49° 0′
Longitude	97° 5′
Mean barometer for the year ending June 30, 1876	29.972
Mean temperature for the year ending June 30, 1876	32°.4
Amount of rain-fall for the year ending June 30, 1876	19.50 inches.

Sergeant Charles Dill remains in charge, and has performed all his duties satisfactorily and without assistance.

No change has been made in the location of the office, nor has the station been inspected during the year.

PHILADELPHIA, PENNSYLVANIA.

[*Official number*, 17.]

Latitude	39° 57′
Longitude	75° 10′
Mean barometer for the year ending June 30, 1876	30.051
Mean temperature for the year ending June 30, 1876	52°.7
Amount of rain-fall for the year ending June 30, 1876	44.93 inches.

Sergeant C. M. Hobbs was transferred, September 21, 1875, to duty elsewhere, and succeeded by Sergeant F. M. M. Beall, who still remains, and has given satisfaction by his prompt and regular rendition of all reports. There are five assistants on duty, of whom two are printers. A reduction of work and in the number of men employed is proposed at an early date. One man has been relieved during the year for promotion and three for misconduct. Eight hundred post-offices have been regularly supplied with the farmers' bulletin, and one hundred and sixty maps issued daily, with the exception of Sundays. The telegraphic work of this station requires the constant services of one man to keep up communication with the Central Office and the stations on the sea-coast line.

The station was inspected in March, 1876, and found in good condition.

The following extracts are made from the semi-annual report of the sergeant:

From many careful inquiries among actual business men, whose operations are liable to be affected by atmospheric changes, there has been found, with a few exceptions, not a doubtful or wavering opinion prevailing, but a steady reliance upon our efforts and forecasts. A few instances may be cited as to the style of beneficial results. A Mr. Raskins, an oyster-dealer, says by carefully noting the approach of the low thermal waves he regulates his supplies on hand; and, in one instance of last winter, he cleared $700 during a freeze by laying in a large stock, from anticipating the low

temperature by consulting our reports. Mr. Peterson, a well-known chemist here, states he had experienced much trouble with his apparatus from sudden changes of temperature, but, since using our reports, no such trouble has occurred.

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Notwithstanding the great draft upon their columns by the current exposition news, the city press have, without exception, uniformly published the several weather reports as heretofore.

* * * * * * *

The members of the Commercial Exchange take a deep interest in the reports, and a large portion of the members keep themselves intelligently posted upon the current weather. It is found the condition of the temperature is very important in ordering or shipping large quantities of grain, especially if the grain is of a new crop. It was discovered that the several ice-companies in this vicinity made very valuable use of our reports in making their calculations during their harvesting season.

* * * * * * *

This station is indebted to Mr. Thomas C. Hand, chairman meteorological committee, for many favors in facilitating our official intercourse with the public.

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It is gratifying to state the uniform courtesy and valuable assistance that has been received from the post-office authorities, which is found to be very valuable in connection with the farmers' bulletin publication. The Maritime Exchange warmly advocates a cautionary-signal station on the Delaware Breakwater, deeming its location there of more importance to vessels than at Cape May.

NUMBER OF STATION PUBLICATIONS.

Farmer's bulletins issued during the year ending June 30, 1876	252,920
Bulletins issued during the year ending June 30, 1876	8,524
Maps issued during the year ending June 30, 1876	56,869
Local reports issued during the year ending June 30, 1876	2,068
Forms 15 (manifold) issued during the year ending June 30, 1876	5,553
Forms 22 issued during the year ending June 30, 1876	366
Total	326,300

PIKE'S PEAK, COLORADO TERRITORY.

[*Official number*, 99.]

Latitude	38° 48′
Longitude	104° 59′
Mean barometer for the year ending June 30, 1876	29.960
Mean temperature for the year ending June 30, 1876	19°.0
Amount of rain-fall for the year ending June 30, 1876	29.89 inches.

Sergeant J. V. Brown was transferred to other duty December 30, 1875, and succeeded by Sergeant C. M. Hobbs, who remains and is in charge of both summit and base stations. There is one assistant on duty at the summit and one at the base, who exchange stations monthly for the better preservation of their health. Three men have been transferred to duty elsewhere during the year. The health of the men has been generally good. The telegraph-line has worked fairly throughout the entire year. The wind-record has been nearly continuous, only two breaks having occurred, when the cups of the anemometer were blown away.

The building will be put in thorough repair before another winter sets in. The number of visitors to the stations has been greater than during the previous year.

The following extracts are made from the reports of the sergeant:

* * * * * * *

The regular change of assistants from summit to base is an agreeable break in the monotony of a lengthy, uninterrupted stay at the former place, which, at times, becomes almost unbearable to them, and at the same time they are not subjected to a continued exposure to the hardships of the peak and the climatic influences of the elevation.

During hail-storms, which are very frequent in summer, electricity is always very strong, but increases and decreases in amount with the severity of the storm or hail-fall. I remained on the roof of the building during the passage of the greater por-

tion of one of the heaviest. The hail-cloud was not more than 75 feet thick, the lower portion of which rested on the surface of the peak. There was but one current and no revolving motion in the cloud.

* * * * * * *

May 13, 1876.—Heavy masses of cumulus clouds hung around the peak in the early afternoon, and snow began at 1.55 p. m. At 3 p. m., loud thunder was heard, and flashes of light leaped out from the instruments. At the same time began the most violent storm which has prevailed on the peak this winter, in the midst of which I arrived on the summit with O'Keefe, a Mr. Yates, an invalid from the springs, both the mules, and a horse. We left the lake this morning at 8 a. m., and I spent all the morning and the afternoon, until 3 o'clock, fixing the line; and just as I had concluded to suspend operations on it for the day some heavy, dark clouds that had been hanging over South Peak all of the afternoon moved overhead, and peal after peal of thunder sounded almost at our sides and awoke the echoes in the mountains and valleys around and below us. At the same time snow began to fall and the wind to increase in violence, but I had seen too much bad weather on the peak to be turned back by this. When we began the last mile, which is the worst of the trail, it was impossible to face the wind with open eyes, and for the last half a mile it was by far the most severe storm that either I, Greenwell, or O'Keefe, who has spent two months here, have ever seen.

O'Keefe fell far behind, and was lost to sight long before I suspected what a nest of trouble we were getting into. After we reached the crater we could not see five feet ahead of us at times, and I am not exaggerating in the least, and an eighth of a mile from the station I was completely lost, and had to abandon myself to the instincts of Balaam, trusting that she would follow the hidden trail; but she finally went wrong, and, with Yates, myself, and the horse, was completely buried in the snow. We scrambled out, however, with the animals at times sinking to their backs, until we came across the telegraph-line, and I knew which way to go. Looking at Yates, I saw that he could not survive such a storm much longer, so I took his horse and told him to follow the line to the house as quickly as possible and send Greenwell out to my assistance. After he left me I tied Balaam to a telegraph-pole and started forward with the horse. The wind was blowing forty-six miles per hour at the time, driving the little pellets of snow like bullets, and time and again I thought I would have to abandon the animals to their fate, even when I knew I was not more than two hundred feet from the house; but I was determined to keep by them as long as possible. More than once the animal fell on the rocks underneath the snow, cutting her legs in a fearful manner, and it would be impossible to get her started again. Finally, above the noise of the storm I heard Greenwell call; and when he came out of the darkness, a short distance in front, I gave him the horse and went back for Balaam, whom I found braced up against the driving wind, like the old soldier that she is.

I urged her forward foot by foot, and finally housed her in the woodshed, where Greenwell had arrived with the horse. I sent him out at once to look for O'Keefe, and then began to look to myself and visitor. From the tops of our heads to the soles of our boots there was not a single square inch of surface that had been exposed, even to our faces, that was not covered with solid ice a quarter of an inch thick, and when Greenwell and O'Keefe arrived, in fifteen or twenty minutes, with "Kit," they were in the same condition; animals as well as men were walking pillars of ice and snow. Terrible as was the experience to us residenters, it was doubly so to Mr. Yates, who had never in his life seen anything even suggestive of it, and who honestly believed that his last hour had come.

Had we lost both the mules and the horse and saved only ourselves, we would have considered ourselves fortunate; but with all the animals in good quarters, we could look back to the terrible ordeal through which we had passed only with thankful hearts.

When I left the station the first of the month almost all the snow had disappeared from the peak; but there is now as much or more than there has been at any time during the past winter, and if the weather had been fair, so that I could have seen the present appearance of the summit, I would have returned to the lake without making a single attempt at finishing the ascent.

The station has not been inspected since date of last report.

PITTSBURGH, PENNSYLVANIA.

[*Official number*, 41.]

Latitude	40° 32′
Longitude	80° 2′
Mean barometer for the year ending June 30, 1876	29.995
Mean temperature for the year ending June 30, 1876	52°.6
Amount of rain-fall for the year ending June 30, 1876	36.21 inches.

Sergeant George H. Rohe was relieved July 1, 1875; his successor, Sergeant L. A. Welsh, April 1, 1876, by Sergeant J. Kabernagle; and the latter, June 23, 1876, by Sergeant J. Mitchell, who is now in charge.

There are two assistants on duty, one of whom is a printer. Three men have been transferred to duty elsewhere during the year; one ordered in for medical treatment, and one for misconduct. The office was moved on April 21, 1876, to another room in the same building.

The station was inspected in June, 1876, and found in bad condition. Necessary instructions were given to have it put in better order, and the sergeant in charge was relieved for neglect of duty.

Three hundred and sixteen post-offices have been regularly supplied with the farmers' bulletin. High water in the Monongahela at this point occurred December 25, 1875, when the gauge-reading was 16 feet 9 inches; and low water September 10, 1875, when it was 4 inches.

NUMBER OF STATION PUBLICATIONS.

Farmers' bulletins issued during the year ending June 30, 1876	108,578
Bulletins issued during the year ending June 30, 1876	8,246
Local reports issued during the year ending June 30, 1876	426
Forms 22 issued during the year ending June 30, 1876	194
Forms 26 issued during the year ending June 30, 1876	3,524
Total	120,968

PORT HURON, MICHIGAN.

[*Official number*, 103.]

Latitude	42° 58′
Longitude	82° 29′
Mean barometer for the year ending June 30, 1876	29.969
Mean temperature for the year ending June 30, 1876	45°.3
Amount of rain-fall for the year ending June 30, 1876	36.51 inches.

No change has been made at this station in the working force, Sergeant N. D. Lane still remaining in charge, with one assistant. Thirty cautionary signals have been ordered, of which number nineteen are reported as justified, and eleven as not justified, at the station.

The following remarks are made by the sergeant in reference to some of these displays:

August 6 *and* 7, 1875.—No damage. One steam-barge, with tow, detained by the signal.

September 10, 1875.—All vessels which left port while signal was up were driven back. Several disasters in this vicinity.

September 16 *and* 17, 1875.—Dangerous winds were very general on the lakes. All vessels which did not take warning were driven back.

September 27 *to* 30, 1875.—No vessels were detained by the signal, owing to the favorable direction of the wind, but three or four of them returned to port after being out several hours.

October 17 *and* 18, 1875.—Order to hoist signal was delayed five hours, in consequence of the closing of the telegraph-office. Vessels went out with a fair wind, but were struck by the storm, with northwest wind, and were driven back to port, some meeting with injury.

November 16 *and* 17, 1875.—All vessels outward-bound detained by the signal.

The daily paper at this station continues to print, in tabular form, the principal matter given in the daily bulletin. Navigation closed December 5, 1875. First vessel arriving spring of 1876 was steamer Evening Star, April 6.

The station was inspected in May, 1876, and found in excellent condition. No change has been made in location of office.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	2,109
Local reports issued during the year ending June 30, 1876	325
Forms 22 issued during the year ending June 30, 1876	49
Total	2,483

PORTLAND, MAINE.

[*Official number*, 12.]

Latitude	43° 40′
Longitude	70° 16′
Mean barometer for the year ending June 30, 1876	29.987
Mean temperature for the year ending June 30, 1876	45°.8
Amount of rain-fall for the year ending June 30, 1876	37.12 inches.

Sergeant W. T. Boyd continues in charge of the station, and has one assistant. One man has been ordered in for promotion, being the only change made during the year.

Forty-four cautionary signals have been ordered, of which number twenty are reported as justified, and twenty-four as not justified, at the station.

The sergeant remarks as follows upon some of these displays:

October 15 *to* 17, 1875.—The Boston and Halifax steamers delayed making their usual trips until the signal was lowered. The New York steamer Franconia, which left New York on Thursday, was caught in the gale off Martha's Vineyard, and compelled to put into Holmes' Hole. All coasters and fishing-craft came into the bay on the 15th and remained until the a. m. of the 18th.

October 26 *to* 28, 1875.—The warning was very favorably commented upon by seafaring men. The gale was severe, and considerable damage done in the city, such as blowing down chimneys and the like.

October 30 *to November* 1, 1875.—The timely warning caused all vessels outside the bay to seek shelter in the harbor. All the steamers delayed making their usual trips until Sunday morning. The gale was the strongest that has occurred on the coast for years. It tore down signs, awnings, and everything in its way; and in the morning the sidewalks were strewn with them. A large number of vessels in the harbor suffered more or less. No serious disaster has yet been reported.

November 10 *and* 11, 1875.—Signal hoisted one hour and a half in advance of commencement of the storm, and gave ample warning for all to be benefited.

November 26 *and* 27, 1875.—No damage reported. All steamers delayed making their usual trips until the morning of the 30th. Chimneys, signs, &c., were blown down, doing more or less injury.

December 13 *and* 14, 1875.—The New York, Boston, and Halifax steamers remained in port until signal was lowered. No results shown.

January 18 *to* 21, 1876.—All sailing-vessels remained in harbor, and the steamer Franconia (Maine Steamship Company) delayed going out until the midnight reports of the 20th were received. This company regulate the movements of their vessels by the reports of the Signal-Service. No damage other than the blowing down of signs, &c.

February 1 *to* 3.—All vessels remained in port, and no damage has been reported in this vicinity. The signal was hoisted sixteen hours in advance of the storm and lowered at the proper time. It was the most satisfactory display since station has been in charge of the present sergeant.

February 14 *to* 16, 1876.—All vessels remained in port during the display of signal. The storm-flag was cut to pieces by the sleet and blown away. Very many snow-slides occurred during the day, and several persons were injured by them.

March 16 *to* 19.—The New York, Boston, and Halifax steamers delayed making their usual trips until the morning of the 18th.

No change has been made in the location of office, nor has the station been inspected during the year. The sergeant reports that close attention is paid to the signals by sea-faring men.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during year ending June 30, 1876	4,623
Forms 15 (manifold) issued during year ending June 30, 1876	1,882
Forms 22 issued during year ending June 30, 1876	91
Total	6,596

PORTLAND, OREGON.

[*Official number*, 74.]

Latitude	45° 30′
Longitude	122° 27′ 30″
Mean barometer for the year ending June 30, 1876	30.069
Mean temperature for the year ending June 30, 1876	54°.5
Amount of rain-fall for the year ending June 30, 1876	68.16 inches.

Sergeant J. E. Evans was discharged December 11, 1875, and succeeded on that date by Sergeant Henry Fenton, who remains and has worked the station without assistance. No change has been made in the location of office, nor has the station been inspected since the date of last report. The daily newspapers of the station continue to publish the local reports.

NUMBER OF STATION PUBLICATIONS.

Local reports issued during the year ending June 30, 1876	466
Forms 22 issued during the year ending June 30, 1876	18
Total	484

PORTSMOUTH, NORTH CAROLINA.

[*Official number*, 137.]

Latitude	35° 2
Longitude	76° 4

This is a repair station on the beach at the south side of Ocracoke Inlet, and was occupied April 23, 1876, by Private T. Burke, who remained until May 20, when he was transferred to duty on another part of the line, and succeeded by Private J. E. Hayes, who still remains. At this date the office has not been connected with the main line, which is nearly a mile distant, but material for making the connection has been shipped.

The station is supplied with meteorological instruments, but observations cannot be taken regularly, owing to the frequent absence of the observer in making repairs on the line.

The repair section extends from the south side of Hatteras Inlet to one-half way to Cape Lookout, a distance of fifty miles.

PUNTA RASSA, FLORIDA.

[*Official number*, 59.]

Latitude	26° 36′
Longitude	82° 10′
Mean barometer for the year ending June 30, 1876	30.107
Mean temperature for the year ending June 30, 1876	74°.4
Amount of rain-fall for the year ending June 30, 1876	39.00 inches.

Sergeant J. D. Sumet was relieved upon the recommendation of the inspecting-officer June 16, 1876, and succeeded by Sergeant F. J. Pabst. There is no assistant allowed this station. No change has been made in the location of office during the year.

The station was inspected in June, 1876, and affairs found in such condition as to require the relief of the sergeant. The want of plentiful drinking-water is one of the most serious experienced here and the most difficult to remedy. The health of the men on duty during the year has been generally good.

ROCHESTER, NEW YORK.

[*Official number*, 32.]

Latitude	43° 8′
Longitude	77° 51′
Mean barometer for the year ending June 30, 1876	29.971
Mean temperature for the year ending June 30, 1876	46°.8
Amount of rain-fall for the year ending June 30, 1876	37.96 inches.

Sergeant L. E. Sebree remains in charge, and has given satisfaction by the prompt and intelligent manner in which all his reports have been rendered. One assistant is allowed the station, and during the year six changes have been made, two of them for promotion and the remainder transferred to other duty.

Thirty-one cautionary signals have been displayed, of which number thirteen are reported as fully justified, four as partly justified, and fourteen as not justified, at the station. The shipping port of this station is at Charlotte, seven miles distant, and it is at that place that the display of signal would be most beneficial to commercial interests.

No change has been made in the location of the office. The station was inspected in June, 1876, and found in excellent condition.

The following extracts are made from the sergeant's reports:

* * * * * * * *

Navigation virtually closed on the 30th of November, 1875, but the last entry of vessel was on the 4th of December, 1875. But little ice has formed at harbor, and vessels could have made trips, so far as interference from this source is concerned, but did not.

* * * * * * * *

The first vessel arriving, spring of 1876, was schooner Baltic, April 8; cargo, lumber.

The newspapers of this station publish the tabular reports in excellent form.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	7,515
Maps issued during the year ending June 30, 1876	2,863
Local reports issued during the year ending June 30, 1876	1,250
Forms 15 (manifold) issued during the year ending June 30, 1876	4,958
Forms 22 issued during the year ending June 30, 1876	198
Total	16,784

SAN DIEGO, CALIFORNIA.

[*Official number*, 75.]

Latitude	32° 44′ 41″
Longitude	117° 8′ 0″
Mean barometer for the year ending June 30, 1876	30.027
Mean temperature for the year ending June 30, 1876	61°.6
Amount of rain-fall for the year ending June 30, 1876	10.11 inches

Sergeant J. B. Wells remains on duty, and has one assistant. One man was discharged June 10, 1876, and replaced by another instructed assistant.

The office was removed October 30, 1875, to room No. 7, Horton's Bank block, on D street, where the accommodations are reported to be satisfactory and the instrumental exposure good.

The station has not been formally inspected since the date of last report; but the presence of a commissioned officer of the Signal-Service at the station renders special inspections unnecessary.

Afternoon reports from the stations on the military-telegraph line in

Arizona are here transferred to the central office, and also furnished the local press for publication.

The following extracts are made from the reports of the sergeant:

* * * * * * *

All of the daily, monthly, and annual reports are published in the two daily papers. The county stations referred to in a former report, sustained by the county, under the direction of the society of natural history, are only offshoots from the Signal-Service. They have been in operation nearly six months, and a summary of their observations is published monthly. Our publsihed reports attract to this town every winter hundreds of invalids suffering with pulmonary troubles.

NUMBER OF STATION PUBLICATIONS.

Local reports issued during the year ending June 30, 1876	1,902
Forms 22 issued during the year ending June 30, 1876	26
Total	1,928

SAN FRANCISCO, CALIFORNIA.

[*Official number*, 29.]

Latitude	37° 47′ 35″
Longitude	122° 26′ 15″
Mean barometer for the year ending June 30, 1876	30.025
Mean temperature for the year ending June 30, 1876	55°.8
Amount of rain-fall for the year ending June 30, 1876	31.19 inches.

Sergeant S. W. Beall remains on duty, and since September 15, 1875, has had one assistant. No change has been made in the location of the office, nor has the station been inspected since the date of last report.

Reports from Portland and San Diego are here transferred to the Chicago circuit.

The sergeant reports the usual amount of interest manifested by the citizens in the service.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	2,279
Local reports issued during the year ending June 30, 1876	379
Forms 22 issued during the year ending June 30, 1876	104
Total	2,762

SALT LAKE CITY, UTAH TERRITORY.

[*Official number*, 70.]

Latitude	41° 10′
Longitude	112° 00′
Mean barometer for the year ending June 30, 1876	29.956*
Mean temperature for the year ending June 30, 1876	53°.1*
Amount of rain-fall for the year ending June 30, 1876	24.91 inches.*

Sergeant J. F. Tenney was transferred to another station October 18, 1875, and succeeded by Sergeant Henry Fenton, who remained until the arrival of Sergeant McGillivray, December 11, 1875, when the latter assumed charge.

The assistant on duty at last report was relieved September 15, 1875, and has not been replaced.

The office was removed June 29, 1876, from the Exchange building to the Wahsatch Hotel, at the corner of Main and South Second streets, where a good exposure for the several instruments is obtained.

* Nine observations missed in March, 1876.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	2,625
Local reports issued during the year ending June 30, 1876	393
Forms 26 issued during the year ending June 30, 1876	72
Total	3,090

SANTA FÉ, NEW MEXICO.

[*Official number*, 69.]

Latitude	35° 41′
Longitude	106° 10′
Mean barometer for the year ending June 30, 1876	29.794
Mean temperature for the year ending June 30, 1876	48°.8
Amount of rain-fall for the year ending June 30, 1876	19.23 inches.

Sergeant W. McElroy remained in charge until October 9, 1875, when he was ordered in for discharge, and succeeded by Sergeant I. A. Reed, who was in turn succeeded by Sergeant J. F. Burke, June 22, 1876.

No change has been made in the location of office during the year, nor has the station been inspected.

Reports from new stations on the telegraph-line as established and provided with instruments are received and published here, and also transferred with the local report to the central office.

NUMBER OF STATION PUBLICATIONS.

Local reports issued during the year ending June 30, 1876	454
Forms 15 (manifold) issued during the year ending June 30, 1876	39
Total	493

SANDY HOOK, NEW JERSEY.

[*Official number*, 112.]

Latitude	40° 28′
Longitude	74° 1′
Mean barometer for the year ending June 30, 1876	30.019
Mean temperature for the year ending June 30, 1876	52°.6′
Amount of rain-fall for the year ending June 30, 1876	61.18 inches

Sergeant J. J. Nanry was relieved February 1, 1876, for absence without leave and neglect of duty. He was succeeded by Sergeant W. McElroy, who still remains, and has one assistant. During the year one assistant was relieved for misconduct and two transferred to duty elsewhere.

Forty-seven cautionary signals have been displayed, of which number forty-six are reported as justified, and eleven as not justified, at the station.

The following remarks are made by the sergeant in reference to some of these displays:

September 10 *and* 11, 1875.—One side-wheel steamer, bound from New York to Saint John's River, Florida, on seeing the signal moved into the Horseshoe for safety.

October 16 *and* 17, 1875.—The schooner Ocean Pearl, from New York for Martinique, West Indies, loaded with wheat, went ashore near Sandy Hook Bay Beach, at 11.30 p. m., where she still remained on the 17th instant. Taken off by tug-boats on the 18th instant.

December 28, 1875.—The barge Gentoo, Calcutta, ashore off point of Hook, where she remained during the display.

February 14 *to* 17, 1876.—When the flag was hoisted, at daybreak, several ships, two steamers, and a number of tugs took refuge in the bay.

March 16 *to* 18, 1876.—On the night of the 16th three large steamers and eighteen craft of other descriptions took refuge in the bay. No disasters known to have occurred this vicinity.

March 20 *to* 22, 1876.—During the p. m. of the 20th the bay was full of all kinds of vessels seeking refuge from the storm. A two-masted schooner (M. M. Weaver) came ashore 2½ miles from station; all hands lost; one body recovered; the schooner went to pieces during the night. The gale considered the most severe of the season.

April 24 *to* 26, 1876.—The signal attracted a good deal of attention on the morning of the 24th, and many were the jibes and jokes cast at the red flag; and, as the day passed without any sign of the approaching storm, the flag barely flapping at mast-head, it looked bad. Between 5 and 6 p. m. I was on top of the house, with glass in hand, when I observed many small schooners making for the Hook; also larger craft, and by dark the bay was crowded; the weather at sea, many of them told me, had begun to look decidedly threatening; to use their expression, "a stone-fence being in the nor'-east." Opinion of the sergeant that this warning was of incalculable value, if not to others, to at least the fishing-fleet of the New Jersey waters. There were at least forty of these schooners anchored, from the evening of the 24th to the morning of the 26th, in the bay opposite this station.

The repair-section of this station extends to the north side of Barnegat Inlet, a distance of 50 miles. Several disasters to shipping have been reported from this station during the year over the signal-line; but as these were given to the press at the same time, they are not enumerated here.

The station has not been inspected since the date of last report, nor has any change been made in the location of office.

SAVANNAH, GEORGIA.

[*Official number*, 22.]

Latitude	32° 5′
Longitude	81° 8′
Mean barometer for the year ending June 30, 1876	30.104′
Mean temperature for the year ending June 30, 1876	67° .6′
Amount of rain-fall for the year ending June 30, 1876	51.46 inches

Sergeant W. S. Popple was transferred to Tybee Island station March 14, 1876, and succeeded by Sergeant Hugh R. Stockman, who still remains, and has one assistant. One man was relieved during the year for misconduct.

Nine cautionary signals have been ordered, of which only one is reported to have been justified at the station, which, owing to its position, does not get the full force of the wind.

The following remarks are made by the sergeant in reference to these displays:

September 14 *and* 15, 1875.—It is the general impression among all classes that the display, as a cautionary measure, was justified.

September 18 *and* 19, 1875.—Rice-planters are the only class that claimed benefit from the display. Cotton-merchants and shippers called at the office. They speak in high terms of the warning as a precautionary measure.

March 20 *and* 21, 1876.—Although the wind did not attain a velocity greater than 22 miles per hour, the signal was fully justified. Captain Daniels, of the steamship Leo, says the gale was the most severe experienced since March 7, 1875. The office frequently visited by shippers, merchants, and planters, who speak in high terms of the display.

The office was removed November 18, 1875, to room No. 3, on the third floor of the Commercial building, at the corner of Bay and Drayton streets. The principal expense attending the removal and refitting the office was borne by the members of the Cotton Exchange.

Signal orders for the Tybee Station are transferred here.

The station was inspected in May, 1876, and found in good condition.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	6,946
Maps issued during the year ending June 30, 1876	2,462
Forms 22 issued during the year ending June 30, 1876	68
Total	9,476

SHREVEPORT, LOUISIANA.

[*Official number*, 72.]

Latitude	32° 30′
Longitude	93° 45′
Mean barometer for the year ending June 30, 1876	30.079
Mean temperature for the year ending June 30, 1876	66°.3
Amount of rain-fall for the year ending June 30, 1876	72.27 inches.

Sergeant J. J. Weinberg was relieved September 10, 1875, by Sergeant P. J. Huneke, who still remains, and has managed the station without assistance since September 27, 1875. The office was removed August 28, 1875, to the second floor of building on the corner of Milan street and Martin's alley. This change was rendered necessary by alterations in the building formerly occupied, which cut off the light from the office and impaired the exposure of roof-instruments.

The office has not been inspected, but will be at an early date, as an officer is now under orders to visit it. The river-gauge was washed away early in the year, and has not been replaced permanently, as the estimated cost of construction appears too high. At present the measurements are made from a temporary gauge. High water occurred April 10–11, 1876, when the gauge-reading was 29 feet, and low water November 29, 1875, when it was 2 feet 10 inches, above bench-mark; which is extreme low water of 1872.

NUMBER OF STATION PUBLICATIONS.

Local reports issued during the year ending June 30, 1876	993
Forms 22 issued during the year ending June 30, 1876	43
Forms 26 issued during the year ending June 30, 1876	3,435
Total	4,471

SPRINGFIELD, MASSACHUSETTS.

[*Official number*, 110.]

Latitude	42° 6′
Longitude	72° 36′
Mean barometer for the year ending June 30, 1876	30.11
Mean temperature for the year ending June 30, 1876	49°.3
Amount of rain-fall for the year ending June 30, 1876	53. inches.

Sergeant N. Dumont continues in charge of station, and has given satisfaction by the promptness and regularity with which all reports have been rendered.

One assistant has been relieved for discharge, and succeeded by another competent man, being the only change made during the year. One hundred and thirty post-offices have been regularly supplied with farmers' bulletins.

The following extracts are made from the reports of the sergeant:

The Probabilities, or farmers' bulletin, are the standard, and the expression everywhere is that it is the first item of news sought for. Those interested in tobacco, the great crop of the Connecticut valley, decide their labors and crop values upon them. The deputy sheriff at Northampton stated this to be the fact in his region; others say the like for other places. As a case of specific interest, Mr. Taylor, of the Taylor Ink and Paper Company, of this place, a very large enterprise, has, since frost came, made it a business rule to regulate the shipment by the firm of bottled ink in accordance with the Probabilities, frequently sending to find what the statements of the a. m. Probabilities are. Other facts could be enumerated, but this general statement covers all, viz, that those whose business or pleasure depends upon weather, or may do so, consult and regard the notifications of this last-mentioned form of report. Mr. Bond, president of the Massachusetts Life-Insurance Company, stated some days since, in conversation, that he at times considered the Probabilities, to a certain degree, in connection with the death-rate, especially when considering periods of sudden and prolonged cold or extreme heat.

Five weather-maps are received daily from New York by 1.30 p. m., and posted in public places.

More than the average interest is taken in the service at this station by the merchants and citizens generally.

It has not been inspected since date of last report.

NUMBER OF STATION PUBLICATIONS.

Farmers' bulletins issued during the year ending June 30, 1876	47,206
Bulletins (manifold) issued during the year ending June 30, 1876	5,766
Forms 22 issued during the year ending June 30, 1876	29
Total	53,001

SAINT MARK'S, FLORIDA.

[*Official number*, 24.]

Latitude	30° 10′
Longitude	84° 12′
Mean barometer for the year ending June 30, 1876	30.102
Mean temperature for the year ending June 30, 1876	67°.0
Amount of rain-fall for the year ending June 30, 1876	62.10 inches.

Sergeant J. T. Minchin was relieved September 15, 1875, and succeeded by Sergeant F. P. Bayes, who still remains, and has had no assistance since October 12, 1875.

Five cautionary signals have been displayed, of which number four are reported as justified at the station. The signal-display at this point is of questionable value, as there is no shipping, and the town is nine miles from the Gulf.

The sergeant reports that the total white population of Saint Mark's consists of nine men, and that consequently but little local interest is taken in the service.

The citizens of Tallahassee, however, are interested, and make use of the reports to show the climatology of the State as an inducement to immigration. A weekly synopsis of the local observations is furnished the Floridian, and regularly published.

The office was moved December 1, 1875, into a wooden building, one and a half stories high, and built upon a slight elevation of ground, which places it above mean-tide level, and renders the location more desirable.

The instrument-shelter projects from a window facing north, and the exposure is good.

The station was inspected in May, 1876, and found in good condition.

The sergeant acts as telegraph-operator, and also attends to the opening and closing of the mails.

SAINT PAUL'S ISLAND, ALASKA.

[*Official number*, 120.]

Latitude	57° 38′
Longitude	169° 50′
Mean barometer for the year ending June 30, 1876	29.850
Mean temperature for the year ending June 30, 1876	34°.35
Amount of rain-fall for the year ending June 30, 1876	38.51 inches

Private C. P. Fish is still on duty, but as his term of service expires in the spring of 1877, Private E. J. Gill has been sent to relieve him, in order that he may return by the annual vessel from the island, which reaches San Francisco in August.

The following table gives in condensed form, a summary of the year's observations at the station.

Abstract of meteorological records for the months from July, 1875, to June, 1876, inclusive.

ISLAND OF SAINT PAUL, BEHRING SEA.

Monthly record.	1875.						1876.					
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April.	May.	June.
Mean of barometer corrected	29.911	29.789	29.725	29.585	30.184	29.931	29.630	30.045	30.111	29.856	29.641	29.799
Maximum of barometer corrected	30.19	30.27	30.33	30.70	30.87	30.31	30.57	30.62	30.82	30.31	30.16	30.19
Minimum of barometer corrected	29.57	28.84	29.00	28.70	29.50	28.75	28.71	29.39	29.26	29.01	28.99	29.21
Monthly range of barometer	.62	1.43	1.33	2.00	1.37	1.56	1.86	1.23	1.56	1.27	1.17	.98
Greatest daily range of barometer	.36	.86	.53	.75	.26	.83	.71	.74	.57	.89	.82	.45
Least daily range of barometer	.02	.04	.04	.01	.03	.02	.09	.08	.03	.05	.03	.02
Mean daily range of barometer	.123	.255	.178	.182	.122	.195	.345	.254	.237	.342	.288	.133
Mean of exposed thermometer	47°.03	47°.88	46°.00	41°.70	34°.86	26°.20	31°.44	16°.53	23°.03	26°.50	32°.69	38°.69
Maximum of exposed thermometer	57°	55°	52°	50°	45°	39°	39°	36°	41°	43°	42°	53°
Minimum of exposed thermometer	39°	43°	41°	33°	26°	15°	23°	8°	3°	5°	22°	30°
Monthly range of exposed thermometer	18°	12°	11°	17°	17°	24°	16°	44°	38°	38°	20°	23°
Greatest daily range of exposed thermometer	12°	9°	10°	9°	10°	11°	13°	29°	20°	20°	16°	15°
Least daily range of exposed thermometer	2°	2°	2°	1°	1°	2°	3°	3°	3°	3°	3°	5°
Mean on warmest day of thermometer	53°.5	50°.5	49°.5	48°.0	41°.7	34°.0	37°.0	34°.5	36°.5	38°.0	37°.5	46°.0
Mean on coldest day of thermometer	41°	45°.5	44°.0	34°.0	30°.5	18°.5	25°.5	1°.5	8°.5	9°	26°	34°
Mean of maxima of thermometer	51°.29	51°.13	48°.83	44°.97	37°.33	29°.13	34°.19	21°.31	28°	31°.57	37°.23	43°.60
Mean of minima of thermometer	43°.90	45°.52	43°.90	39°.39	33°.10	22°.90	26°.42	12°.31	19°.29	22°.23	29°.07	34°.40
Mean daily range of thermometer	7°.39	5°.61	4°.93	5°.58	4°.23	6°.23	7°.77	9°	8°.71	9°.34	8°.19	9°.20
Mean relative humidity	83.4	85.9	83.9	84.7	78.3	84.1	84.1	80.8	83.9	84.8	84.2	83.39
Maximum relative humidity	100	100	100	100	91	100	100	100	100	100	100	100
Minimum relative humidity	66	62	69	65	62	61	62	57	62	62	68	62
Prevailing wind	E.	S. W.	S. W.	N.	N. E.	N.	S.	N. E.	N.	S. E.	N. W.	S. E.
Number of miles traveled by wind	9,115	12,363	10,929	11,904	11,349	15,285	15,373	15,555	13,908	11,517	11,715	8,707
Mean daily velocity of wind (Miles)	204.0	398.8	364.3	384.0	378.3	493.1	495.8	536.4	448.6	383.9	377.9	290.2
Mean hourly velocity of wind (Miles)	12.2	16.6	15.2	16.0	15.8	20.5	20.7	22.3	18.7	16.0	15.8	12.1
Maximum hourly velocity of wind (Miles)	39	63	58	40	34	67	68	83	63	66	62	35
Proportion of cloudiness	80.2	92.6	76.4	84.1	76.9	72.8	71.0	54.3	69.6	77.5	88.8	89.0
Proportion of fog	11.8	12.8	3.6	0.2	0.0	0.0	0.4	0.1	12.6	16.8	17.3	14
Amount of rain-fall, in inches	4.75	5.73	3.86	4.50	.79	1.73	4.54	1.04	3.39	2.89	3.73	1.56
Amount of rain-fall, greatest daily	1.04	1.05	1.40	1.35	.17	.38	1.17	.24	1.10	.88	.83	.45
Amount of melted hail and snow included in rain-fall	0.00	0.00	0.00	.03	.12	.11	2.87	.87	1.29	1.32	2.33	.98
Number of days on which precipitation occurred	21	29	26	27	19	25	27	17	26	22	31	13
Number of days on which hail or snow fell	0	0	0	3	12	24	24	16	22	18	31	3
Number of days on which rain fell	21	29	26	27	15	5	14	7	9	11	16	11

SAINT PAUL, MINNESOTA.

[*Official number*, 39.]

Latitude	44° 53′
Longitude	93° 5′
Mean barometer for the year ending June 30, 1876	29.918
Mean temperature for the year ending June 30, 1876	43°.2
Amount of rain-fall for the year ending June 30, 1876	25.90 inches.

Sergeant W. O. Bailey remains in charge, and since April 11, 1876, has performed the station duties without any assistance. One assistant was ordered in during the year for promotion and one for discharge.

The station has not been inspected since the date of last report, nor has any change been made in the location of the office.

The following extracts are made from the reports of the sergeant:

* * * * * * *

The interest of the service is largely supported in this city and the Northwest through the courtesy and kindness of Messrs. Blakely, Wheelock and Driscoll, editors and proprietors of the Pioneer Press. Not only have they appointed a particular corner in this popular and independent journal for the regular publications of river, weather, and monthly summary reports, but their frequent comments on the "probabilities" are often replete with friendly remarks, and rarely harsh whenever their verification fails.

* * * * * * *

Navigation closed at this station on the 17th day of November, 1875.

* * * * * * *

July 27th I was directed by the Chief Signal-Officer to notify the lumber-merchants of Stillwater and others that a list of special river-reports would be sent regularly to this station. I complied with these instructions July 31, and immediately perfected arrangements with the Pioneer Press Company for publication, which continued until October 25, and then discontinued in consequence of the near approach of closed navigation, and no extraordinary river-changes. From July 31 to October 30, 1875, reports of this description have been received, bulletined, posted, and published with methodical regularity. The daily issue of bulletins ceased October 30, when the reports by telegraph were discontinued.

High water in the river at the station occurred April 10, 1876, when the gauge-reading was 11 feet, and low water August 28, 1876, when it was 2 feet and 1 inch.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	4,500
Local reports issued during the year ending June 30, 1876	327
Forms 22 issued during the year ending June 30, 1876	116
Forms 26 issued during the year ending June 30, 1876	765
Total	5,708

SAINT LOUIS, MISSOURI.

[*Official number*, 66.]

Latitude	38° 37′ 28″
Longitude	90° 15′ 16″
Mean barometer for the year ending June 30, 1876	30.017
Mean temperature for the year ending June 30, 1876	56°.5
Amount of rain-fall for the year ending June 30, 1876	43.25 inches.

Sergeant George Prender remains in charge, and has discharged his duties during the year promptly and satisfactorily. At present there are four assistants on duty; but it is proposed to reduce the number and the work at an early date. During the year one assistant has been

ordered in for promotion, one for discharge, and one transferred to duty elsewhere.

Three hundred and ninety-eight post-offices have been regularly supplied with the farmers' bulletin, and 124 maps issued daily, except Sundays.

The station was inspected in April, 1876, and found in good condition.

The leading daily newspapers print the tabulated reports and such other data as is furnished from time to time.

High water in the Mississippi at this station occurred May 10, 1876, when the gauge-reading was 32 feet 6 inches, and low water December 5, 1875, when it was 3 feet 11 inches.

NUMBER OF STATION PUBLICATIONS.

Farmers' bulletins issued during the year ending June 30, 1876	244,785
Bulletins issued during the year ending June 30, 1876	9,136
Maps issued during the year ending June 30, 1876	46,088
Local reports issued during the year ending June 30, 1876	2,617
Forms 22 issued during the year ending June 30, 1876	482
Forms 26 issued during the year ending June 30, 1876	2,968
Total	306,076

SAINT MICHAELS, ALASKA.

[*Official number*, 119.]

Latitude	63° 48′
Longitude	161°.00

The observer, Private Lucien M. Turner, arrived at Saint Michaels May 25, 1874. Observations began on the 27th of June, and were not interrupted until the 10th of May, 1876, when a break of about one month occurs in consequence of a severe injury received by him. The instruments were placed as follows: Barometer No. 1869 was originally hung up in the observer's room at an altitude of 24 feet above mean tide; a second barometer, No. 164, was received June 21, 1875, and hung alongside of the former until September 29, when both were removed to another room, at an elevation of 30 feet.

Comparisons of the two barometers were made at once, showing a difference of 0.009. One of the barometers, probably 1869, was cleaned October 4, and the comparisons of the two instruments, made monthly thereafter during the following year, show but slight differences. The barometric means here given refer to sea-level, and are the averages of the 7, 2, and 9 o'clock observations. The readings quoted in the notes refer to the sea-level.

The thermometers were placed in a suitable shelter, thirteen feet above ground, at the north end of the Alaska Commercial Company's warehouse. Beneath this shelter, at an elevation of 9 feet 10 inches, is the roof of a wooden shed. On December 23, 1874, the upper end of the maximum thermometer was found to be broken, but the instrument continued to register correctly. The monthly means given in the following table are computed by the formula—

$$\tfrac{1}{4}(7 + 2 + 9 + 9)$$

The anemometer was originally erected on a short post on the top of the warehouse; the cups were 25 feet 6 inches above ground; but on November 13, 1874, the instrument was removed to the top of a tall post, erected on a knoll back of the fort. In this new position the cups are

higher above the ground than before, and free from obstructions. The post is furnished with a row of pegs for use in climbing up to the anemometer.

The wind-vane is 5 feet 6 inches long, and is erected on top of a house. The half-points, N. N.W., N. N.E., &c., were rarely recorded, and are counted in with the principal points in compiling the following table. The wind-directions refer to the true meridian. The frequency of each wind is determined by including in the enumeration all of the seven observations made, respectively, at 1.59 a. m., 6.24* a. m., 7 a. m., 10.59 a. m., 2 p. m., 5.24 p. m., and 9 p. m., local time. Nothing is known as to the accuracy with which the observer's clock was regulated, but the station is believed to be furnished with a sun-dial of Russian construction. The dates of gales, (velocity, 40 to 60,) storms, (60 to 80,) and hurricanes (over 80) are given in the following notes.

The mouth of the receiver of the rain-gauge was 16½ inches above ground, and not near any building. The snow caught in the gauge was melted and measured; dates on which the snow drifted, so as to prevent reliable measurements, were also noted.

The magnetic variation was observed by Private Turner in June, 1874, to be 23° E., agreeing with the statement of the captain of the schooner Eustace.

* It is possible that the observer adopted local noon instead of the regular time, which is Washington noon.

Summary of meteorological observations at Fort St. Michaels, Alaska.

Date.	Barometer.				Temperature.				Rain-fall.		Number of days.			Winds.	Winds—number of observations.									Prevailing wind.
	Mean.	Maximum.	Minimum.	Monthly range.	Mean.	Maximum.	Minimum.	Monthly range.	Monthly precipitation in rain or melted snow.	No. of days on which a measurable amount of rain or snow fell.	Cloudy.	Fair.	Clear.	Total movement in miles.	N. and NNW.	NE. and NNE.	E. and ENE.	SE. and ESE.	S. and SSE.	SW. and SSW.	W. and WSW.	NW. and WNW.	Calms.	
1874.																								
July	29.902	30.281	29.426	0.855	52.7	70	38	32	1.18	11	.....	.....	.....	9,675	16	39	21	26	73	15	8	18	1	S.
August	29.964	30.435	29.375	1.060	53.0	67	39	28	2.07	13	.....	.....	.....	9,005	23	87	8	8	48	21	12	8	1	NE.
September	29.764	30.101	29.332	.769	42.9	56	23	33	0.79	4	.....	.....	.....	9,491	57	70	23	30	14	7	19	12	5	NE.
October	29.639	30.311	29.026	1.285	28.4	45	13	32	2.06	9	.....	.....	.....	11,838	20	74	6	6	73	15	16	4	3	NE.
November	29.775	30.852	29.085	1.767	20.3	42	1	41	0.78	4	.....	.....	.....	12,264	14	105	11	16	43	8	4	5	4	NE.
December	29.583	30.580	29.015	1.565	16.9	38	— 9	47	2.03	8	.....	.....	.....	14,182	2	146	14	7	37	3	2	1	5	NE.
1875.																								
January	30.029	30.799	28.875	1.924	17.1	35	—37	72	0.28	3	.....	.....	.....	15,798	20	97	16	7	40	18	9	5	5	NE.
February	29.753	30.264	29.269	.995	20.4	38	—25	63	0.09*	11	.....	.....	.....	16,344	5	115	27	15	27	3	0	1	3	NE.
March	29.954	30.703	29.058	1.645	0.6	30	—36	66	.....*	7	.....	.....	.....	18,416	32	65	29	7	21	30	19	5	9	NE.
April	30.117	30.645	29.431	1.214	12.4	39	—23	62	0.03*	2	.....	.....	.....	11,991	26	59	21	0	32	43	12	8	9	NE.
May	29.694	30.289	29.227	1.062	30.5	42	15	27	0.31	7	.....	.....	.....	13,797	49	77	6	0	15	38	21	9	2	NE.
June	29.815	30.368	29.382	.986	44.8	64	29	35	0.67	6	.....	.....	.....	13,397	28	76	18	20	21	27	14	5	1	NE.
July	29.924	30.312	29.645	.667	55.4	70	39	31	1.45	9	.....	.....	.....	14,433	69	43	13	9	33	23	10	8	8	N.
August	29.717	30.112	29.301	.811	50.7	64	28	26	2.21	14	.....	.....	.....	14,827	31	21	22	8	44	55	17	11	8	SW.
September	29.719	30.289	29.404	.885	45.5	56	30	20	2.00	11	.....	.....	.....	12,503	10	48	19	32	24	54	18	2	3	NE.
October	29.694	30.583	28.862	1.721	35.4	54	17	37	0.22	7	.....	.....	.....	16,511	20	125	35	7	18	4	2	1	5	NE.
November	30.281	30.998	29.399	1.599	8.0	24	—17	41	0.20	3	12	10	7	7,950	14	73	16	3	19	41	8	1	30	NE.
December	29.966	30.463	29.011	1.452	— 0.7	29	—32	61	0.57	2	14	8	9	9,568	29	43	10	3	29	65	8	4	26	SW.
1876.																								
January	29.814	30.582	29.018	1.564	+ 8.9	34	—28	62	0.33	5	15	10	6	16,298	24	48	23	10	69	24	2	0	17	S.
February	30.207	30.689	29.341	1.348	— 9.3	17	—40	57	.....*	1	6	3	20	7,156	38	73	1	2	11	2	0	1	75	Calm.
March	30.145	30.598	29.358	1.240	+ 7.05	34	—28.5	62.5	.....*	7	15	8	8	11,396	67	30	27	1	19	30	3	2	38	NE.
April	29.899	30.366	29.335	1.031	15.7	41	—17	58	1.58	7	13	9	8	8,477	16	86	13	9	19	45	3	4	15	N.
May	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	NE.
June	29.763	30.009	29.419	0.590	47.4	67	32	35	1.46	6	19	10	1	.....	52	28	10	8	14	47	10	11	5	W.

* Snow drifted too much to measure.

July, 1874.—Light thunder, 24th, (the first since May 14th,) from a cloud in the southwest; no lightning seen.

August, 1874.—Light gales, 5th, 7th, and 21st. Hail fell briskly for three or four minutes, 22d.

September, 1874.—Light gale, 28th; light snow, 27th. A very light frost, the first or the season, was seen on the morning of the 14th, and a somewhat heavier frost on the following morning. An aurora, with three arches, was observed on the 10th, and a similar one on the 12th, the latter exhibiting a greenish-yellow appearance.

October, 1874.—Gales on the 17th, 21st, 22d, 23d, 24th, 25th, and 27th. Immeasurable snow fell on the 2d, 3d, 8th, 12th, 13th, 14th, 15th, 16th, 19th, and 20th; measurable snow, 18th, 29th, and 30th. Aurora on the 4th, with three well-defined arches.

November, 1874.—Gales, 7th, 8th, 10th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 21st, 23d, and 24th; hurricane, 9th; measurable snow, 4th, 6th, 7th, and 18th; immeasurable, 11th; bay froze over, uniting the floating ice, on the 6th, but broke up under the influence of southwest winds, 17th, when the snow-bed also disappeared; pale diffuse auroras, 10th, 23d, 29th, and 30th; parhelion, 7th.

December, 1874.—Gales, 5th, 6th, 8th, 9th, 14th, 19th, 23d, 25th, 26th, 28th; storm velocity, 15th, 31st; hurricanes, 24th, 27th; measurable snow, 2d, 7th, 20th, 22d, 23d, 25th, 26th, and rain, 24th; immeasurable snow, 3d, 16th, 19th, 21st, 25th, 28th; heavy frost-work, 1st, 21st; solar halos, 4th, 17th; lunar halos, 16th, 20th; faint auroras, 6th, 7th, 8th, 31st; magnificent auroras of five splendid arches, 14th, remaining until 4 a. m. 15th, and re-appearing in same position on the evening of the 15th, and continuing until the morning of the 16th.

January, 1875.—Gales, 1st, 2d, 3d, 9th, 11th, 28th, 29th, 30th, 31st; storm velocity, 25th, 26th, 27th; measurable snow, 9th, 25th, and rain, 11th; immeasurable snow, 3d, 18th, 29th and rain, 10th, 27th; dense fog of snow spiculæ, with frost-work, 17th, 18th; very low barometer, 25th; coldest day, 24th; solar halos, &c., 19th, 21st, 23d; rainbow, 10th; auroras, faint, 1st, 2d.

February, 1875.—Gales, 1st, 2d, 3d, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 12th, 14th, 15th, 17th, 19th, 20th, 21st, 22d, 23d, 25th, and 26th; measurable snow, 1st and 10th, also with rain and sleet on the latter date; immeasurable snow, 2d, 16th, 19th, 20th, 21st, 22d, 24th, and 25th; lunar halos, 14th, 16th, and 17th; heavy frost deposit, 19th; warm and spring-like, 13th; mirage, 28th; auroras, faint, 6th, 27th, and 28th; three light arches, 26th.

March, 1875.—Gales on the 1st, 2d, 3d, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 12th, 14th, 15th, 16th, 17th, 19th, 20th, 21st, 22d, 23d, 25th, and 26th; inappreciable snow on the 2d, 16th, 19th, 20th, 21st, 22d, 24th, and 25th; appreciable snow, 1st and 10th; rain and sleet, 10th; heavy frost-work, 19th; lunar halos, 14th, 16th, and 17th; mirage, 28th; auroras, 6th, 27th, 28th, and 29th, (three bright arches.)

April, 1875.—Gales on the 5th, 13th, 26th, 27th, 28th, and 30th; storm, 4th; hurricane on the 1st, 2d, and 3d, (hourly velocities, 81, 86, and 85 respectively:) inappreciable snow, 12th, 13th, 17th, 24th, 25th, and 27th; heavy snow, 4th and 5th; fog and frost-work, 18th; solar halos, 12th and 26th; auroras, 6th, 7th, and 8th; first arrival of migratory birds, 29th; swans flying past on the 29th.

May, 1875.—Gales on the 1st, 2d, 3d, 4th, 14th, 21st, 29th, 30th, and 31st; snow fell on 7th, 17th, 18th, 19th, 21st, and 24th; solar halos, 4th and 5th; radish, lettuce, and turnip seed sown in open ground on the 23d; ducks, geese, swans, gulls, and sparrows arrive between the 9th and 16th; several species of snipe and duck and one species of blackbird arrive between 22d and 29th.

June, 1875.—Gales, 2d, 4th, 13th, 17th, 18th, 20th, and 28th; highest temperature, 64°, on the 2d; grass shows signs of life on the 3d; a few flowers in bloom, 5th; two vessels arrive 14th, but ice prevents their approach to shore until the 20th; solar halos, 1st; mirage, 18th; light thunder-showers, 15th.

July, 1875.—Gales on the 10th, 13th, 14th, 18th, 20th, 26th, 27th, 30th, and 31st. The maximum temperature of the summer (70°) occurred on the 27th and 28th, being five days later than the maximum for the summer of 1874.

August, 1875.—Gales on the 3d, 4th, 7th, 11th, 12th, 27th, and 29th; storms, 3d, 12th, and 27th; hurricane on the 28th, hourly velocity of 81 miles. Much less rain falls at this station than on a range of hills about 30 miles to the south and southeast.

September, 1875.—Gales on the 1st, 5th, 6th, 7th, 8th, 10th, 14th, 17th, 23d, 24th, and 27th. Pale aurora on the 3d.

October, 1875.—Gales on the 8th, 9th, 13th, 17th, 29th, and 30th; storm on the 7th; snow on hill-tops, 8th and 9th; snow and sleet, 17th; inappreciable snow, 27th, 29th, and 30th; hard freeze, 9th; brilliant meteor in the southeast on the 11th; gulls flying south, 28th; auroras on the 4th, 5th, (three arches,) 7th, and 24th.

November, 1875.—Gales on the 1st, 4th, 9th, and 22d; broken ice in the bay, 1st; heavy frost-work, 16th, 17th, and 18th; solar halo, 19th; lunar halo, 13th; highest barometer, (30.99,) on the 13th; auroras on the 1st, 2d, 3d, 5th, 26th, 29th, and 30th.

December, 1875.—Gales on the 3d, 21st, 22d, 24th, 25th, 27th, and 28th; storm, 20th; inappreciable snow on the 3d and 5th; appreciable on the 20th, 21st, and 25th;

mirage, 4th and 31st; parhelia and paraselene in the drifting snow, 9th and 10th; in the sky, 2d; auroras, 1st, 2d, 3d, 17th, 18th, 19th, 29th, 30th, and 31st; ice cleared out of harbor on the 7th.

January, 1876.—Gales on the 3d, 4th, 5th, 6th, 9th, 11th, 15th, 16th, 17th, 18th, 19th, 20th, 23d, 24th, 25th, 26th, 27th, and 31st; storms on the 7th, 22d, and 25th; inappreciable snow on the 4th and 6th; appreciable, 8th, 13th, 14th, 15th, and 19th; frost-work, 9th; mirage, 1st and 2d; parhelia and lunar fog-bow, 10th; auroras on the 22d, 24th, 27th, 28th, 29th, and 30th; ice driven out of harbor, 6th, 7th, 17th, 18th.

February, 1876.—Gales on the 8th, 9th, 12th, 13th, 24th, and 25th; appreciable snow-fall on the 24th, but drifted so as to prevent measurement; dense fog and frost-work on the 22d; parhelia, 21st, 23d, and 26th; coldest day for ten years, —27°, on the 27th; auroras on the 2d and 12th. Traders from the Yukon Valley and other points of the Territory report the past as an unusually cold winter, with very little snow. At Nulato, Anvik, and Tanana the depth is 2 feet as compared with a normal depth of 8 feet.

March, 1876.—Gales 2d, 4th, 6th, 8th, 17th, and 19th; hurricane, 7th; inappreciable snow or sleet, 7th, 8th, 9th, and 14th; appreciable, 12th and 21st, but drifted so as to prevent measurement; frost-work on the 10th; lunar halo, 3d; mirage, 30th; auroras, 25th, 26th, 27th, and 28th.

April, 1876.—Gales, 5th, 10th, and 22d; inappreciable snow on the 5th, 13th, and 22d; appreciable, 3d, 14th, 15th, 23d, 24th, 25th, and 26th; frost-work on the 1st; parhelia, 17th and 27th; mirage, 7th and 8th; red-pole linnets, (*Ægiothus linnaeus*,) snow-bunting, (*Plectrophanes nivalis*.) seen and partridges plentiful on the 21st; Golrova River reported much swollen by melting snow on the 22d; wild geese and chickadee (*Parus atricapillus*) seen on the 26th. Traders from a distance report not so much snow as at St. Michael's, where 14.5 inches, equal 1.58 of water, fell from the 23d to the 26th; geese and ducks reported abundant in the Kus Koguin Valley; on the 25th, the observer noted a temperature of +40° during the snow-fall, and adds that a temperature of +29° had been observed by him during a rain-fall.

May, 1876.—Gale on the 3d. Low barometer 2d, 29.16, with temperature —20°; barometer 28.74 on the 13th; light snow, 2.7; ice commenced moving out of bay on the 25th; many migratory birds arrived and the snow disappearing rapidly on the 29th. Observer was disabled by a severe wound on the 10th, from which time until the 9th of June the record is incomplete. No preceptible tide from May, 1875, to May, 1876. Geese and ducks reported in the Yukon Valley, with warm, spring-like weather, on the 4th.

June, 1876.—Gales on the 9th, 13th, and 30th. Fog, (sometimes very dense,) 11th, 12th, 13th, 16th, 18th, 21st, and 24th. Ice in bay melting fast, 10th; returned, completely blocking harbor, 11th; nearly all melted, 19th; last seen in bay, 22d. Two *Delphinidæ*, which are rarely seen here, observed on the 12th. Several white whales appeared on the 17th, probably in pursuit of herrings. Heavy thunder-showers on the 27th and 30th; just previous to the shower of the 29th, the temperature rose to 75°, 50° above the maximum for the previous summer. High tide, 15th; mosquitoes so bad for several days as not to allow any one to be out of doors with comfort, 30th. Considering the extreme lateness of the season, the garden looks very promising, 20th.

Notes on gardening at Fort Saint Michael's.—As I am fond of gardening, I will give a short description of vegetables raised successfully at this place by myself, including lettuce, cabbages, onions, (from sets,) radishes, mustard, beets, turnips, and spinach. All of these grew well, and, with better attention, could be made to form a valuable addition to our table. I have seen it stated in a book, recently published about this country, that the raising of such things comes under the head of mere possibilities; but such is not the fact, as all of these, and possibly others, could be raised with the same care which they demand in warmer latitudes. During the fall of 1875, I had heads of cabbages that were the wonder of all who saw them, as they were as large as medium-sized muskmelons, firm, and very sweet. The Russians declared that these were the first that had ever, to their knowledge, been raised in this country. The Russians had tried several times, but without success. The turnips were undoubtedly the finest flavored that I ever ate, and the same may be said of the other varieties mentioned.

SMITHVILLE, NORTH CAROLINA.

[*Official number*, 133.]

Latitude	33° 55′
Longitude	78° 1′

This station was established September 27, 1875, on the completion of the sea-coast line from Wilmington to this point, with Sergeant B. C. Anderson in charge. On January 5, 1876, he was provided with an assistant, as the repair of the telegraph-line, added to other station duties,

was more than one man could properly attend to. The office is in the second story of a building on Front street, and is well located. The roof-instruments have a good exposure. The instrument-shelter projects from a window facing the north, on the third floor.

Twenty-two cautionary signals have been displayed, of which number thirteen are reported as justified, and nine as not justified, at the station.

The sergeant makes the following remarks in reference to some of these displays:

December 7, 1875.—Signal justified outside, as a very high sea was created.

February 1 *and* 2, 1876.—The most severe storm since the station was established. One steamer, bound out, remained in port during the display, and only moved out when the signal was lowered.

March 28 *and* 29, 1876.—The steamer J. D. Toley remained in port until after signal was lowered.

May 22 *to* 24, 1876.—Signal very timely. Vessels remained in harbor; quite a severe storm.

* * * * * * *

The most severe storm to vessels was the one that occurred December 7, 1875, and for which cautionary signal was ordered. Although the wind did not attain a velocity of twenty-five miles per hour, still it was reported to me by pilots that it was very severe outside. Steamer Regulator, which went out, had to return to this harbor. German brig Emma, just arrived from Antwerp, ran ashore here, and the tug-boat Wacaman, which went to her rescue, became unmanageable, on account of heavy sea and wind, and shared the same fate as the brig. The display of cautionary signals at this station is mostly useful to vessels bound out, nearly all of which stop here several days, and sometimes weeks, before they venture out, waiting for favorable wind, &c.

The repair-section of this station extends to Wilmington, a distance, by the telegraph-line, of thirty-four miles.

The station was inspected in March, 1876, and found in good condition.

SQUAN BEACH, N. J.

[*Official number*, 114.]

Latitude	40°	8′
Longitude	74°	1′

Discontinued, February 26, 1876.

Sergeant D. M. Kennedy was in charge until September 21, 1875, when he was succeeded by Sergeant E. F. Brady, who remained until the station was abandoned. No change of assistants was made during that time.

Thirty-four cautionary signals were ordered, of which number twenty-six are reported as justified, and eight not justified, at the station.

The following disasters were reported from this station over the sea-coast line:

September 10, 1875.—Schooner Fuchsia, from Norfolk, Va., for New York, with sweet-potatoes, drifted down beach dismasted, struck about eight miles north at 4 p. m. One passenger taken off; crew remained on board; sea, east and heavy.

* * * * * *

September 19, 1875.—Three-masted schooner in distress ten miles south of Squan Inlet; anchored and dragging toward shore; sails and some spars gone; sea breaking over her.

November 8, 1875.—The schooner Cora, bound for New York from Little Egg Harbor, laden with hoop-poles, sprung a leak at 4 p. m., and was driven ashore at about 8 a. m. opposite Station No. 11. Surf-boat launched 9 a. m., reaching wreck 9 o'clock and 5 minutes a. m., and returned from wreck at 9.30 a. m. Number of lives saved, five; names, Capt. J. McKeen, Mate S. McKeen, Sailors John Keywood, Jesse Williams, and William Adams. The vessel is a total wreck, and is rapidly going to pieces.

THATCHER'S ISLAND, MASS.

[*Official number*, 99.]

Latitude	42° 36′
Longitude	70° 34′

Corporal E. Davis remains in charge, and has given satisfaction by the faithful manner in which he has attended to the station duties alone.

Forty-one cautionary signals have been ordered, of which number thirty-three are reported as justified and eight as not justified at the station.

The observer makes the following remarks in reference to some of these displays:

September 10 *and* 11, 1875.—About forty vessels, fishermen and coasters, were in sight when signal was hoisted, but they all made for harbor before the storm commenced.

October 15 *to* 17, 1875.—Six fishing-vessels, coming out of Rockport on the morning of the 15th instant, seeing the signal flying, put back to port.

November 23 *and* 24, 1875.—Ten fishing-vessels put for harbor when the signal was hoisted, and one stone-sloop, from Rockport to Boston, had just got to the island, when she put back to Rockport.

March 20 *to* 22, 1876.—One hundred and sixteen vessels in sight when the signal was hoisted this day; they all put for sea or harbor. At dark not more than six in sight, and they were making for harbor. A very heavy sea, very many disasters, but not one within 40 miles of this station.

March 28 *to* 30, 1876.—Forty-three vessels in sight when the signal was hoisted; they all put to sea or for the harbor. Four vessels coming out of Rockport and Pigeon Cove after the signal was hoisted, saw it and put back, and remained until it was lowered.

April 25, 26, *and* 27, 1876.—Twenty vessels in sight when signal was hoisted; they all put for harbor. No further results known.

An instrument-shelter was put up in November, and on December 26, 1875, the observer began making observations, and has continued them regularly since that date.

The station has not been inspected, nor has any change been made in the building, but it is proposed to add another room to the latter before the arrival of winter.

The following extracts are made from the reports of the observer:

Mr. Henry Webb, shore fisherman, says the cautionary signal has been a benefit of at least $500 to him since last spring. As a general thing, all vessels put for harbor when the signal is hoisted. It is also a great benefit to the Rockport and Pigeon Cove Granite Companies. They load about twelve vessels daily, but they never leave Rockport when the signal is up. Sometimes, when they do come out and get as far as the island, if I hoist signal, they put back for Rockport until it is lowered, or run into Gloucester harbor. The signal is the greatest benefit to the hundreds of coasters that are passing station all the time, as they invariably make for harbor if they see signal up, but as soon as it is lowered they are out and on their way again; consequently, the very class of vessels that it is the greatest benefit to we can never hear from.

TOLEDO, OHIO.

[*Official number*, 35.]

Latitude	41° 40′
Longitude	83° 32′
Mean barometer for the year ending June 30, 1876	29.963
Mean temperature for the year ending June 30, 1876	50°.6
Amount of rain-fall for the year ending June 30, 1876	31.84 inches.

Sergeant J. E. Cook was relieved for discharge November 29, 1875, and succeeded by Sergeant O. S. M. Cone, who still remains, and has one assistant.

During the year three men have been transferred to duty elsewhere, and one relieved for misconduct.

Thirty-three cautionary signals have been ordered, of which number

nineteen are reported as fully justified, eight as partly justified, and six as not justified at the station.

The station was inspected in May, 1876, and found in good condition.

The sergeant reports that navigation was virtually suspended December 2, although the bay and river were free from ice until the close of that month.

Navigation opened in the river March 8, 1876, and a schooner arrived in port from the lake fisheries.

The first vessel arriving from other ports was the steam-barge Addie E. Allen, April 4, 1876, in ballast.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	3,899
Maps issued during the year ending June 30, 1876	1,115
Forms 22 issued during the year ending June 30, 1876	99
Total	5,113

TYBEE ISLAND, GEORGIA.

[*Official number*, 121.]

Latitude	32° 00′
Longitude	80° 52′
Mean barometer for the year ending June 30, 1876	30.094
Mean temperature for the year ending June 30, 1876	66°.1
Amount of rain-fall for the year ending June 30, 1876	47.22 inches.

Sergeant Hugh R. Stockman was in charge until March 14, 1876, when he was transferred to Savannah, and succeeded by Sergeant W. S. Popple, who still remains.

Nine cautionary signals have been displayed, of which number six are reported as justified and three as not justified at the station.

The station was inspected in May, 1876, and found in good condition. The local reports are telegraphed to Savannah regularly, for the information of the merchants.

VICKSBURG, MISSISSIPPI.

[*Official number*, 61.]

Latitude	32° 23′
Longitude	90° 54′
Mean barometer for the year ending June 30, 1876	30.118
Mean temperature for the year ending June 30, 1876	66°.5
Amount of rain-fall for the year ending June 30, 1876	65.31 inches.

Sergeant John Dascomb remains in charge, and since October 2, 1875, has performed all the station duties without assistance. No change has been made in the location of office during the year, nor is any considered necessary at present.

The station was inspected in January, 1876, and found in good condition.

To correct an evident error in former elevation, on January 12, 1876, Messrs. Pierce and Wood, civil engineers, ran a line of levels from high-water mark of 1858, to cistern of barometer in the office, and found the elevation to be $14\frac{367}{1000}$ feet above said mark.

The following extracts are made from the reports of the sergeant:

A large weather-map is now displayed at the Cotton Exchange in this city, and the reports received from stations in the cotton-growing regions are very favorably received by brokers and others engaged in the cotton traffic.

A lively interest is manifested by river-men, shippers, and planters, and especially is this interest manifested during high water, when the knowledge of what the river is doing above is of the greatest importance.

The bulletins are posted in good locations, and receive the attention of the intelligent citizens, who manifest an increasing interest in our reports.

High water in the river at this point occurred May 10–14, 1876, when the gauge-reading was 44 feet and 10 inches above the bench-mark, and low water November 13, 1875, when it was 8 feet above bench.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during year ending June 30, 1876	6,442
Forms 22, (manifold,) issued during the year ending June 30, 1876	50
Forms 26 issued during the year ending June 30, 1876	1,949
Total	8,441

VIRGINIA CITY, MONTANA TERRITORY.

[*Official number*, 77.]

Latitude	45° 20′
Longitude	112° 03′
Mean barometer for the year ending June 30, 1876	29.695
Mean temperature for the year ending June 30, 1876	41°.3
Amount of rain-fall for the year ending June 30, 1876	18.07 inches.

Sergeant R. B. Watkins remains in charge, and has been without assistance during the year.

No change has been made in the location of the office, nor has the station been inspected since the date of last report.

The local observations have been regularly published in the Montanian, a weekly journal.

Telegraphic communication has been frequently interrupted, but no break has occurred in the mail-reports.

WASHINGTON, D. C.

[*Official number*, 19.]

Latitude	38° 53′
Longitude	77° 1′
Mean barometer for the year ending June 30, 1876	30.064
Mean temperature for the year ending June 30, 1876	54°.5
Amount of rain-fall for the year ending June 30, 1876	48.01 inches.

Sergeant Theodore Mosher remains in immediate charge of the station, and has performed his duties promptly, faithfully, and zealously, as in previous years.

Sergeants T. B. Jennings and E. B. Robbins continue in charge of the night-relief, and Sergeant J. B. Newlin of the correspondence in the station division.

All the men have been steady, prompt, and faithful in the discharge of their duties. Sergeant Hirst was relieved from the charge of the printing-room August 10, 1875, and his successor, Sergeant F. W. Conrad, April 3, 1876. Since the latter date, Corporal B. C. Wright has been in charge and attended faithfully to his duties. Sergeant P. F. Nagle was in charge of the lithograph-room until February 1, 1876, when he was succeeded by Corporal Simon Farrell, who has worked hard to fit himself for the duty. Mr. James A. Swift continues in charge of the telegraph-room, and is entitled to special commendation.

NUMBER OF STATION PUBLICATIONS.

Farmers' bulletins issued during the year ending June 30, 1876	179,599
Bulletins (manifold) issued during the year ending June 30, 1876	14,235
Maps issued during the year ending June 30, 1876	134,345
Weekly chronicles issued during the year ending June 30, 1876	20,443
Forms 15 (manifold) issued during the year ending June 30, 1876	13,465
Forms 22 issued during the year ending June 30, 1876	140
Monthly weather-reviews issued during the year ending June 30, 1876	14,049
International bulletins issued during the year ending June 30, 1876	91,033
Total	467,309

WILMINGTON, NORTH CAROLINA.

[*Official number*, 20.]

Latitude	34° 11′
Longitude	78° 10′
Mean barometer for the year ending June 30, 1876	30.092
Mean temperature for the year ending June 30, 1876	63°.1
Amount of rain-fall for the year ending June 30, 1876	45.92 inches.

Sergeant Robert Seyboth remains in charge, and has given satisfaction by the promptness and regularity with which he has forwarded all reports. Since October 5, 1875, only one assistant has been allowed the station.

Twenty-two cautionary signals have been displayed, of which number 10 are reported as fully and 2 as partly justified and 10 as not justified at the station.

Since the establishment of the Smithville station the display of signals at this point has become of less value than formerly to the larger class of vessels, but continues to be of importance to the small coasting-schooners which go to sea through New Inlet, several miles above Smithville. The sergeant reports that none of this class of vessels will venture to sea while the signal is flying.

The following extracts are made from the reports of the sergeant:

Of the many advantages derived from the service, I may mention one class as having come under my immediate observation, namely, the pecuniary benefit derived by captains and owners from a knowledge of the probable direction of the wind for some hours to come. If the wind be favorable and likely to remain so, or if expected to veer from an unfavorable direction, vessels will sail up or down the river instead of employing tug-boats at considerable expense; while, on the other hand, tug-boats will proceed in search of vessels when the indications are unfavorable for sailing, such knowledge being thus advantageous to both vessels and tugs.

I have heard of no instance where a vessel went to sea from this port during display of signals. Since the establishment of cautionary-signal station at Smithville, N. C., the important point has been gained that vessels, after leaving here for the mouth of the river, derive the benefit of signals displayed here hours after their departure and before proceeding toward the dangerous shoals beyond Cape Fear. The telegraph-line to Smithville was commenced September 20 and completed October 2, 1875, since which time no material interruption has taken place. The building of this line and its extension to Cape Hatteras has made this part of the service immensely popular here, the line supplying a long-felt want. Although but a few months in existence, the use of the line in marine disasters has more than once been demonstrated. I refer to the grounding of the German bark Emma, the steamer Waccamaw, and the British brig Brothers, near Smithville, when prompt assistance was sent from this port and the vessels gotten off without material damage.

By the completion of the coast telegraph line to this point March 14, 1876, the office was put in direct communication with the Central Office and with the several life-saving stations along the coast. Owing to a break in the line, which occurred soon after its completion, the full benefits of the service have not as yet been realized at the station. The line

will be repaired as soon as the appropriation for the next fiscal year becomes available.

The station was inspected in March, 1876, and found in excellent condition. No change has been made in location of office during the year.

NUMBER OF STATION PUBLICATIONS.

Bulletins issued during the year ending June 30, 1876	4,755
Maps issued during the year ending June 30, 1876	2,548
Local reports issued during the year ending June 30, 1876	142
Forms 22 issued during the year ending June 30, 1876	51
Total	7,496

WOOD'S HOLL, MASSACHUSETTS.

[*Official number*, 60.]

Latitude	41° 33′
Longitude	70° 40′
Mean barometer for the year ending June 30, 1876	30.019
Mean temperature for the year ending June 30, 1876	48°.9
Amount of rain-fall for the year ending June 30, 1876	40.59 inches.

Sergeant J. K. P. Purdum remains in charge. An assistant was furnished him from November 2, 1875, to March 28, 1876, when his health was sufficiently restored to enable him to attend to the duties alone.

Forty-seven cautionary signals have been ordered, of which number thirty are reported as justified and seventeen as not justified at the station.

The following remarks are made by the sergeant in reference to some of these displays:

September 30 *and October* 1, 1875.—Although the velocity of the wind was not great, the signal was justified, on account of thick weather. Some vessels took warning and anchored in Vineyard Haven Harbor.

October 6 *and* 7, 1875.—Six large vessels took warning by the signal and anchored off Nobsque light-house, while hundreds made for Vineyard Haven Harbor.

October 16 *and* 17, 1875.—A large fleet of vessels sought the harbor on the display of the signal.

November 17 *and* 18, 1875.—The storm very severe. The warning heeded by a large fleet of vessels, which took refuge in the harbor as soon as signal was hoisted. Vessels going through the sound obey the signal quickly. Thousands of vessels pass through the sound daily, and there is not one out of ten that will pass the signal unheeded.

November 23 *and* 24, 1875.—Several vessels took warning and escaped the gale.

March 20 *to* 22, 1876.—A large fleet of vessels took warning and sought shelter.

March 24 *to* 26, 1876.—Ample warning was given, and vessels dropped both anchors and prepared to ride out the gale.

May 1 *and* 2, 1876.—Signal of much benefit, as very many vessels took warning and escaped the weight of the gale.

The station has not been inspected, nor has any change been made in location of office, since the date of last report.

The flag-staff on Nobsque Point, from which cautionary signals are displayed, was moved in April to the bell-tower, which gives the signal a greater elevation. The staff is in front of the light-house, and about 100 feet from it.

WYTHEVILLE, VIRGINIA.

[*Official number*, 91.]

Latitude	36°.56′
Longitude	81°.0′
Mean barometer for the year ending June 30, 1876	29.858
Mean temperature for the year ending June 30, 1876	51°.9
Amount of rain-fall for the year ending June 30, 1876	40.31 inches.

Sergeant F. Z. Gosewisch was relieved on account of ill-health May 8, 1876, and succeeded by Sergeant J. Craig, who still remains.

The work of the station has been well done by both men. It has not been inspected during the year. The room adjoining office was occupied October 4, 1875, and the barometer moved into it without making any change of elevation.

YANKTON, D. T.

[*Official number*, 95.]

Latitude	42°. 45′
Longitude	97°, 30′
Mean barometer for the year ending June 30, 1876	29.993
Mean temperature for the year ending June 30, 1876	44°.6
Amount of rain-fall for the year ending June 30, 1876	27.17 inches.

Sergeant C. A. Shaw has been in charge throughout the year, with the exception of the month of September, 1875, during which he was absent for the purpose of re-enlisting, and the station-duties were performed by Private James A. Barwick, sent from the Saint Paul station to attend to them.

The station has not been inspected since date of last report.

The erection of a building, adjoining the office, so sheltered the anomemeter that it was found necessary to raise it about 15 feet. This was done by means of a wooden staff, until the receipt of a standard telescopic rod.

No change of location in office has been made.

High water in the Missouri, at this point, occurred April 13, 1876, and low water November 7, 1875, when the gauge-readings were 13 feet 9 inches and 5 feet 8 inches, respectively.

RECAPITULATION.

Number of sergeants on station June 30, 1876	103
Number of corporals on station June 30, 1876	9
Number of privates on station June 30, 1876	94
Total	206

Of this number, five sergeants, one corporal, and four privates are on duty in the central office.

The aggregate last year was two hundred and forty-five men, making the reduction in station-force during the year thirty-nine men.

PUBLICATIONS.

[*Year ending June* 30, 1876.]

Maps, (printed)	385, 246
Maps, (manifold)	34, 711
Farmers' bulletins	2, 480, 023
Bulletins, (manifold)	314, 393
River bulletins, (Forms 26)	50, 626
Forms 15, (manifold)	71, 012
Form 22	5, 966
Local reports	41, 928
Weekly weather chronicles	20, 443
Monthly weather reviews	14, 049
International bulletins	91, 093
Total	3, 509. 430

TELEGRAPHIC STATIONS.

Each station opened on the telegraph-lines in charge of this office in Texas, California, Arizona, New Mexico, and the Indian Territory is required to make at least one meteorological observation each afternoon, and report it by telegraph to the Central Office. All of the stations are not yet fully equipped with instruments, but it is proposed to supply them as rapidly as practicable.

Those without instruments report the state of weather and direction of wind, getting the latter from some local vane. The reports from the Texas line are collected at Denison, and sent to Saint Louis for transfer to the Central Office with the regular afternoon report of that station. The California and Arizona reports are similarly transferred at San Diego, and the New Mexican ones at Santa Fé. The officers in charge of the several lines have immediate charge of this work, and attend to its details under instructions from the Central Office.

The following table shows the stations from which reports have been received, the date at which they were commenced, and when stopped, the date of discontinuance, with the kind of report sent, whether complete or partial:

Name of station.	Reports commenced.	Reports discontinued.	Kind of report sent.
TEXAS LINE.			
San Antonio	Jan. 20, 1876		Complete report.
Boerne	May 9, 1876		Weather, direction and velocity of wind.
Brackettsville	May 2, 1876		Temperature, weather and wind.
Brownsville	Sept. 14, 1875		Complete report.
Castroville	Jan. 22, 1876		Weather only.
Cambridge	Jan. 22, 1876		Weather, direction and velocity of wind.
Colorado	Jan. 22, 1876		Weather, direction and velocity of wind.
Comfort	May 9, 1876		Weather, direction and velocity of wind.
Concho	Oct. 20, 1875		Weather, direction and velocity of wind.
Decatur	Jan. 22, 1876		Weather, direction and velocity of wind.
Denison	Sept. 1, 1875		Complete report.
Eagle Pass	Nov. 26, 1875		Weather, direction and velocity of wind.
Edinburgh	Jan. 24, 1876		Weather, direction and velocity of wind.
Fredericksburgh	Mar. 22, 1876		Temperature, humidity, rain, and weather, direction of wind and clouds.
Griffin	Jan. 22, 1876		Weather, direction and velocity of wind.
Jacksboro	Sept. 12, 1875		Complete report.
Laredo	Jan. 24, 1876		Weather, direction and velocity of wind.
Mason	Feb. 8, 1876		Thermometer, humidity, direction, and velocity of wind and weathr.
McKavitt	Jan. 22, 1876		Weather, direction and velocity of wind.
Pilot Point	Jan. 22, 1876		Weather, direction and velocity of wind.
Rio Grande	Sept. 15, 1875		Complete report.
Roma	Jan. 25, 1876	Mar. 7, 1876	Weather only.
Ringgold	Sept. 4, 1875	Feb. 7, 1876	Weather, direction and velocity of wind.
Sill	Sept. 9, 1875		Complete report.
Stockton	Feb. 29, 1876		Complete record, excepting barometer.
Uvalde	Jan. 22, 1876		Weather, direction and velocity of wind.
NEW MEXICO LINE.			
Fort Bayard	June 12, 1876		Thermometer, weather, direction of wind.
Fort Selden	June 12, 1876		Thermometer, weather, direction of wind.
ARIZONA LINE.			
Campo	Jan. 25, 1876		Thermometer, wind direction, clouds, and weather.
Florence	Jan. 25, 1876		Thermometer, wind direction, clouds, and weather.
Lowell	Feb. 10, 1876		Thermometer, wind direction, clouds, and weather.
Maricopa	Jan. 25, 1876		Thermometer, wind direction, clouds, and weather.
Phœnix	Jan. 28, 1876		Thermometer, wind direction, clouds, and weather.
Prescott	Sept. 21, 1875		Thermometer, wind direction, clouds, and weather.
Stanwix	Jan. 25, 1876		Thermometer, wind direction, clouds, and weather.
Tucson	Sept. 21, 1875		Complete report, except velocity.
Verde	Feb. 17, 1876		Thermometer, wind direction, clouds, and weather.
Wickenburgh	Jan. 28, 1876		Thermometer, wind direction, clouds, and weather.
Yuma	Sept. 21. 1875		Complete report, except velocity.
Grant	Feb. 28, 1876		Only one report received

The following detailed report of the Texas stations is furnished by Lieut. George S. Grimes, acting signal-officer:

DENISON.

This station was opened on December 16, 1874. Meteorological reports began September 1, 1875.

Meteorological instruments: Nine barometers, (5 unserviceable,) 1 anemometer, 1 hygrometer, 5 rain-gauges, 1 self-register, 7 thermometers, (6 unserviceable,) 3 maximum thermometers, (2 unserviceable,) and 1 minimum thermometer. Telegraphic: 1 key, 1 lightning-arrester, 2 relays, 2 sounders, and 1 switch-board.

Changes: On duty July 1, 1875, Sergeant John Laurens, chief clerk; Sergeant George S. Rowley, operator; and Private T. W. Milburn, assistant operator. Sergeant George S. Rowley was assigned to temporary duty at Jacksboro', Tex., August 31, 1875. Private T. W. Milburn was transferred to Eagle Pass, Tex., where he was assigned to duty as repairer, September 16, 1875. Private James O'Dowd reported for duty at Denison in compliance with Special Orders 164, Office of Chief Signal Officer, September 30, 1875. Sergeant John Laurens was ordered to proceed to Fort Stockton and Concho, Tex., to carry out special instructions, on October 1, 1875, and to return to Denison October 15, 1875. Private William R. Partrick was ordered to this station for assignment to duty by Special Orders 173, Office of Chief Signal Officer, dated October 12, 1875, and placed on temporary duty October 18, 1875. Private James O'Dowd was assigned to duty as operator and repairer at Roma, Tex., October 15, 1875. Private Frank King was ordered to this station for assignment to duty by Special Orders 181, Office of Chief Signal Officer, dated October 26, 1875, and was placed on temporary duty October 31, 1875. On November 11, 1875, Private William R. Partrick relieved Corporal James O'Dowd at Roma, Tex., and ordered to establish an office at that point. Private Frank King was ordered to Mason, Tex., to establish an office, December 28, 1875. Private Pembroke M. Wilson was ordered to this office for assignment to duty by Special Orders 7, Office of Chief Signal Officer, dated January 11, 1876. Private William A. Massey was assigned as meteorological observer by Special Orders 4, Office of Chief Signal Officer, dated February 12, 1876. On February 2, 1876, Private Pembroke M. Wilson was ordered to Mason, Tex., to carry out special instructions, and on the 29th to Fredericksburgh, Tex., to establish an office; Corporal James O'Dowd was ordered to this office from Roma, Tex., on March 26, 1876, to await further orders; on March 26, 1876, Sergeant John Laurens was relieved from duty at this office by Private John V. Brown, who was ordered here by Special Orders 45, Office of Chief Signal Officer, dated March 20, 1876. Private I. V. Wallace was ordered here by Special Orders 46, Office of Chief Signal Officer, March 21, 1876, and on the 29th transferred to Boerne, Tex., and assigned to duty there as repairer. On April 3, 1876, Corporal James O'Dowd was ordered to Jacksboro', Tex., to relieve Private Henry A. Rathvon, and assigned to duty as operator. Private James Brown was ordered to this office by Special Orders 52, Office of Chief Signal Officer, April 3, 1876, and assigned to duty as repairer at this point on the 10th. On April 28, 1876, Private I. V. Wallace was relieved from duty at Boerne, Tex., and assigned to duty here as clerk, and to extra duty as repairer June 17, 1876. Private James Brown was ordered to Rio Grande City, Tex., on May 2, 1876, and assigned to duty as repairer. Sergeant George S. Rowley was transferred to Jacksboro', Tex.,

May 6, 1876. Private Thomas B. Bowlus was ordered to this office from Pecos Crossing to await further orders, June 17, 1876. Sergeant John V. Brown, Privates Ignatius V. Wallace, William A. Massey, and Thomas B. Bowlus, were on duty at this station June 30, 1876.

PILOT POINT.

Opened June 18, 1875. Meteorological reports began to be sent January 1, 1876. Meteorological instruments: 1 anemometer, 1 hygrometer, 1 sounder, 1 rain-gauge. Telegraphic: 1 relay, 1 key, and 1 switch-board, all serviceable.

Changes: Private Frank Mangels was on duty at this station July 1, 1875, and remained until transferred to Fort Sill, I. T., on June 17, 1876. This change was not effected up to June 30, 1876. Private Frank Mangels remains in charge of the office June 30, 1876.

DECATUR.

Opened February 1, 1876. Meteorological reports, consisting of direction of wind and state of weather began about same date. Meteorological instruments: none. Telegraphic: 1 relay, 1 sounder, and 1 key; all serviceable.

Changes: Private H. E. Conner was ordered January 1, 1876, to establish this office and remained in charge until relieved by Private James H. Crowley, April 3, 1873. Private James H. Crowley was in charge of the office June 30, 1876.

JACKSBORO'.

Opened May 8, 1875. Meteorological reports began September 12, 1875. Meteorological instruments: 1 barometer, 1 thermometer, 1 hygrometer, 1 minimum thermometer, and 1 rain-gauge. Telegraphic: 3 relays, 2 box sounders, and 2 switch-boards, all serviceable.

Changes: Private Eugene Peters was on duty at this office July 1, 1875. On August 1, 1875, Private Charles Comlossy was ordered to this station from Fort Richardson, and assigned to duty as repairer, and continued until August 17, 1875, when he was relieved and ordered to Fort Whipple, Va. On August 31, 1875, Sergeant George S. Rowley relieved Private Eugene Peters, who was transferred to Fort Sill, I. T., relieving Private H. E. Conner, who was in turn transferred to Jacksboro', relieving Sergeant Rowley, who was ordered to return to Denison, Tex. On September 25, 1875, Private P. B. McSweeney was ordered from Houston, Tex., where he was awaiting orders, and assigned to duty as repairer. On October 1, 1875, Private Floyd Shock was transferred here from Graham City, Tex., exchanging offices with Private H. E. Conner. On October 15, 1875, Private P. B. McSweeney was relieved and ordered to Fort Whipple, Va. Corporal Charles H. Mays was transferred here from Griffin, Tenn., and assigned to duty as repairer, October 23, 1875. Private H. E. Conner, then in confinement at Fort Richardson, (Jacksboro',) was ordered to proceed to Decatur, Tex., January 3, 1876. Private H. A. Rathvon was ordered here by Special Order 28, Office Chief Signal Officer, February 15, 1876, relieving Corporal Floyd Shock, who was ordered to Fort Whipple, Va. Corporal James O'Dowd was transferred here from Denison, Tex., April 3, 1876, relieving Private H. A. Rathvon, transferred to Griffin, Tex. On May 2, 1876, Corporal James O'Dowd was transferred to Stockton, Tex. May

2, 1876, Sergeant George S. Rowley, was ordered here from Denison, Tex., and placed in charge of office. On June 25, 1876, Corporal Joseph M. Kistler was transferred to this office from Boerne, Tex., and assigned to duty as repairer.

Sergeant George S. Rowley, Corporal J. M. Kistler, and Private Charles H. Mays remain on duty at this office, June 30, 1876.

CAMBRIDGE.

Opened June 17, 1875. Meteorological reports began January 22, 1876, consisting of direction of wind and state of weather. Meteorological instruments: One rain-gauge. Telegraphic: 1 combination set, and 1 lightning-arrester, all serviceable.

Changes: Private Wm. M. Weddington has been in charge during the year and still remains.

FORT SILL, INDIAN TERRITORY.

Opened June 23, 1875. Meteorological reports began September 9, 1875. Meteorological instruments: 1 barometer, 1 anemometer, 1 hygrometer, 1 rain-gauge, 1 maximum thermometer, and 1 minimum thermometer. Telegraphic: 1 relay, 1 sounder, 1 key, and 1 lightning-arrester, all serviceable.

Changes: Private H. E. Conner was in charge of this office July 1, 1875, and remained until transferred to Jacksboro', Tex., August 31, 1875, relieving Private Eugene Peters, who was ordered to duty at this station. On June 17, 1876, Private Frank Mangels was ordered here from Pilot Point, Tex., and Private Eugene Peters to Uvalde, Tex. (This change was not effected June 30, 1876.)

Private Eugene Peters remains in charge of the office, June 30, 1876.

GRAHAM.

Opened June 16, 1876. Meteorological reports, consisting of direction of wind and state of weather, began about same date. Meteorological instruments: none. Telegraphic: 1 relay, 1 sounder, 1 key, and 1 lightning-arrester; all serviceable.

Changes: Private Floyd Shock was in charge of this station July 1, 1875, and remained until transferred to Jacksboro', Tex., October 1, 1875, exchanging stations with Private H. E. Conner, (no data of latter transfer.) A civilian, Mr. T. J. Barry, was put in charge about the time of above transfer, and still remains, June 30, 1876.

GRIFFIN.

Opened July 1, 1875. Meteorological reports began January 22, 1876, Meteorological instruments: 1 barometer, 1 anemometer, 1 hygrometer, 1 maximum thermometer, 1 minimum thermometer, and 1 rain-gauge. Telegraphic: 2 combination sets, 2 keys, and 2 lightning-arresters—all serviceable.

Changes: Private James H. Crowley was in charge July 1, 1876. Corporal Charles H. Mays was transferred here from repair party between Fort Griffin and Camp Colorado, Tex., July 23, 1875, and again transferred on October 23, 1875, to Jacksboro', Tex. Private H. A. Rathvon was ordered here from Jacksboro', Tex., relieving Private Crowley, who was ordered to Decatur, Tex., on April 3, 1876.

Private H. A. Rathvon remains in charge June 30, 1876.

CAMP COLORADO.

Opened October 19, 1875. Meteorological reports, showing direction of wind and state of weather and rain-fall, began January 22, 1876. Meteorological instruments: 1 rain-gauge. Telegraphic: 1 combination set, and 2 lightning-arresters; all serviceable.

Changes: Private Courtland R. Browder was in charge July 1, 1875. Private William M. Hawes was ordered here from repair party between Fort Griffin and Camp Colorado, Tex., and assigned to duty as repairer on July 23, 1875. Private Hawes was ordered to Fort Whipple, Va., September 27, 1875. Private John Peters was assigned here as repairer from construction party then between Fort Richardson and Griffin, Tex., June 26, 1875, and transferred to Concho, Tex., June 20, 1876.

Private Courtland R. Browder was on duty at this station June 30, 1876.

CONCHO.

Opened about October 20, 1875, (no exact data.) Meteorological reports began with date of opening. Meteorological instruments: 2 barometers, 1 anemometer, 1 hygrometer, 2 thermometers, and 2 rain-gauges. Telegraphic: 1 combination set, 2 keys, 2 sounders, 2 switch-boards, and 1 lightning-arrester; all serviceable.

Changes: Private William J. Cundall, from San Antonio, was assigned as operator August 4, 1875; Corporal James E. Cairns, from construction party, as repairer, on August 31, 1875. Corporal Cairns was ordered to Denison, Tex., for discharge on September 3, 1875. Private J. H. Ramsey was ordered to this station from Houston, Tex., as repairer, September 25, 1875. Private J. C. Rickli was transferred here from McKavett, Tex., October 23, 1875, and assigned to duty as repairer on October 27, 1875. Private J. H. Ramsey was transferred to Stockton, Tex. Private John Peters was transferred to this station from Camp Colorado, Tex., June 25, 1875. Private John C. Rickli was relieved from duty as repairer, and assigned to charge of Comfort, Tex., June 17, 1876.

Privates W. J. Cundall and John Peters remain on duty June 30, 1876.

STOCKTON.

Opened February 26, 1876. Meteorological reports began February 29, 1876. Meteorological instruments: 1 thermometer, 1 hygrometer, 1 anemometer. Telegraphic: 1 combination set, and 1 relay; all serviceable.

Changes: Private Jos. H. Ramsey was ordered as repairer at this station, October 27, 1875, and was relieved by Special Orders No. 43, Office Chief Signal-Officer, dated March 14, 1876, and ordered to Fort Whipple, Va. Corporal Jas. O'Dowd was assigned here from Jacksboro', Tex., May 2, 1876, and was in charge of office June 30, 1876.

McKAVETT.

Opened October 19, 1875. Meteorological reports began January 22, 1876, showing direction of wind and state of weather. Meteorological instruments, none. Telegraphic: 1 combination set, and 1 switch-board; all serviceable.

Changes: Private John C. Rickli was ordered here from construction party, September 25, 1875, and assigned to duty as repairer, and was

transferred to Concho, Tex., Oct. 23, 1875. Private Edwin G. Prince was assigned to this office from Denison, Tex., on September 25, 1875, and still remains, June 30, 1876.

MASON.

Opened February 7, 1876. Meteorological reports began February 8, 1876. Meteorological instruments, 1 maximum thermometer and 1 minimum thermometer. Telegraphic: 1 combination set, and 1 switch-board; all serviceable.

Changes: Private Frank King was assigned here from Denison, Tex., and still remains, June 30, 1876.

FREDERICKSBURG.

Opened March 14, 1876. Meteorological reports began on the March 22, 1876. Meteorological instruments: 1 hygrometer and 1 rain-gauge. Telegraphic: 1 combination set, 1 relay, 1 sounder, and 1 key; all serviceable.

Changes: Private Pembroke M. Wilson was ordered from Denison, Tex., to establish office at this point, February 29, 1876, and still remains, June 30, 1876.

COMFORT.

Opened May 6, 1876. Meteorological reports, showing direction of wind and state of weather, began same date. No meteorological instruments here. Telegraphic: 1 combination set, 1 cut-out and lightning-arrester; all serviceable.

Changes: Mr. G. I. Copp (civilian) was in charge of this station until relieved by Private John C. Rickli, from Concho, Tex., June 17, 1876, to take charge of the office. Private Rickli was in charge June 30, 1876.

BŒRNE.

Opened May 6, 1876. No meteorological reports or instruments at this office. Telegraphic: 1 combination set; serviceable.

Changes: Miss Annie Pollmar (civilian) is in charge. Private I. V. Wallace was assigned here as repairer March 29, 1876, and relieved from duty and ordered to Denison, Tex., April 28, 1876. Corporal J. M. Kistler was ordered here as operator June 17, 1876, relieving Miss Annie Pollmar. On June 25, 1876, Corporal Kistler was transferred to Jacksboro', Tex., and assigned to duty as repairer. Miss Annie Pollmar was in charge June 30, 1876.

SAN ANTONIO.

Opened September 22, 1875. Meteorological reports began January 20, 1876. Meteorological instruments: 1 barometer, 1 anemometer, 1 hygrometer, 1 self-register, 2 thermometers, 2 maximum themometers, 2 minimum thermometers, and 2 rain-gauges. Telegraphic: 1 relay, 1 key, 2 repeaters, 1 sounder, 1 box-sounder, 2 lightning-arresters, and 1 switch-board; all serviceable.

Changes: Mr. N. J. Petrich (civilian) has been in charge since the opening of the office. Mr. Petrich has two civilian assistants, Messrs. J. K. and E. M. Dunbar, all of whom remain on duty June 30, 1876.

CASTROVILLE.

Opened September 29, 1875. Meteorological reports began January 22, 1876. Meteorological instruments: 1 thermometer, 1 anemometer, and 1 hygrometer. Telegraphic: 1 combination set, 1 key, 1 relay, 1 sounder, and 1 switch cut-out; all serviceable.

Changes: Private Julius Gerard was assigned to this office September 11, 1875, and remains on duty June 30, 1876.

UVALDE.

Opened September 6, 1875. Meteorological reports began January 22, 1876. Meteorological instruments: 1 anemometer and 1 rain-gauge. Telegraphic: 1 relay, 1 sounder, and 1 cut-out with lightning-arrester attached; all serviceable except anemometer, which is reported out of order.

Changes: Private C. F. Ottinger was ordered here from San Antonio, where he was awaiting orders, July 10, 1875, and assigned to duty as repairer, and remained until ordered to Fort Whipple, Virginia, September 27, 1875. Private J. T. Fitzgerald was ordered to this office from San Antonio, Tex., July 23, 1875, and to Fort Whipple, Virginia, January 11, 1876, being relieved by Mr. George I. Copp, (civilian,) who was placed in charge. Private Eugene Peters was ordered here from Fort Sill, Ind. T., June 17, 1876. This change had not been effected up to June 30, 1876. Mr. G. O. Appleby remained in charge June 30, 1876.

BRACKETTVILLE.

Opened September 1, 1875. Meteorological reports began May 2, 1876. Meteorological instruments: 2 thermometers, 1 anemometer, 1 hygrometer, and 1 rain-gauge. Telegraphic: 1 sounder, 1 box-sounder, and 1 key. All serviceable.

Changes: Sergeant Isaac R. Birt in charge until relieved by Sergeant John McGlone, Special Order No. 77, Office of Chief Signal-Officer, dated May 18, 1876, and transferred to Indianola, Tex. Private J. J. Buckley was transferred to this office from Sabinal, Tex., for repair duty, and remained until transferred to Eagle Pass, Tex., April 29, 1876. Sergeant John McGlone was ordered to relieve Private W. R. Partrick at Laredo, Tex., and the latter placed in charge of this office June 15, 1876. Private Partrick was in charge June 30, 1876.

EAGLE PASS.

Opened January 19, 1875. Meteorological reports began November 26, 1875. Meteorological instruments: 2 thermometers, 1 maximum thermometer, 1 minimum thermometer, and 1 anemometer. Telegraphic: 1 combination set. All serviceable.

Changes: No record who was in charge of this station July 1, 1875. Private T. W. Milburn was assigned as operator and repairer, from Denison, Tex., September 16, 1875. Corporal J. J. Buckley was transferred to this office from Brackettville, Tex., and assigned to duty as repairer April 29, 1876. Both men remained on duty June 30, 1876.

LAREDO.

Opened December 15, 1875. Meteorological reports began January 24, 1876. Meteorological instruments: 1 thermometer, 1 hygrometer, and

1 rain-gauge. Telegraphic: 1 sounder, one key, one box-sounder, 1 combination set, and 1 lightning-arrester. All serviceable.

Changes: Corporal James O'Dowd was ordered from Roma, Tex., to open an office at this point November 11, 1875. Corporal J. M. Kistler and Private William R. Miller were ordered here from Rio Grande City, Tex., November 25, 1875, and assigned to duty as repairers. Corporal James O'Dowd was ordered to Denison, Tex., and relieved by William R. Partrick from Roma, Tex., March 20, 1876, and on June 15, 1876, Private Partrick exchanged offices with Sergeant John McGlone from Brackettville, Tex. Corporal J. M. Kistler was relieved from this office and ordered to take charge of Boerne, Tex., June 17, 1876. Sergeant John McGlone and Private William L. Miller were on duty at this station June 30, 1876.

ROMA.

Meteorological reports beginning February 2, 1876, were discontinued March 20, 1876.

Changes: Corporal James O'Dowd was ordered to this point from Denison, Tex., to establish an office, October 15, 1875; Private William R. Partrick, for the same purpose, November 11, 1875, relieving Corporal O'Dowd, who was transferred to Laredo, Tex. On March 20, 1876, Private William R. Partrick was ordered to relieve Corporal James O'Dowd at Laredo, Tex. A civilian was put in charge of the office and remained until closed. No date when closed.

RIO GRANDE CITY.

Opened May 28, 1875. Meteorological reports began September 15, 1875. Meteorological instruments: 1 barometer, 1 thermometer, and 1 rain-gauge. Telegraphic: 1 combination set, 1 relay, 1 sounder, 1 key, and 2 lightning-arresters. All serviceable.

Changes: On duty July 1, 1875, Corporal J. M. Kistler, operator, Private H. C. Wineland, operator and repairer, and Private W. L. Miller, repairer. Corporal Kistler and Private Miller were transferred to Laredo, Tex., November 8, 1875. Private James Brown was ordered to this office from Denison, Tex., May 2, 1876, and assigned to duty as repairer. Corporal H. C. Wineland and Private James Brown remained on duty June 30, 1876.

EDINBURG.

Opened September 12, 1875. Meteorological reports showing direction of wind and state of weather began January 24, 1876. Meteorological instruments: 1; rain-gauge. Telegraphic: 1 combination set. All serviceable.

Changes: Sergeant E. A. Lewis was transferred here from Brownsville, Tex., July 27, 1875. Private John H. Ramsey and Henry C. Scott, from construction party, then between Brownsville and Ringgold Barracks, Tex., were assigned to duty as repairers, August 1, 1875. Private Scott was ordered to Fort Whipple, Va., August 17, 1875. Private Ramsey was transferred to Houston, Tex., to await further orders, September 3, 1875. Sergeant Lewis was ordered to exchange offices with Corporal George Morrill, at Brownsville, Tex., January 1, 1876. (Corporal Morrill died at Brownsville January 2, 1876, before transfer was effected.) Private H. M. Wells was assigned to this office as operator and repairer, Special Order No. 7, Office Chief Signal-Officer,

dated January 11, 1876, and remained in charge of this office until ordered to Fort Whipple, Va., and was succeeded by Private Edson T. Peck, who was ordered to this station by Special Order No. 71, Office Chief Signal-Officer, May 5, 1876. Private Edson T. Peck remains in charge June 30, 1876.

BROWNSVILLE.

Opened August 29, 1875. Meteorological reports began September 14, 1875. Meteorological instruments: 1 barometer, 1 thermometer, 1 hygrometer, 1 anemometer, 1 rain-gauge, 1 maximum and 1 minimum thermometer. Telegraphic: 2 combination sets, 1 relay, 1 sounder, 1 key, and 2 lightning-arresters. All serviceable.

Changes: On duty July 1, 1875, Sergeant E. A. Lewis and Private P. B. McSweeny. Private Wm. R. Partrick was transferred to this office from Brownsville, Tex., June 15, 1875. Private McSweeny was ordered to Houston, Tex., to await further orders, September 3, 1875. Sergeant E. A. Lewis was transferred to Edinburg, Tex., July 27, 1875. Private George Morrill was ordered to this station from Denison, Tex., August 9, 1875, and Private H. C. Wineland from Rio Grande City, Tex., August 4, 1875, the latter only temporarily, and was returned to Rio Grande City as soon as Private Morrill arrived. Corporal Morrill remained until relieved by Sergeant E. A. Lewis, from Edinburg, Tex., and ordered to exchange offices with him January 1, 1876. Sergeant E. A. Lewis absent with leave, June 1, 1876. Private Wm. E. Smith was ordered to this office by Special Order No. 83, Office Chief Signal-Officer, May 29, 1876, and placed in charge of the office, and remains, June 30, 1876.

PECOS CROSSING, (repair station.)

Private Thomas B. Bowlus was ordered to this station and placed on repair-duty March 20, 1876, and remained to June 17, 1876, when the office was discontinued and Private Bowlus ordered to Denison, Tex., to await further orders.

SPECIAL RIVER STATIONS.

The following table shows the names and locations of all the special river stations under the direction of the Signal-Office from which reports have been received during the year:

	Stations.	Rivers.	Names.	Commenced reporting.
1	Freeport, Pa	Alleghany	M. H. Alter	April 17, 1873
2	Hermann, Mo	Missouri	Edward Kehr	April 24, 1873
3	Jefferson City, Mo	do	Louis C. Lohman	May 12, 1873
4	Oil City, Pa	Alleghany	W. R. Stevenson, C. E	April 20, 1873
5	Brownsville, Pa	Monongahela	J. Allen Hubbs	June 6, 1873
6	Evansville, Ind	Ohio	A. C. Pusbee	April 21, 1873
7	Confluence, Pa	Youghiogheny	M. Tannehill	April 23, 1873
8	New Geneva, Pa	Monongahela	H. T. Davenport	April 24, 1873
9	Lexington, Mo	Missouri	Z. S. Mitchell	April 28, 1873
10	Kansas City, Mo	do	W. A. M. Vaughan	April 21, 1873
11	Brunswick, Mo	do	G. D. Kennedy	May 1, 1873
12	Little Rock, Ark	Arkansas	Alfred Cohen	April 21, 1873
13	Plattsmouth, Nebr	Missouri	A. L. Child, M. D	April 20, 1873
14	Marietta, Ohio	Ohio	J. H. Best	April 19, 1873
15	Saint Joseph, Mo	Missouri	Robert Gunn	May 8, 1873
16	Warsaw, Ill	Mississippi	D. H. Cox	May 7, 1873
17	Paducah, Ky	Ohio	Captain C. Bachmann	May 1, 1873
18	Boonville, Mo	Missouri	Charles W. Hazell	April 28, 1873
19	Le Claire, Iowa	Mississippi	C. P. Disney	June 2, 1873
20	Helena, Ark	do	J. B. Miles	Feb. 25, 1874
21	Chattanooga, Tenn	Tennessee	Charles E. Stivers	Sept. 12, 1875
22	Decatur, Ala	do	F. Ludwig	Oct. 1, 1875
23	Johnsonville, Tenn	do	W. H. Johnson	Oct. 1, 1875

The three stations on the Tennessee River were added, at the earnest request of the business men of Louisville and Memphis, whose interests are largely affected by the quantity of water in this river.

The reports from Little Rock were made so irregularly as to be comparatively worthless, and a change was made in the observer April 1, 1876, since which date no failures have occurred when the telegraph line has been in working order.

No change has been made in the dates of reporting by telegraph, which are from April 1 to July 31, and from October 1 to November 30, of each year, and on Saturday of each week during the intervals.

Voluntary reports from Mr. G. W. Schneider, at Muscatine, Iowa, were received during the month of July, and were useful in connection with those from the other stations.

WEST INDIAN STATIONS.

Reports from these stations were sent by telegraph until October 31, 1875, and by mail throughout the entire year. The telegraphic communication continues imperfect, and the service consequently irregular.

Payment for the services of the observers at several of the stations was stopped April 1, 1876, owing to the want of funds applicable to such purposes. It is creditable to the observers at the stations in question that they continued to make their observations and reports, free of cost, until the close of the year, when the limited appropriation made for the next fiscal year compelled the discontinuance of reports at all of the stations, which was done by order on June 30, 1876.

The instruments remain safely stored, in readiness for work whenever resumption becomes possible.

HAVANA, CUBA.

[*Official number*, 100.]

Latitude	23° 9′ 24″
Longitude	82° 22′ 00″

The office was removed March 27, 1876, to No. 4 Compostela street, with the loss of one day's observation only.

Mr. Hasselbrink, the regular observer, was absent from July 7, 1875, until December 31, 1875, during which period the observations were taken by Mr. R. Zenos, director of the Meteorological Observatory of Havana, whose experience and skill assured the accuracy of his work.

Telegraphic reports were forwarded until November 2, 1875, and mail reports until the close of the year.

SANTIAGO DE CUBA.

[*Official number*, 3.]

Latitude	19° 55′
Longitude	75° 50′

Mr. Robert Mason continued to make and report observations throughout the year. Payment for his services was discontined April 1, 1875, but he continued to forward the reports, free of cost, until the end of June.

Telegraphic reports were forwarded until October 31, 1875.

No change was made, during the year, in the location of the office.

KINGSTON, JAMAICA.

[*Official number*, 4.]

Latitude	17° 58′
Longitude	76° 47′ 30″

Mr. James Gall made and reported observations throughout the year; reporting by telegraph until October 31, 1875, and by mail for the remainder of the year. Mr. Gall continued to act as general agent for the service in the West Indies until some difficulty occurred with the West India and Panama Telegraph Company, which rendered it advisable to supervise the stations directly from the Central Office. During the summer months the midnight observations were omitted out of regard for the observer's health.

ST. THOMAS, WEST INDIES.

[*Official number*, 102.]

Latitude	18° 20′ 24″
Longitude	64° 55′ 45″

Mr. W. S. Cameron remains the observer at this station. Telegraphic reports were made until October 31, 1875, and mail reports throughout the whole year.

Midnight observations were discontinued during the hot weather. Payment for service was stopped April 1, 1876.

POINTE-Á-PITRE, GUADELOUPE.

[*Official number*, 9.]

Latitude	16° 3′
Longitude	61° 30′

Mr. L. V. Bigard continued to act as observer during the year. Telegraphic reports were made until October 31, 1875, and mail reports to the close of the year. Payment for services was stopped April 1, 1876.

The reports from this station have been made with commendable regularity and neatness.

BARBADOES, WEST INDIES.

BRIDGETOWN.

Latitude	13° 4′ 12″
Longitude	59° 37′ 00″

Mr. E. Racker has continued to act as observer during the year. Telegraphic reports were forwarded until October 31, 1875, and mail reports until close of fiscal year.

BERMUDA ISLANDS.

SAINT GEORGE.

Latitude	32° 20′
Longitude	64° 50′

Mr. E. F. Allen has made reports throughout the year, and forwarded them by mail regularly. Payment for services was discontinued April 1, 1876, but reports were continued until the close of the fiscal year.

BRITISH AMERICAN STATIONS.

YORK FACTORY.

Latitude	57° 2′
Longitude	92° 26′

Mr. T. J. Fortescue continues to forward reports with regularity, and makes two series of observations, as in the preceding year—one synchronous with the 7.35 Washington observation, and the others at the hours of 7 a. m., 2 p. m., and 9 p. m., local time. Mr. Fortescue has paid especial attention to the subject of meteorology, and his reports are more than usually full and interesting. No reports have as yet been received from any of the other stations in British America, which were supplied with instruments in 1874, but correspondence on the subject still continues, and it is hoped that satisfactory results will eventually be obtained.

DOMINION OF CANADA.

Telegraphic reports have been regularly received during the year from the stations named below, after concentration at the central office of the Dominion meteorological system in Toronto.

CHATHAM, NEW BRUNSWICK.

Latitude	47° 1′
Longitude	65° 30′

CAPE ROZIERE, QUEBEC.

Latitude	48° 52′
Longitude	64° 21′

Reports discontinued October 20, 1875.

FATHER POINT, QUEBEC.

Latitude	48° 31′ 25″
Longitude	68° 27′ 40″

HALIFAX, NOVA SCOTIA.

Latitude	44° 39′ 20″
Longitude	63° 36′ 40″

KINGSTON, ONTARIO.

Latitude	44° 12′
Longitude	75° 41′

MONTREAL, QUEBEC.

Latitude	45° 31′
Longitude	73° 30′

OTTAWA, ONTARIO.

Latitude	45° 25′ 32″
Longitude	75° 42′ 00″

PARRY SOUND, ONTARIO.

Latitude	45° 22′ 00″
Longitude	80° 12′ 45″

QUEBEC, QUEBEC.

Latitude	46° 48′
Longitude	71° 12′

PORT DOVER, ONTARIO.

Latitude	42° 47′
Longitude	80° 13′

PORT STANLEY, ONTARIO.

Latitude	42° 40′ 00″
Longitude	81° 13′ 30″

SAUGEEN, ONTARIO.

Latitude	44° 40′
Longitude	81° 10′

SYDNEY, CAPE BRETON.

Latitude	46° 12′
Longitude	60° 12′

TORONTO, ONTARIO.

Latitude	43° 39′ 04″
Longitude	79° 23′ 15″

WINNIPEG, (FORT GARRY,) MANITOBA.

Latitude	47° 52′ 39′
Longitude	97° 08′ 39′

Reports from this station are sent direct to the Washington office, over the regular circuits.

GENERAL SUMMARY.

UNITED STATES STATIONS.

Number of stations making full telegraphic reports	92
Number of stations making observations and reporting by mail	15
Number of printing-stations at which observations are not made	3
Number of special river-stations	23
Number of stations on telegraph-lines	38
Total	171

WEST INDIAN STATIONS.

Number of stations making full telegraphic reports	6
Number of stations making full reports by mail	1
Total	7

BRITISH AMERICAN STATIONS.

Number of stations from which telegraphic reports are received	15
Number of stations from which reports are received by mail	1
Total	16

First Lieutenants H. H. C. Dunwoody, C. E. Kilbourne, and H. W. Howgate, acting signal officers, are, at the date of this report, on duty as

assistants to the Chief Signal Officer, and in charge, respectively, of the records and correspondence, srations, and the property division of this office.

The resignation of Assistant Thompson B. Maury, A. M., was accepted November 30, 1875.

A total number of 145 stations has been maintained during the year to fill the system of stations of observation from which reports are deemed necessary, or at which other action is required, to enable proper warnings to be given of the approach and force of storms, and of meteoric changes for the benefit of agricultural and commercial interests.

The average cost of maintaining each station of observation during the year, exclusive of the cost of the telegraphic service and of the pay and maintenance of the men on duty at each, has been $424.03. The average force employed at the stations referred to, or on duty as connected therewith, has amounted to one and four-tenths men for each station. In the cost of each station, as thus given, is included the cost of rent, and of maintaining a suitable office or room at each place for the public use, with facilities for the necessary exposure of instruments and for the display of cautionary signals, where such signals are required. The duties of the enlisted men at each station are as follows: At stations forwarding telegraphic reports they are required to take, put in cipher, and furnish, to be telegraphed tri-daily on each day, at different fixed times, the results of observations made at those times, and embracing, in each case, the readings of the barometer, the thermometer, the wind-velocity and direction, the rain-gauge, the relative humidity, the character, quantity, and movement of upper and lower clouds, and the condition of the weather. These observations are taken at such hours, at the different stations, as to provide the three simultaneous observations, taken daily at three fixed moments of physical time throughout the whole extent of the territory of the United States. The differences between these fixed times and the local times at the different stations causes it to happen that at some stations the observations are to be made in the earliest hours of the morning, and at others in the latest of the night. The work thus practically extends throughout the twenty-four hours. Each of these observations is required to be carefully recorded, for future reference, at the time it is taken. Three other observations to be taken at the local times, 7 a. m., 2 p. m., and 9 p. m., are also to be taken and recorded at each station. A seventh and special observation is also taken and recorded at noon on each day. If at this observation such instrumental changes are noted as to cause anxiety, the fact is to be telegraphed to the Central Office at Washington.

At the stations at which cautionary signals are displayed an observer must be constantly on duty to receive the order and to show the signal, which may be ordered at any moment. At stations from which river-reports are furnished, an observation and record of the depth and temperature of the water is made and reported at 3 o'clock p. m., local time, on each day. In the cases of threatening storms or dangerous freshets, any station may be called upon to make hourly reports.

The data thus gathered on the files at each station are to be consolidated, first weekly, on forms which, with copies of the telegraphic-cipher report, are to be sent weekly to the Central Office, then monthly, in the form of a careful digest, also to be forwarded. The thorough study of the work of the month is then to be condensed in the form of a monthly chart. None of these observations or records ought to be dispensed with, nor can they, with meteorological instruments as they now exist, be taken and recorded more economically. At stations where the popu-

lation warrants it the duties of the enlisted men are increased by the receipt and record of data from other stations, to be exhibited upon written bulletins or furnished to the press for public use.

The distribution of farmers' bulletins for the uses of agricultural populations has been frequently and is elsewhere described.

In the cities upon the sea-coasts of the United States, or at its lake ports, the offices of the service are open for the comparison of instruments, the examination of their data, or to furnish whatever information may be practicable to captains of vessels or others concerned in shipping interests. At stations upon telegraphic lines in charge of or constructed by the service in pursuance and furtherance of its duties, the ordinary duties of telegraphing and the maintenance of the lines devolve upon the force so stationed, in addition to duties of observation.

The forms exhibiting condensed, the labor thus required of Signal-Service men stationed at separate stations, are hereby submitted. Papers 32 to 39.

The enlisted men in charge of stations are responsible for the care, cleanliness, and good working of the instruments, the clearness of the records, the correctness and punctuality of reports, the display of signals or bulletins, and, in fine, for the cleanliness and good condition of the station itself. It has been considered necessary to make this description thus minute, that it might be understood what is required of them.

The sum of their pay and allowances scantily compensates for the continuous labor.

The detail of the duties and the force stationed at each is given at length in the record of stations. The meteorological statistics of the regular stations for the year are given in detail in papers 14 to 18.

In considering the duties performed in the Central Office, it must be borne in mind that they are continued day and night, without cessation for holidays or days of rest, and that they must of necessity be performed by details of men who relieve each other at fixed times. It is difficult to make a comparison between an establishment thus conducted and others in which the work is limited to certain hours of daylight alone.

This office is the center to which the daily, weekly, and monthly contributions of all other officers or stations of the Signal-Service scattered throughout the United States tend, to be finally elaborated and made of practical value. There are here concentrated, also, the reports from the six hundred and twenty-six places at which voluntary observations are now made on this continent, and from the two hundred and seventy-two places whence simultaneous reports are had in foreign countries.

From this great mass of data are continually elaborated the results which appear in the different issues and publications of the office, whether in the form of forecasts, telegraphed to the press throughout the country, of charts distributed hence, or of the weekly and monthly publications. No single report of any observation received at the Office fails to receive attention and study.

The daily exchange of telegraphic reports, had by comity of exchange with the chief meteorological office of the Dominion of Canada, has been continued. Meteorological reports furnished according to the forms of this Office have been received tri-daily from sixteen stations within the Dominion, and warnings have been regularly sent from this Office to the central office at Toronto to enable signals to be displayed at the ports of the Dominion at times of threatened danger. The relations maintained between the two services continue to be of benefit to both.

The series of daily telegraphic reports from stations in the West Indies extending from Cuba, by Jamaica, to Barbadoes and the Windward Islands, referred to in previous reports, has, in view of the small amount of appropriation available, been suspended. While the defective working of the telegraphic cable often impaired the value of these reports by delay, and it was difficult to secure the services of skilled observers, they were at times of importance for the pre-announcement of cyclones approaching the Gulf of Mexico and threatening the coasts of the United States.

The plan of the location of the different stations of observation was referred to in the last annual report of the Chief Signal Officer as follows:

"It has been so arranged that each station might, from its point of observation, give notice of meteoric changes and warn against unusual disturbances for its particular section, while all should be so placed, as in a series of lines, and in such relations each to the other, that the reports of any one and the contiguous stations received at the other stations as they pass by telegraph toward the office of the Chief Signal Officer may of themselves give notice of marked meteoric changes. The reports of all, concentrated, charted, and studied at this Office, are intended to enable the extent, movement, and course of the disturbance to be observed and defined from report to report, and to permit warnings to be issued by publications or by signals at any time for the benefit of all.

"The eastern line of observation, attempted to be maintained, reaches from the stations far southward and eastward, at Barbadoes and the Windward Islands, through the West India Islands, and along the Atlantic coasts to the northeast, at Father Point and Halifax.

"The southern line, joining that of the east at Key West, extends along the southern coasts of the United States bordering the Gulf of Mexico to the mouth of the Rio Grande and the Mexican frontier. Between this point and the southern port of San Diego upon the Pacific Ocean, the intervals not covered by telegraph lines each year diminish. The time is not far distant when the line can be extended across the continent.

"The western line reaches, on the Pacific, with far too few stations, from San Diego to Portland, Oregon. The northern line connects this station, passing over the plains by the great upper lakes, through the Dominion of Canada and the Saint Lawrence Valley, with the eastern line at Halifax.

"Within these bounding lines the territory is covered by the establishment of such stations of observation as the skill and the facilities of the office have permitted. There have been but few changes in the locations of these stations east of the Mississippi River. West of the Mississippi the lines of stations are carried steadily westward, wherever improving facilities of communication and the means at the control of the service have made the measure possible.

"In the whole list of stations there is not one but the failure of reports from which is unpleasantly felt; nor is there any limiting station but from which the student looks longingly into the unknown region beyond, with the wish that from that unknown might come the information to give his studies accuracy. Near the southern extremity of the eastern line, the experience of meteorists has located the origin of cyclones, which sometimes sweep in a single course over the whole eastern portion of the United States in the vicinity of the sea. Beyond the western extremity of the southern line, and upon the coast of the Gulf of Mexico,

there lies a region from which the sad experience of the last summer shows reports are needed to warn our ports against such storms as that which recently devastated the southwestern coasts. But little progress can be made in the study of the practical meteorology of the Pacific coast while the scant stations which now dot the Pacific line are all from which information can be had. North and west of the great lakes some of the richest territories of the United States cannot be properly forewarned of coming changes until the lines of stations can be carried farther westward. Over the whole interior west of and in the Mississippi Valley, the populations are impatient for premonitions, which must be delayed until the advancing telegraph lines have pioneered the way for stations, reports from which must be had. For the interior east of the Mississippi, and for the districts near the great lakes, reports for study cannot be too full or too numerous for the proper protection of the great agricultural and commercial interests. Experience has shown that a storm once fairly within the scope of the stations of this office, the study-charts can hardly fail to indicate, in their ceaseless sequence, the place of its existence, its extent, and something of its probable march. It is a duty to give that scope such field as will make it most effective."

It is to be hoped that the office may be again so situated as to permit the reports from the line of West India stations to be resumed. So long as this line of stations is silent, the commerce of the Gulf of Mexico and that of the States bordering upon it, together, to some extent, with that upon our Atlantic coasts, is exposed to dangers, against some of which they might be forewarned. The experience of the past would permit the work to be resumed, with a better knowledge of the difficulties to be overcome and more satisfactory results than have been before had. In any system of reports intended to forewarn the coasts or commerce of the United States against approaching tempests, those to be had from experienced observers at these stations, and with improved telegraphic communication, ought to be included.

It has been found necessary to suspend during the year, for economic reasons, several stations which had before been maintained at colleges, scientific institutions, or places at which, from a want of existing data, it seemed desirable that series of reports should be had. The observations taken at these places were of the character before described in this report, including the tri-daily simultaneous reports, and would afford a basis for judging of the climatology and other meteorological facts relating to the interests of the section. They formed a part, also, of the system of reports, each, to some extent, complementary of the others, which would permit the atmospheric conditions over the whole country to be studied.

The utility for meteorological purposes of the sea-coast stations of the Signal Service, in connection with the life-saving service, and located in the life-saving service stations, has been further exhibited in the period elapsing since the date of the last annual report.

As explained in that report, the observations taken at these stations have the advantage of being taken on the sea-coast itself, and from positions which permit the condition of the sea-swell to be reported. The stations have the further advantage of being directly connected with this office by telegraph lines under its control. Reports of any character can so be had at any time they may be called for, or signals may be displayed to warn of danger.

The reports of observations here had differ frequently and markedly from those had from stations farther in the interior, and suggest the ap-

proach of weather conditions, which, without such indications, might either have escaped attention or would not have been foreseen.

Generalizations had from the reports received from these stations will not fail to become each year of increasing value for the prediction of weather conditions to be expected near our coasts. The reports themselves, appearing in the daily journals and read by those interested, give some clew to the circumstances under which coasting voyages may be undertaken or are being made.

The benefits to follow a sea-coast service, of which these stations offer an example, are such as cause it to be hoped that those coasts of the United States most exposed and frequented may early have the advantage of its protection.

The stations on the lines of telegraph constructed in pursuance of acts of Congress, in the Southwest and on the Indian frontier, have served the purpose for which the lines were in part recommended—of extending the field of meteorological research in that direction. They have made possible the daily receipt of meteorological data from regions in which their collection was before impracticable, and have furnished for the office a daily knowledge of atmospheric conditions existing on their course. The value of these reports, taken in connection with those from other reporting stations, the whole forming one system, is very great.

It can be safely claimed that upon no other continent can such a chain of stations as that exhibited upon chart herewith, (Paper 45,) and reaching from sea to sea, be found.

The southern line of stations reported at the date of last report as incomplete, is, by the connection these lines furnish, now filled. Warnings of a character before impossible on the western Gulf coasts can now be given, while disturbances menacing other sections of the United States, and approaching from this direction, can be early noted. In the studies of a practical meteorology, having reference to this continent, that of these reports ought not to be omitted.

Reports from the eastern Mexican coast are still to be desired for the proper protection of the Gulf. Cyclones passing over the West Indies would doubtless often manifest themselves near these coasts in time to permit warnings to be given to our own.

The forward march of civilization on the great interior plateau west of the Mississippi each year renders more extended observations practicable in that region. The field of study ought to be pressed in that direction as rapidly as the means at the disposal of the office will permit. The barometrical readings made in this region still lose part of their value by the difficulty of reduction to the hypothetical reading at sea-level. It is perhaps by multiplying stations the correct solution of this problem will be soonest attained. This difficulty each year lessens. The lines of stations crossing the continent, above alluded to, will afford material for interesting studies in this direction.

The means are not available to maintain upon the Pacific coast the number of stations which ought to be there established to permit proper warnings to be given. The stations in the States east of the Mississippi have been sufficiently referred to before in this and in preceding reports. The necessity for each, and the uses to be made of each, have been carefully examined into before the stations were established. The benefits to be had from the continuity of stations and of reports are regarded as having passed beyond the domain of experiment, and as established by facts.

The constant and exact work required at the numerous stations now

connected with this office renders it necessary that each station should be frequently and minutely inspected, the books and papers examined, and the instruments compared with the standard instruments. Each station ought to be inspected at least once in each period of six months.

Forty-seven stations have been inspected during the year, four of them twice. First Lieutenants F. C. Grugan, A. W. Greely, J. A. Buchanan and Second Lieutenant James Allen, acting signal-officers, have been employed upon this duty—the two first named temporarily, and the others permanently. Paper 7 shows the name of each station inspected, with date of inspection.

The proposition adopted at the congress of persons charged with meteorological duties, assembled at Vienna in 1873, and to the effect that it is desirable, with a view to their exchange, that at least one uniform observation of such character as to be suited for the preparation of synoptic charts be taken and recorded daily and simultaneously throughout the world, has continued to have practical effect.

By authority of the Department, and with the courteous co-operation of scientists and chiefs of meteorological services representing the different countries, a record of observations taken daily, simultaneously with observations taken throughout the United States and the adjacent islands, is exchanged semi-monthly. These reports are to cover the territorial extent of Algiers, Austria, Belgium, Great Britain, Denmark, France, Germany, Greece, Italy, Japan, the Netherlands, Sweden, Norway, Portugal, Russia, Spain, Switzerland, Turkey, British North America, the United States, Sandwich Islands, West Indies, and South America.

On July 1, 1875, the daily issue of a printed bulletin exhibiting these international simultaneous reports was commenced at this office, and has been since maintained. A copy of the bulletin is furnished each co-operating observer. The results to be had from the reports thus collated are considered as to be of especial importance. The bulletin combines, for the first time of which there is record, the labors of the nations in a work of this kind for their mutual benefit. There is needed only the assistance to be had from the naval forces of the different powers, to extend the plan of report upon the seas, to bring within the scope of study observations practically extending around the northern hemisphere. In this connection the Office has to acknowledge the cordial and valuable co-operation of the meteorological services of the different countries represented, as follows: Algiers, by General d'Eudeville, supérieur de génie; Austria, by Prof. Carl Jelinek, director of the Royal Central Meteorological Institute at Vienna; Great Britain, by Mr. Robert H. Scott, director of the Meteorological Office, London; Denmark, Capt. N. Hoffmeyer, director of the Royal Danish Meteorological Institute at Copenhagen; France, by U. J. Le Verrier, director of the Paris Observatory; Germany, by George Neumayer, superintendent Hydrographic Office, Berlin; Greece, by Prof. J. F. Julius Schmidt, director of the Royal Observatory at Athens; Italy, by the minister of agriculture, industry, and commerce; the Netherlands, by Prof. Buys Ballot, director of the Royal Meteorological Institute of the Netherlands at Utrecht; Norway, by Prof. H. Mohn, director of the Royal Norwegian Meteorological Institute at Christiania; Portugal, by J. C. de Brito Capello, director of the Meteorological Observatory of the Infante Don Luiz at Lisbon; Russia, by Prof. H. Wild, director of the Imperial Central Physical Observatory of Russia at St. Petersburg; Spain, by Antonio Aguilar, director of the Royal Observatory at Madrid, and of Don Cecilia Pujazon, director of the Naval Observatory at San Fernando; Sweden, by Prof. R. Rubenson, director of the Royal Swedish Meteor-

ological Institute at Stockholm, and Dr. H. H. Hildebrandsson, chief of the meteorological division of the Upsala Observatory; Switzerland, by Prof. R. Wolf, director of the observatory at Zurich, and Prof. E. Plantamour, director of the Observatory at Geneva; Turkey, by A. Coumbary, effendi director of the Central Observatory at Constantinople, and Prof. C. V. A. Van Dyck, superintendent of the Lee Observatory at Beirut; Canada, by Prof. G. T. Kingston, director of the Magnetic Observatory at Toronto, and by individual observers at other points.

A copy of the international bulletin herewith (Paper 31) exhibits the character of the reports, and that of the information had from each station. The chart accompanying this paper exhibits the location of the stations, and foreshadows the studies the reports had from them will make practicable. The number of stations reporting increases. The work is not likely to be abandoned by those in the different countries who have taken part in establishing it, and who share its benefits. If it served no other purpose than to maintain the pleasant co-operation of those charged with meteorological duties of the different countries, it would be of value. It is hoped that by systems of observations thus extensive, generalizations may be had to permit the announcement of approaching meteoric changes for periods longer in advance than have been hitherto practicable.

The average number of daily simultaneous observations now made abroad is two hundred and seventy-two. The co-operation of the different nations given as above described renders the additional cost to the United States of the grand system of reports it opens but little more than that of the cost of the preparation, paper, and binding of the international bulletin, a cost which would have to be met in great part for the proper preservation of the records themselves, even if the bulletin was not distributed.

The system of meteorological reports made by voluntary observers throughout the United States and elsewhere on this continent, formerly organized for the Smithsonian Institution under the direction of its distinguished Secretary, Professor Joseph Henry, and now become the voluntary system of this office, has been increased since the date of the last annual report by the tender and acceptance of reports to be made by additional observers. These reports are of observations made at 7 a. m., 2 p. m., and 9 p. m., local time, by the different observers, and at the different stations named in Paper 11, herewith.

Paper 18[a] exhibits the form adopted by this office upon which observations of this character are now entered.

By the very courteous action of the Surgeon-General of the Army, Brigadier-General Joseph K. Barnes, Brevet Major-General, the extensive series of observations made by the medical officers of the Army at the different military posts and stations, are placed at the disposal of this office, after having extracts made from them at the office of the Surgeon-General. (Paper 12.)

These reports are, like those of the voluntary system of this office, from observations made at 7 a. m., 2 p. m., and 9 p. m. The series of the Medical Department of the Army is now regularly received and entered on the record-files of the office. The record of observations is as the form herewith. (Paper 18[b].)

The total of daily reports filed at the office of the Chief Signal-Officer now numbers as follows:

Number of daily service telegraphic reports, 151; number of international daily simultaneous reports, 185; number of reports from voluntary observers, 408; number of reports received from the medical corps.

of the Army, 122; number of reports received from naval observers, 32; making a grand total of 898 reports received regularly for discussion.

It is proper to call attention to the fact that each of these reports evidences the existence of the necessary instruments, and has required the action of some observer at as many different places upon the earth's surface. The value of these data increases with each additional year during which the record of them is made. The study of the atmosphere as a unit results in benefits which are felt not only in the country in which any especial reports may be made, but throughout the world. It is doubtful whether so extensive a record as that above described was ever before had with so little expense.

The subject of the construction of a building, to be fire-proof and properly arranged, for the duties of the Signal Service and for the preservation of these records, now become very valuable, and which if destroyed cannot be reproduced, is respectfully recommended to the Secretary of War. It is estimated that if each separate observation is considered to have a money-value of ten cents, those now on file in this office represent a money-value of not less than three millions of dollars.

The data thus accumulating on the files of this office have afforded scope for generalizations differing from and perhaps more extensive than any before had by any one nation. The subject of their extent, and the uses made of them, were thus referred to in substance in the last annual report:

The number of reports received daily and unceasingly have necessitated a constant labor to keep up, in the discussion of them, to the dates at which they are recorded, in order to prevent an accumulation which, by its mass, might lessen their usefulness. The published daily study-charts of the office, and the Monthly Review, with its charts of generalizations, are examples of this work—the study-charts exhibiting a study of the data telegraphically received on each day; the Monthly Review combining the results had from these data and those received from other sources for each month during the year. It has thus been in the power of the office to lay before scientists and the public, at the close of each day, if necessary, and at the close of each month, and of each year, a summary for the period then terminating. The labor of referring to the individual records in figures, which, after a time, becomes almost impracticable, is thus rendered unnecessary on the part of those who receive these papers. The charts of the average direction and velocity of movement of areas of low barometer; charts of the average barometric pressures at the hours of tri-daily report; charts of wind-direction found most frequent at the different stations before rain-fall; charts of rain-frequencies for the different months, are examples of other studies of generalization. Studies of this character and incidental to those, which have in view the pre-announcement of storms or other meteoric changes, furnish results valuable for practical uses.

It is by studies of this kind and in this great field of research that the hoped-for rules, each of which is to add its aid in the effort to attain precision of forecast and knowledge of climatology for the United States, are to be elaborated. It is by such rules and such knowledge, slowly, but each year improving, the widest benefits of the service are to be sought. They will follow the practical use by the people themselves of the information gained through it, either in their attempts to have fore-knowledge of coming changes from the study of their own instruments, or by supplementing that study by reference to the daily-published bulletins and reports of this office. There is hardly a class of the people,

or an industry they practice, but to which good may, in this way, and from such studies, result. Enough has already been done to prove that it is possible.

The policy pursued by the office of diffusing as widely as possible, and in condensed form, the information in its possession, and that of extending the scope of its observations, enables it to benefit, in studies like these, by the labors of students everywhere. The results returned to it in the able suggestions made by distinguished scholars, and based upon deductions had from the charts and data so furnished, aid in forming the rules on which its duties rest.

The daily official deductions or forecasts issuing from the office of the Chief Signal-Officer and constituting the tri-daily "Synopses and Probabilities," as they are styled, and the especial deductions in pursuance of which the orders for the display of cautionary signals at stations are given, when necessary, are based upon the regular meteorological reports of the service-stations of observation, transmitted tri-daily to the office, by telegraph, after passing over a system of telegraphic circuits, so arranged as to at once concentrate the reports at this office, and to distribute, in doing so, certain numbers of them at designated cities and ports. Special reports are demanded from any station or number of stations, whenever additional information is required as to impending disturbances. The synopses are those of the meteoric conditions existing over and near the United States for each period of twenty-four hours, terminating at the hour for each general report. The "Probabilities" are announcements of the changes considered from the study of the charts, in connection with such rules and generalizations as the experience of the office and the study of meteorologists seem to have determined as probable to happen within the twenty-four hours then next ensuing. The study for each issue requires the draughting and study of four charts, these charts to exhibit chartographically the data furnished by the simultaneous reports of the one hundred and forty-five stations, heretofore referred to, located in the United States on the Atlantic and Pacific coasts, the coasts of the Gulf and of the Lakes, in the western interior, and in the Dominion of Canada, Nova Scotia, Newfoundland, New Brunswick, and the West India Islands. The charts are as follows: (*a.*) A chart of barometric pressures, the temperatures, and the winds, together with the wind-directions and velocities at the different stations; the character of the precipitation, if any, occurring at the time of the report, and the amount since the time of the last preceding report. This chart exhibits barometric pressures and the temperatures in their relations to districts of territory and to each other, by a system of isobaric and isothermal lines inscribed. The wind-directions are shown by arrows at the different stations. (*b.*) A chart of the cloud-conditions prevailing over the United States, in which the different varieties of cloud reported at the stations appear by symbols. On this chart are also indicated the weather, as reported at each station at the time of each report, the direction of movement of lower and upper clouds, and each morning the minimum temperature of the preceding night in relation to districts of territory. The cloud-areas appearing upon this chart are surrounded by an outline to enable their extent and probable movement to be considered. (*c.*) A chart of the relative humidities over territorial districts, with the temperatures at the several stations. This chart of humidities enables studies to be made of territorial sections, the difficulties attending the study of observations of this character being obviated to a very considerable extent by the intercorrection of the stations among themselves, and by the great extent of the

regions over which the readings are made simultaneously. In fields so great, purely local conditions in part disappear, or affect very little the general result. (*d.*) A chart of barometric pressures exhibits, for purposes of reference, by lines of no variation, the districts of territory over which the barometric pressure has increased, and those over which it has diminished, in each averaged period of eight hours in the twenty-four hours terminating at the hour of the report. (Papers 41 to 44.) The study of these charts requires that they should be compared with each other, and with the antecedent charts of a similar character, prepared at the times of the preceding reports. The total of the readings of the different instruments inscribed on each series of charts, as exhibiting the elements of the general meteoric condition, reaches the number of two thousand nine hundred. The duties of the preparation of these charts, and of the reports based upon them, have been since the date of last report under the immediate charge of Assistant Cleveland Abbe, A. M.; First Lieut. H. H. C. Dunwoody, Acting Signal-Officer and assistant; and First Lieut. Robert Craig, Acting Signal-Officer and assistant, who have been relieved and alternated in the discharge of these and other special duties at such times as directed under the instructions of the Chief Signal-Officer. The daily series of study-charts are twelve in number; the yearly series, four thousand three hundred and eighty. The field which a series continuing for years opens for investigation is almost without a limit. Additions to the charting are made as it is found it can be improved.

The statements of synopses and probabilities have been furnished for the press at regular hours—1 o'clock a. m., 10.30 a. m., and 7.30 p. m., daily, and under the same rules as in preceding years. There has been no failure in the delivery of any report during the year. The total number of statements thus issued for publication has been one thousand and ninety-five. These have been telegraphed at the moment of their issue to the principal cities, and have appeared in some form in almost every journal in the United States. The great diffusion thus given this intelligence has, of course, its advantages.

A careful analysis of these statements of the office, made for the year terminating June 30, 1876, and a comparison of the meteoric conditions occurring within the twenty-four hours and within the district to which each statement has had reference, has given an average of eighty-eight and three-tenths per cent. of forecasts as verified.

The percentage of verifications for each district, and for each month in the year, is given in the following table:

Districts.	1875. July.	1875. Aug.	1875. Sept.	1875. Oct.	1875. Nov.	1875. Dec.	1876. Jan.	1876. Feb.	1876. Mar.	1876. April.	1876. May.	1876. June.
New England	92.47	89.4	90.76	88.7	93.74	85.30	91.1	90.4	93.7	80.2	89.3	83.86
Middle States	91.62	90.25	89.92	89.8	91.52	85.05	93.2	90.5	95.4	83.4	88.7	87.00
South Atlantic States	94.45	91.3	86.94	89.3	89.58	84.98	88.6	86.7	91.7	78.9	90.1	82.32
Eastern Gulf States	95.18	91.0	84.72	89.3	91.12	87.34	92.5	92.8	94.0	85.8	92.0	81.20
Western Gulf States	95.20	90.9	84.99	83.9	90.89	81.75	87.2	89.1	83.7	88.0	89.4	84.56
Lower Lakes	89.50	92.3	88.74	86.5	93.95	78.74	91.4	89.5	91.3	84.4	88.3	82.64
Upper Lakes	91.70	92.6	89.44	87.7	94.78	86.52	88.3	90.4	90.0	85.2	87.6	79.74
Tennessee and Ohio Valley	87.50	91.8	86.66	87.6	89.79	83.36	90.4	92.4	91.8	84.7	88.3	79.86
Upper Mississippi Valley	91.03	92.1	90.13	84.8	94.02	84.68	87.9	90.6	89.4	85.8	90.1	81.03
Lower Mississippi Valley	90.75	89.8	85.97	82.8	92.49	84.40	84.6	85.6	85.5	80.0	87.9	82.41
Total percentage of verifications	90.94	91.14	87.82	87.04	92.18	84.21	89.5	89.8	90.6	83.6	89.1	82.46

The mode of comparison is set forth in paper 28, herewith. A comparison of this percentage with the average percentage of preced-

ing years exhibits an improvement in accuracy with each succeeding year. An average of 90 per cent. of accuracy is believed to be attainable. The popular faith in the announcements of the office, now in the sixth year of their issue, has remained unchanged. It has not at any time been sensibly lessened by the errors which sometimes direct attention to the fact that in the present condition of science premonitions, having for their scope a territory so great as that of the United States, cannot always be correct for every part of a district.

The popular knowledge of the duties of this office, and its reasonable success, cannot, perhaps, be better evidenced than by the criticisms to which it is subjected if errors occur in its work. A few years ago the work itself was deemed by many impracticable.

The instruction of officers of the Signal-Service to fit them for duties of this description has been continued, though greatly interfered with, by the small force charged with the now very extensive duties of the service in its different branches. The duties in which the officers are engaged, each in his sphere, and each of which contributes its share to the success of the whole, are such as necessarily lay well the foundation for the courses of especial study and practice. The courses once commenced, the skill increases with acquired experience. The studies to which reference has been hitherto made, and the data condensed for generalization, improve each year the material before the student for consideration. The improving, accuracy of the reports seems to evidence the correctness of the plan of study adopted.

The display of cautionary signals, by flags by day and by lights at night, has been made systematically on occasions of supposed especial danger at the following points, ports, and harbors, located upon the lakes, the Atlantic, and the Gulf coasts: Alpena, Mich.; Atlantic City, N. J.; Baltimore, Md.; Barnegat, N. J.; Boston, Mass.; Buffalo, N. Y.; Cape Hatteras, N. C.; Cape Henry, Va.; Cape Lookout, N. C.; Cape May, N. J.; Charleston, S. C.; Chicago, Ill.; Cleveland, Ohio; Detroit, Mich.; Duluth, Minn.; Eastport, Me.; Erie, Pa.; Escanaba, Mich.; Grand Haven, Mich.; Galveston, Tex.; Indianola, Tex.; Jacksonville, Fla.; Key West, Fla.; Kittyhawk, N. C.; Long Branch, N. J.; Marquette, Mich.; Milwaukee, Wis.; Mobile, Ala.; New Haven, Conn.; New London, Conn.; New Orleans, La.; New River, N. C.; New York, N. Y.; Norfolk, Va.; Oswego, N. Y.; Peck's Beach, N. J.; Port Huron, Mich.; Portland, Me.; Punta Rassa, Fla.; Rochester, N. Y.; Sandy Hook, N. J.; Smithville, N. C.; Saint Mark's, Fla.; Thatcher's Island, Mass.; Toledo, Ohio; Tybee Island, Ga.; Wilmington, N. C.; Wood's Holl, Mass.

During this period one thousand five hundred and seventy-seven signals have been ordered, counting each separate display at each port a separate signal, in anticipation of seventy dangerous storms. Of the total number of signals thus displayed, seventy-seven and three-tenths per cent. have afterward been reported as justified by the occurrence of winds held to warrant them at the points where the signals were displayed, or within the radius of one hundred miles of these points, as set forth in the rules of the Office. In the cases reported as failures of justification following the display, the winds did not attain, within that radius, a violence held to justify the warning. The signal ordered by this Office is always cautionary in its character, not announcing that a storm will come, but that the indications are sufficiently threatening to call for caution, both as to going to sea and for preparation for rough weather if vessels are about to sail.

It is one of the most difficult tasks which falls to the Office to deter-

mine in advance over what ports to be selected, to the exclusion of others, an observed storm-area will pass, and in such manner as to be accompanied at these ports with a given wind-velocity. Within the same area the winds differ in force at different points. There is the danger that warnings unnecessarily given may delay the movements of shipping. A heavy responsibility is incurred if the warnings are not given when they ought to be. Time, increasing experience, and increasing facilities will permit greater accuracy.

There will be higher success as the data of the Office become full enough to enable it to be judged what local wind-velocities are to be expected to follow the different meteorological indications in the different districts at the different seasons. The experience of the few years past gives assurance of progress.

It has been attempted to determine definitely and to the satisfaction of the Office what benefits to shipping have followed the display of signals ordered by it. The reports of the observers at stations give instances in which vessels have remained in port in recognition of the warnings given in advance of storms. In these cases danger was avoided. A series of tables of disasters to shipping, compiled for a number of years past, have seemed to show that the annual average of disasters occurring at or near points at which cautionary signals have been displayed has been lessened by a considerable percentage for the years during which that display has been had. As to the fact that warnings can be given with reasonable accuracy there can be no question.

The plan of exhibiting as widely as possible, in the agricultural districts throughout the United States, the results of the daily office studies in the form of printed forecasts for the benefit of the agricultural populations has been continued in operation. The effort to cover so wide an extent of territory has made the labor great. The continuance of the work has seemed to be warranted by the favor with which it has been received. It has been considered due to the farming populations that they should have an opportunity to profit by whatever information could be given them. With the active co-operation of the Post-Office Department, with which there is an arrangement for this purpose, six thousand nine hundred and twenty-seven printed farmers' bulletins, on which have appeared daily the reports of this Office, have been distributed and displayed in frames daily at as many different post-offices in different cities, villages, and hamlets in different States. There are numerous and especial requests to increase this number. At 1 o'clock a. m. of each day the midnight report of the Office for the ensuing day has been telegraphed during the year ending June 30, 1876, to twenty centers of distribution, located in the following-named cities: Albany, N. Y.; Augusta, Ga.; Bangor, Me.; Boston, Mass.; Buffalo, N. Y.; Burlington, Iowa; Chicago, Ill.; Cincinnati, Ohio; Detroit, Mich.; Leavenworth, Kans.; Logansport, Ind.; Memphis, Tenn.; Montgomery, Ala.; Nashville, Tenn.; New Orleans, La.; New York, N. Y.; Pittsburgh, Pa.; Philadelphia, Pa.; Springfield, Mass.; Saint Louis, Mo. They are also issued at Washington, D. C. These centers have been carefully chosen as in the midst of the denser agricultural populations of the United States, and at points whence the facilities of communication would enable the surrounding districts to be most rapidly supplied.

The telegraphic report of forecast received at a center of distribution is at once printed by enlisted men of the Signal Service on bulletin forms provided for that purpose. These are enveloped as rapidly as printed, addressed to each designated post-office within the district to

be supplied, and which can be reached by the swiftest conveyance by the hour of 2 p. m. of the date, and are then placed in charge of the Post-Office Department, under an arrangement by which each postmaster receiving a bulletin has the order of the Postmaster-General to display it instantly in a frame, furnished by this office for that purpose, and reports, in writing, the fact and time of its receipt and of its display to the Chief Signal-Officer.

The bulletins have reached the different offices, and have been displayed in each of the frames at the average hour of 11 a. m., averaging thus ten hours from the time the report has left the office of the Chief Signal-Officer until it has appeared bulletined in the midst of the farming populations, and accessible to them in the distant parts of the country.

The information given on these bulletins has a value. Facts relating to the climatology of the different sections are condensed into brief notes, which are published with the reports. For instance, each bulletin now announces for the geographical district in which it is displayed, and, in addition to the forecast, what winds, in each month, have been found most likely, and what least likely, to be followed by rain. This simple foot-note will have its effect in increasing the gains and reducing the losses of harvesting. (Paper 26.) These bulletins will improve for the uses for which they are intended, as the experience of the office permits the information they exhibit to be supplemented with further data and other rules. With each year the popular knowledge of the uses of the bulletin and some increased interest in and study of meteorology renders the farming communities better able to judge of its correctness and to benefit by its contents. It is contemplated, as the work of the office progresses, to add to the bulletin such brief instructions as may be developed in regard to its uses in connection with such local instruments as may be had for local use. Reference has been made in preceding reports to the economy of this work. Careful estimates have shown that if the total cost for each bulletin station at which the bulletin is displayed at each different post-office, hamlet, village, or city were computed to be twenty-seven cents per day, the sum so resulting would meet all the expenses caused by the Signal-Service. A little saving of any one crop or gain to any interest made on any one day in the vicinity of each station, supposing nothing to be saved on any other day of the year, would more than counterbalance this expenditure.

The river-reports of the office, giving the changing depths of the water in the river-channels of the great rivers of the interior, and notices of expected rises or falls of the river-levels, for the benefit of river commerce and of the population in the vicinity, have been regularly made, telegraphed, bulletined in frames, and published also by the press at the different river ports and cities. Especial reports have been made before and at the times of rises threatening to cause dangerous freshets.

A circular issued on March 15, 1875, showing the range between high and low water marks on the western rivers, and the height at which the rises become dangerous along their banks, is believed to have been the first systematic attempt to establish a "danger-line" on these rivers. This circular was prepared from data collected at this office, and was given, by order of the Secretary of War, a wide circulation, through the press and otherwise. The uses of the information thus published have been shown upon the occurrence of the river-floods; a reference then had to the circular, in connection with the daily reports, enabling those interested to judge of the limits of the rises to be expected at the differ-

ent places upon the river-banks, and of the consequences to be anticipated.

The data had at this office from stations making river-reports, though scanty as compared with those to be desired, permit a foreknowledge of changes likely to happen, and enable useful warnings to be given of coming floods, ice-floods, or sudden and great rises of the river-levels. The daily reports are useful at times of low water; the information they give permitting river-shipping to be moved with intelligent foreknowledge of the probable depths of water at different points upon the river's course. These reports are especially useful to those for whom they are intended, as having an official character.

The manner in which the reports continue to be received by the communities especially concerned, and the official requests of boards of trade and others engaged in river commerce for the increase of the number of them, have given evidence of their usefulness.

In instances attracting attention, the notice of the probable heights floods anticipated or passing would attain, have been followed by preparations made upon the levees to guard against danger. A brief examination of the charts of changes of the river-levels accompanying this and preceding reports, (Papers 47 to 55,) show that the river-rises to occur at the different localities can be judged of frequently as to the time at which they will occur, and their extent by the conditions existing at points sometimes far distant. Accumulating data permit studies of this kind to be valuable.

In connection with these studies the examination of the daily weather charts, exhibiting places at which precipitation has occurred, or is likely to occur, and the amount of precipitation, had with the study of the charts of the river-basins, which enable it to be determined what rivers will be affected by precipitation, are found to be of value in furnishing correct prognostications. This subject was referred to in the last annual report.

The Chief Signal Officer is confirmed in the opinion before expressed, that, with a proper study of the river-floods, and with stations properly placed, reporting at times of especial danger, it can be made almost impossible for a flood to follow a river-course without notice given in advance of its coming at the localities threatened. Daily bulletins of river-reports have been regularly displayed during the year, at the following named stations: Cairo, Ill.; Cincinnati, Ohio; Davenport, Iowa; Dubuque, Iowa; Keokuk, Iowa; La Crosse, Wis.; Leavenworth, Kans.; Louisville, Ky.; Memphis, Tenn.; Nashville, Tenn.; New Orleans, La.; New York, N. Y.; Omaha, Nebr.; Pittsburgh, Pa.; Savannah, Ga.; Shreveport, La.; St. Louis, Mo.; St. Paul, Minn.; Vicksburg, Miss.; and Yankton, D. T. Systematic reports of river observations, carefully made and closely criticised, are had daily by telegraph and weekly by mail, on established forms, from the stations above named. Reports of similar daily observations are also had from twenty-four special river stations named in the record of stations. For certain months of the year in which danger is not anticipated from floods, these reports are forwarded by mail. For the months in which floods more frequently happen, and at any time in any case of special danger, the reports are telegraphed. The observers are, in effect, a river guard.

The daily reports of the surface and bottom water-temperatures at designated points upon the rivers, lakes, and sea-coasts have been continued during the year. These reports are furnished at the request of Prof. Spencer F. Baird, United States Commissioner of Fish and Fisheries, the object had in view being to determine the proper rivers and

lakes in which to place the different varieties of food-fishes. It is necessary, for this purpose, to ascertain the extremes and means of the water-temperatures in the different localities. This series of reports has now continued for four years.

The series of reports being the announcement, from day to day, of such approaching changes of temperature as would be likely to cause the closing of the canals by freezing, or, as in other cases, as would open them, were continued during the days of closing canal navigation of the fall and winter of the past year. Paper 56 exhibits the water-routes of transportation, the subjects of these reports. The commerce moving upon the canals, as their closing draws near, is sometimes of greater value than at any other season. These water-routes are then thronged with hundreds of laden barges, each of which must move with reference to the danger of the closing of the routes by freezing. The market-rates at the great cities are influenced by the probability that the merchandise or grain thus afloat will reach or fail to reach the points for which it is intended. These reports are received with satisfaction by the canal commerce, and by the commercial associations of cities. They constitute, for the months of November, December, and January, one of the regular issues of the office. Paper 27 exhibits a specimen of river, special river, and canal reports.

The exhibition of symbol maps, on which the meteoric conditions are shown by symbols, at the rooms of the boards of trade, chambers of commerce, and of commercial associations in the municipal cities, and at places of public resort, for the benefit of shipping and other interests, the display of bulletins, the distribution of weather-maps, and the employment of other methods for rapidly diffusing for public use the information had at this office, have been continued during the year ending June 30, 1876. It has been found necessary to discontinue, since that date, the issue of maps at several prominent stations.

The form of the bulletins published for the uses of farmers, of those issued for the uses of seamen, for the river reports, for the canal reports, and for the other varied interests which the information borne upon them is intended to benefit, change gradually with increasing knowledge and facilities. Each form has, however, its object. The issue of bulletins is closely scrutinized for every station, and is reduced to the smallest number which can be wisely used.

The regular printed publications of the office have been issued, as in the preceding year. Copies of these papers, the office Weekly Weather Chronicle and the office Monthly Weather Review, sufficiently illustrate their character. (Papers 24 and 25.)

The scope of the Review has become extensive with the increase of the number of reports received, all of which are valuable for reference, and a study of which enters necessarily into the study for the preparation of each Review.

The collection of materials for this paper permits also the study of especial storms, descriptions of, or facts relating to, which are given in the local journals of the regions over which they pass, or in the shipping-news communicated by vessels encountering them at sea. The three charts, which accompany each issue of the Review, exhibit the uses made of meteorological data. Each of these charts is, to some extent, the reduction of data first chronicled on ninety separate study-charts for the month. It will be readily understood how much this monthly reduction simplifies the work of generalization for the year. The review exemplifies also, to some extent, the consideration of the great mass of data before mentioned as entering upon the files of this Office. The wide

circulation given this publication meets, in part, the popular wish for generalizations prepared by this Office, while the receipt of a copy by each one of the hundreds of the voluntary observers, now its correspondents, is accepted as, at once, a sufficient acknowledgment of, and compensation for, the labor of making their reports. Assistants Abbe, Dunwoody, and Craig have alternated in charge of the preparation of these papers and of the charts which accompany them.

The preparation of the matter for the publication of the "Synopses, Probabilities, and Facts," commenced in 1872, has been continued.

These volumes, issued in sequence, one for each month, contain the records of all the tri-daily telegraphic reports received at the Office from the dates at which such records commenced; the tri-daily charts based upon the study of each report on that date issued, with a statement of the "facts" or meteoric conditions, which subsequent reports have shown as actually existing during the time for which each forecast was made. They are useful for purposes of exchange, and bring to the office in return publications fully equaling their value. They constitute a meteoric record more full, perhaps, than any other now issued.

It was estimated in the last annual report that by the publications of this Office, which have been above referred to—by the cautionary signals displayed by day or at night on coasts or at ports in times of probable danger; by the announcement of probable changes of weather in the synopses and probabilities furnished thrice daily to the press; the farmers' bulletins exhibited at so many villages and hamlets in the interior; the river and canal reports made with reference to river and canal interests; the bulletins and data exhibited at all the great cities and ports; the symbol maps displayed in boards of trade rooms and rooms of chambers of commerce; the Weekly Chronicle and Monthly Weather Review furnished to agricultural societies, commercial associations, and correspondents of the Office; the daily weather-maps; the monthly charts, and, finally, the charts condensing the results of years of observation—the information emanating from this Office was received in some form daily at not less than one-third of all the households of the United States. It must be considered in estimating such a distribution that the distribution is easiest, and the readiest modes of communication are found in those districts which, most densely populated, contain the greatest number of households.

The different reports of the Office, of which mention has thus been made, have been favorably received in the communities for which they have been furnished, and their uses have been acknowledged by communications from commercial associations, and by other official action.

The regular daily publication of the reports by the press, now continued for six years without cost to the United States, is considered as an evidence of their usefulness and of the favor with which they are received by the communities for which they are intended.

The Office is in correspondence in reference to its duties with committees appointed for the purpose by forty-eight boards of trade and chambers of commerce, and one hundred and seventeen agricultural societies. (Papers 9 and 10.)

A number of sets of resolutions officially adopted by the leading associations of this character in the prominent cities of the United States, and which express approval of the service, and ask favorable action in its behalf, accompany this report. These resolutions were officially submitted to Congress at its last session. (Paper 30.)

A number of observations taken on vessels at sea to complement the synchronous reports of the service, and at the request of the Depart-

ment, have been received upon the forms provided for the purpose. Their utility is evident in the study of storms approaching our coasts, or which endanger vessels sailing from our ports. (Paper 13.) A systematic collection of shipping-news, extracts from logs of vessels, notices of storms at sea, or disasters caused by them, is made for similar use. The offices of the Signal Service at the different cities and ports of the United States and upon the sea-coast, offer every facility for the comparison of instruments, the use of data, or by other modes in their power, to the vessels of any nation which enter our waters for commerce or for shelter.

Assistant Cleveland Abbe has prepared a final report, with accompanying charts, of the auroral display of April 7, 1874, which has formed the subject of previous papers by this officer. (Paper 19.)

Lieut. H. H. C. Dunwoody, Acting Signal Officer and assistant, has prepared a paper exhibiting some of the results of an examination of a series of meteorological observations made at high altitudes. (Paper 20.)

Lieut. Robert Craig, Acting Signal Officer and assistant, has prepared a description, with accompanying charts, of the cyclone of September 16, 1874, compiled from official reports and other authentic sources. (Paper 21.)

A series of charts, showing the mean direction of the movements of areas of low barometer across the continent, accompanies this report. (Papers 46^1 to 46^{12}.) A series of charts, accompanying the annual report of this Office for the year 1874, exhibits the course and number of such areas observed during the period from March, 1871, to July, 1874, inclusive. They were compiled from the charts published monthly in the Weather Review of this Office, and the means were calculated for all areas approximating the same direction, irrespective of the section of country they traversed.

The charts accompanying the present report were, as in the case of the former series, prepared in the map-room of the Office under the immediate direction of Lieut. Henry Jackson, Acting Signal Officer and assistant, and show the number and course for each month of all areas that have come within the observation of this Office, with the mean velocities of translation, while moving between the several meridians, and the average velocities, from the time of appearance to disappearance. They were compiled directly from the original maps, prepared tri-daily in the study-room of the Office, and include all storms observed from March, 1871, to December, 1875, inclusive. The examination of the data upon which the charts are based has been very carefully made. The charts themselves form only a part of a paper, to which, it is hoped, the facilities of the Office will permit further publication to be given.

The papers thus referred to exhibit the results of studies constantly in progress in the Office, to utilize the data gathered on its files, and each of which has reference to improvement in the discharge of the duties especially confided to it.

A list of disasters upon the lakes for the year ending June 30, 1876, compiled by Sergeant S. W. Rhode, Signal Service, United States Army, in charge of the Milwaukee station, is given in Paper 22.

Paper 8 contains the names of places from which requests have been received for the establishment of signal-stations, but at which stations had not been established June 30, 1876.

In the instrument-room of the Office, four hundred and forty meteorological instruments have been carefully compared with the official standards during the year, and five hundred and forty have been issued

during the same period. A model atmograph, an anemograph, and an illustrated meteoric globe have been added to the self-registering instruments of office manufacture, and are undergoing the customary tests. Several additions have been made to the collection of self-registering instruments of foreign manufacture.

In compliance with instructions received from the Secretary of War, under date of March 25, 1875, First Lieut. F. C. Grugan, Second Cavalry, and Acting Signal Officer, on duty at this Office, was, on November 20, 1875, assigned to the duty of collecting, arranging, and displaying at the International Exhibition of 1876, subject to the direction of the chairman of the board on behalf of the United States Executive Departments, such stores, materials, and articles pertaining to the Signal Service as might be designated by the Chief Signal Officer to be placed on exhibition.

This duty was performed at this Office until March 20, 1876, on which date Lieutenant Grugan proceeded to Philadelphia, where he still remains.

In addition to the display of such experimental self-registering instruments as have been adopted for the use of the Signal-Service after careful examination, the ordinary station-instruments and a full set of the office publications have been exhibited, together with a station in practical operation, illustrating the printing of maps and farmers' bulletins, the issuing and posting report bulletins, receiving and transmitting reports by telegraph, and such other duties as are usual at a station of observation. In military signaling, the display has consisted in the regulation equipments and supplies for day and night signals, the heliograph, a field-telegraph train, fully equipp d, and a field-telegraph line in operation. Grapic meteorological charts charted at this Office and transmitted in the lines of the charting by teleg aph to Philadelphia was used for the first time of which there is known record at this exhibition. These charts formed the basis of daily weather-maps there issued. A smaller map based upon the same work appeared in a newspaper—the New York Herald—printed on the grounds.

The regular telegraphic weather-reports have been received during the year over the wires of the Western Union, Northwestern, and International Telegraph Companies. Seven hundred and eighty-two thousand nine hundred and thirty-one cipher-words of weather-reports have been received at, and one hundred and eighty-eight thousand one hundred and sixty-four sent from, this office during the year. Four thousand four hundred and fifty-six telegraphic messages, other than weather-reports, were received, and seven thousand nine hundred and forty-one sent in the same period. There have also been received twenty-five thousand one hundred and sixteen cipher-words of special river-reports. The plans of working-forms of telegraphic circuits, and the rapidity of telegraphic work so assured to the service, has been sufficiently referrred to in preceding reports.

The average time elapsing from the time at which the readings of the instruments have been had at the stations to that at which the reports based on these readings have been telegraphed to the press and to the distributing-stations has been one hour and forty minutes.

It is considered with some satisfaction, as one of the consequences resulting from the organization of this office, that, by the uses of its ciphers, improved with the experience of years, the facility with which constant practice has rendered practicable the telegraphic work necessary for its reports, and the understandings arrived at with telegraphic

companies, the annual cost of its telegraphic communications has been reduced by many thousands of dollars.

The sea-coast service of the Signal-Service, in connection with the life-saving service, has been before referred to in this report. At the date of the last annual report telegraphic lines on the sea-coast itself, and reaching from Sandy Hook to Cape May, and from Norfolk to Cape Hatteras, were in operation. The extension of the sea-coast line from Cape Hatteras via Wilmington, N. C., to Smithville, at the mouth of the Cape Fear River, was completed March 14, 1876. The total length of the sea-coast lines constructed by this office became thus five hundred and forty-three miles. The coast-lines are connected with the office by leased wires from Cape May and Norfolk.

The act of Congress requiring this service contemplates the establishment of signal-stations at life saving stations and light-houses at points along the coast in such manner that the coast and sea in their vicinity may be at once kept under observation, warning of approaching storms be given to vessels within signal distance, and information of disasters and other incidents occurring be rapidly conveyed to the chain of life-saving stations, to light-houses, ports from which aid may come in case of need, and to the Central Office. The enlisted men stationed at these stations have been taught to take and report meteorological observations, and, as signal-men, are practiced in both the Army and Navy codes, in the use of semaphores, and that code of permanent flag-signals known as the International Code, to enable them to communicate with vessels of any nationality. The service has proven its usefulness in the case of a number of disasters to shipping. Its uses for meteorological purposes are before referred to. In the cases of saving at the times of disasters, it is believed that the values saved have been greater than the whole cost of the lines.

The sea-coast-service stations in operation at different dates have been at Sandy Hook, Long Branch, Squan Beach, Barnegat, Atlantic City, Peck's Beach, and Cape May, N. J.; Norfolk and Cape Henry, Va.; Kittyhawk, Cape Hatteras, Cape Lookout, Portsmouth, New River, Wilmington, and Smithville, N. C. Of these, Sandy Hook, Barnegat, Atlantic City, Cape May, Norfolk, Cape Henry, Kittyhawk, and Cape Hatteras have been in continuous operation.

The constant changes occurring in the widths of the numerous inlets, across which the line upon the coast is carried by cables between Cape Hatteras and Wilmington, the destruction of portions of the lines and changes in the coast itself, caused by storms, have frequently interrupted communication south of Cape Hatteras. The force and the appropriations available have not permitted extensive repairs. It is hoped the appropriations for the ensuing year will permit the cables to be lengthened in this section, portions of the line to be re-erected, and the line itself maintained in good condition.

The Chief Signal-Officer does not feel called upon to refer at length to the importance of a service of this character on the sea-coasts. The reasons for its maintenance and the benefits to be expected from it are manifest. The commerce which approaches a coast on which such a service exists, properly conducted, is spared disasters, in comparison with the cost of which the cost of the service is little.

The total force employed upon the coast has averaged thirty-five enlisted men.

In pursuance of the acts of Congress authorizing the construction and maintenance of telegraphic lines in the interior and upon the frontier, connecting military posts, and for the protection of the populations

from Indian and other depredations, officers and enlisted men of the Signal-Service have been continued upon these duties. The lines in Arizona, New Mexico, and upon the Texan frontier are nearly completed. The work of construction has been in part done by working parties furnished by the active co-operation of department commanders. A total length of two thousand four hundred and eighty-two miles of line has been erected, and is now operated and maintained in the care of officers and enlisted men of the Signal-Service. The enlisted men at each telegraphic station are instructed in the manner of making and reporting meteorological observations. A telegraphic simultaneous report is required daily from each observer. The stations are thus at once observing-stations of the Signal-Service and stations for any necessary telegraphic communication. The whole of the reports form a valuable part of the system of reports daily discussed at this office. The saving of the cost of these reports and the sums received for messages make the lines in part self-supporting. Aside from the benefits resulting from the connection of military posts and the incidental protections the stations at frontier villages upon the lines give the country through which they pass, thus aiding its development, the meteorological information such lines make available, and which could be had in no other way, already developes its uses. The existence of the lines in the interior of Texas permit warnings to be exhibited on the Texan coast, and a knowledge of atmospheric conditions over that State, before impossible.

The regular daily receipt of these reports at this office answers the purpose of a daily roll-call of the stations, assuring that the stations were in readiness and the lines are in working order. The average time elapsing from that at which the instrumental readings are ordered to be made at the thirty-five stations upon these remote lines and that at which they are received, reported at this office, has been one hour and ten minutes.

The uses of the line of telegraphic stations in Northern Texas, Arizona, and New Mexico have been before referred to.

The subject of the construction of these lines has been mentioned in preceding reports. For the purposes of description the lines are divided into three divisions, those of Texas, Arizona, and New Mexico. Work upon the lines in the Texan division was completed May 17, 1876, on which date the last working party reached San Antonio. Lieut. A. W. Greely, Acting Signal-Officer, was, as reported in the last annual report, in charge of the work and of the line until March 7, 1876, when, having been granted leave of absence, with permission to go beyond the sea, he was relieved by First Lieut. (now Capt.) Charles S. Heintzelman, Acting Signal-Officer, who continued the work to its completion.

Capt. Charles S. Heintzelman, A. Q. M. United States Army, was relieved from duty in connection with this office by Special Orders No. 149, paragraph 5, Headquarters of the Army, Adjutant-General'sOffice, dated Washington, July 24, 1876.

First Lieut. James A. Buchanan, Fourteenth Infantry, was assigned to the charge of these lines by Special Order No. 149, paragraph 5, Headquarters of the Army, Adjutant General's Office, dated Washington, July 24, 1876, and relieved by Special Orders No. 160, paragraph 3, Headquarters of the Army, Adjutant-General's Office, dated Washington, August 5, 1876.

First Lieut. George S. Grimes, Second Artillery, Acting Signal-Officer, was assigned to the charge of these lines by Special Orders No. 160,

paragraph 3, Headquarters of the Army, Adjutant-General's Office, dated Washington, August 5, 1876.

The total length of line completed at the date of the relief of Lieutenant Greely was one thousand two hundred and eighteen and three-fourth miles, of which there had been constructed under his supervision in eleven months one thousand one hundred and forty-eight and three-fourths miles. The total length of line in this division constructed under the direction of this office is one thousand two hundred and ninety miles.

The following-named stations, operated by enlisted men of the Signal-Service, were in operation June 30, 1876: San Antonio, Boerne, Brackettsville, Brownsville, Castroville, Cambridge, Colorado, Comfort, Concho, Decatur, Denison, Eagle Pass, Edinburgh, Fredericksburgh, Griffin, Jacksboro', Laredo, Mason, McKavett, Pilot Point, Rio Grande, Fort Sill, Stockton, and Uvalde.

The commanding general of the department and the officers of the different staff departments serving within it have, in carrying out the instructions of the Secretary of War, co-operated with the office in the construction of the line, and have rendered material and valuable aid. Capt. W. C. Beach, Eleventh Infantry; Capt. Daniel Hart, Twenty-fifth Infantry; First Lieut. D. B. Taylor, Eleventh Infantry; First Lieut. S. H. Lincoln, Tenth Infantry; First Lieut. W. N. Sage, Eleventh Infantry; First Lieut. C. L. Davis, Tenth Infantry; Second Lieut. J. L. Kane, Twenty-fourth Infantry; Second Lieut. J. R. Pierce, Twenty-fourth Infantry; Second Lieut. A. L. Myer, Eleventh Infantry; Second Lieut. William Paulding, Ten h Infantry; Second Lieut. H. W. James, Twenty-fourth Infantry, and Second Lieut. F. F. Kislingbury, Eleventh Infantry, at different times commanding construction parties during the progress of the work, are commended in the report of the officer in charge for the zeal and efficiency by which their services and those of their commands were characterized. There are now employed in this division thirty enlisted men of the Signal-Service.

The work upon the Arizona division has remained as at the date of the last annual report, in charge of Second Lieut. Philip Reade, Acting Signal-Officer. The location of the lines in this division, and the points proposed to be reached by those then in process of construction, were referred to at length in the last annual report.

Two construction parties have been engaged in the completion of the line extending from Tucson to Camp Apache. Of these, one, consisting of one non-commissioned officer and nine private soldiers, in charge of a sergeant of the Signal-Service, commenced the construction at Camp Lowell on July 1, 1875. The work progressed slowly, owing partly to the failure of the contractor to deliver line-supports promptly, and partly to the fact that it became necessary to await the arrival of wire from San Francisco. The line was completed to Camp Grant, a distance of ninety-two and a half miles, on February 28, 1876. A second construction party, consisting of a detail of three non-commissioned officers and twenty-two men, in charge of a sergeant of the Signal-Service, commenced construction at Camp Apache on July 27, 1875. On November 2, 1875, the line-supports had been erected for a distance of one hundred and twenty miles between Camp Apache and Camp Grant, and seventy miles of wire were upon the insulators. The appropriation being exhausted, the work was suspended. The material is now on hand, and a few days' work will suffice to complete the line.

The line between San Diego and Fort Yuma has been repaired and is reported to be now in fair condition. East of Yuma and extending to

Prescott the whole of the line has been reset. The expense of this work has been in part met by the receipts of the line. This portion of the line in Arizona should be rebuilt with as little delay as practicable. It was not constructed under the direction of this office. The line from Prescott to Camp Verde has required extensive repairs, although recently constructed. The lines in this division connect stations at San Diego, Campo, Yuma, Florence, Camp Lowell, Maricopa Wells, Phœnix, Prescott, Stanwix, Tucson, Camp Verde, Wickenburgh, and Camp Grant, at each of which places office sare in operation.

The commanding general of the district of Arizona has rendered constant and valuable aid to the Office in its duties of construction and in the maintenance of the lines within this division. There are employed in this division twenty-four enlisted men of the Signal-Service.

In the New Mexican division a careful reconnaissance of a route for the proposed telegraph-line from Camp Grant, Ariz., to Santa Fé, N. Mex., referred to in the last annual report, was completed by Lieutenant Reade, Acting Signal Officer, on October 22, 1875. The preparations for the construction of the section of line extending from Santa Fé to Fort Bayard, a distance of three hundred and ninety-six miles, were at once commenced. Arrangements for the delivery of line-supports and the other necessary line-material were made without delay. The details for construction parties were provided for. The commanding generals of the department and of the district co-operated actively with this office, furnishing men, transportation, and material, without which the work would have been seriously delayed. Three construction parties were organized for the construction, simultaneously, of as many sections of the line. Party No. 1, in charge of Second Lieut. T. F. Davis, Fifteenth Infantry, entered upon field-work upon section one, extending from Santa Fé to Las Lunas, at Santa Fé, December 20, 1875. Party No. 2, in charge of Second Lieut. F. E. Phelps, Eighth Cavalry, entered upon field-work upon section number two, extending from Las Lunas to Fort Craig, at Las Lunas, on December 28th, 1875. Party No. 3, in charge of Second Lieut. George H. Kinzie, Fifteenth Infantry, entered upon field work on section No. 3, extending from Fort Craig to Mesilla, at Fort Craig, December 13, 1875. All of these parties were well equipped. They had been thoroughly instructed at a camp of instruction, organized by Lieutenant Reade at Santa Fé before taking the field.

The section of the line extending from Santa Fé to Las Lunas, a distance of ninety-one miles, was completed February 16, 1876, and the party under Lieutenant Davis was ordered to Fort Bayard on that date. The section of the line from Las Lunas to Fort Craig, a distance of eighty-four miles, was completed on March 31, 1876. The section of the line from Fort Craig to Mesilla, a distance of one hundred and eleven miles, was completed April —, 1876. The line was completed to Fort Bayard on May 26, and to Silver City on May 31, 1876.

On April 27, 1876, Second Lieut. S. C. Vedder, Acting Signal-Officer, was assigned to duty in charge of the lines within the New Mexican division.

The work of connecting the lines in New Mexico with those in Arizona is now in progress, and will be completed by the erection of one hundred and fifty miles of line, upon which the work of construction has been already commenced. A continuous telegraphic connection from Santa Fé to San Diego will then exist. The line-supports have been erected from Fort Bayard to Ralston, a distance of forty-eight miles. The telegraphic wire is in readiness to be insulated, with a few days' labor, upon

the approach of the line to be constructed from Camp Grant to Ralston, and for material for which contract has been already made.

The lines of the New Mexican division connect stations at Santa Fé, Fort Craig, Fort Selden, Mesilla, Fort Bayard, and Silver City, at each of which places offices are in operation.

There are now employed in this division six enlisted men of the Signal-Service. While the lines thus described are maintained and operated daily with fair success, the scanty force of the Signal-Service will not permit it to occupy them to their full capacity without additional details.

In closing this rapid review, it is proper to refer to the duties in the last year expected of the service.

They have been to give protection to commerce by warnings on all of the Atlantic and Gulf coasts of the United States, and on those of the lakes; to watch the river-changes along their courses in the great river-valleys; to note at seasons the temperatures affecting canal-commerce; to carry telegraphic-lines, by which meteorological reports may be had, over regions considered impracticable for such constructions; to maintain a system of connected stations on the sea-coast; to take charge of the recognized system of voluntary meteorological observations on this continent, in addition to the regular system of the service; to secure the co-operation of foreign observers in foreign countries; to endeavor to aid directly all the farming population in the harvesting of their crops; and, finally, to put it in the power of every citizen to know each day, with reasonable accuracy, the approaching weather-changes.

The Chief Signal Officer earnestly recommends legislation for a more complete organization of the Signal-Service. With duties now as extensive as important, and reaching directly more interests of the people of the United States than those of any other bureau of the War Department, it exists without laws providing for the permanent employment and grades of its officers, or the promotion of its enlisted men. This condition is found to seriously embarrass the work of the Office. The subject of such organization received last year careful attention, and was favorably recommended by the President to the consideration of Congress. The experience of the year has demonstrated the need of it. If the service is to advance to greater successes, it cannot be too safely guarded against possible hamperings. A bill providing for a permanent organization was passed by the Senate at its last session. (Paper 29.)

The results for the year give cause for encouragement. The question of the useful pre-announcement of approaching meteoric changes may be considered as settled by now six years of successful service. With each year of labor the paths for improvement have opened more plainly. The co-operation of scientists has continued, both at home and abroad. The uses of the work accomplished, the results to be hoped from that in the future, have been well appreciated. The popular support and the support of the press have not failed. Whatever there has been of embarrassment can be but temporary. The opportunities for rendering a public good remain to the service. The effort will be to use them.

ALBERT J. MYER,
Chief Signal-Officer.

Hon. J. D. CAMERON,
Secretary of War, Washington, D. C.

PAPER 1.

RECORD OF SIGNAL CAMP OF INSTRUCTION, FORT WHIPPLE, VA.

Officers instructed during the year ending June 30, 1876.

Name.	Rank and corps.	Reported for instruction—	Relieved from instruction—	Remarks.
S. C. Vedder	Second lieutenant Nineteenth Infantry	Mar. 3, 1875	Sept. 10, 1875	Complet'd full course of signaling, telegraphy, and meteorology.
C. S. Heintzelman	First lieutenant Third Artillery	May 5, 1875	Aug. 25, 1875	
H. A. Reed	First lieutenant Second Artillery	May 21, 1875	Sept. 8, 1875	
J. A. Buchanan	First lieutenant Fourteenth Infantry	June 1, 1875	Jan. 21, 1876	
J. Allen	Second lieutenant Third Cavalry	June 8, 1875	Nov. 17, 1875	
A. H. Jackson	First lieutenant Seventh Infantry	June 17, 1875	Nov. 25, 1875	
J. McClellan	First lieutenant Fifth Artillery	Oct. 4, 1875	June 3, 1876	
C. A. Booth	Second lieutenant First Infantry	Dec. 23, 1875	.....	Still under instruction.

PAPER 2.

Amount of field-practice had by each officer.

Name.	Rank and corps.	Number of days flag-practice was had.	Number of nights torch-practice was had.	Remarks.
S. C. Vedder	Second lieutenant, Nineteenth Infantry	4	1	
C. S. Heintzelman	First lieutenant, Third Artillery	10	3	
H. A. Reed	First lieutenant, Second Artillery	10	3	
J. A. Buchanan	First lieutenant, Fourteenth Infantry	25	6	
J. Allen	Second lieutenant, Third Cavalry	26	4	
A. H. Jackson	First lieutenant, Seventh Infantry	21	5	
J. McClellan	First lieutenant, Fifth Artillery	35	6	
C. A. Booth	Second lieutenant, First Infantry	25	4	Still under instruction.

PAPER 3.

Table showing the instruction of candidates for the grade of sergeant, from July 1, 1875, to June 30, 1876.

Name.	Instruction commenced.	Date of promotion.	Remarks.
Christopher J. Costello	Apr. 10, 1875	July 16, 1875	Reduced April 6, 1876; now in charge of United States military telegraph office, near Fort McRae, N. Mex.
Richard O. Trent	Apr. 22, 1875	July 21, 1875	Reduced June 27, 1876; now on duty at Fort Whipple, Va.
Penton Belville	Apr. 17, 1875	July 21, 1875	In charge of station at Malone, N. Y.
Harry F. McFarland	July 5, 1875	Dec. 24, 1875	In charge of station at Manhattan, Kans.
Alfred P. Guthrie	July 29, 1875	Dec. 1, 1875	In charge of United States military telegraph office, near Fort Bayard, N. Mex.
Richard J. Lewis	Aug. 7, 1875	Nov. 20, 1875	In charge of station at Barnegat, N. J.
Owen S. M. Cone	Aug. 12, 1875	Nov. 20, 1875	In charge of station at Toledo, Ohio.
Edwin Garland	Oct. 29, 1875	Dec. 1, 1875	In charge of station at North Platte, Nebr.
Michael McGauran	Oct. 29, 1875	Feb. 19, 1876	In charge of station at Charleston, S. C.
James A. Barwick	Nov. 12, 1875	Feb. 11, 1876	In charge of station at Denver, Colo.
Benjamin M. Pursell	Nov. 21, 1875	Feb. 11, 1876	In charge of station at Buffalo, N. Y.
John Craig	Dec. 1, 1875	Feb. 19, 1876	In charge of station at Wytheville, Va.
Charles Howard	Dec. 2, 1875	.....	Dropped from instruction December 14, 1875.
Hubert M. Wells	Dec. 20, 1875	.....	Dropped from instruction January 12, 1876.
Daniel O'Leary	Jan. 4, 1876	Feb. 11, 1876	In charge of station at Fort Gibson, Ind. T.
John W. Smith	Jan. 24, 1876	May 16, 1876	In charge of station at Corsicana, Tex.
Edward B. Garriott	Feb. 10, 1876	May 16, 1876	In charge of station at Milwaukee, Wis.
Frederick J. Papst	Feb. 20, 1876	May 16, 1876	In charge of station at Punta Rassa, Fla.
James F. Burke	Feb. 21, 1876	May 16, 1876	In charge of station at Santa Fé, N. Mex.
John C. Rogers	Feb. 28, 1876	May 16, 1876	Temporarily in charge of station at Montgomery, Ala.
James T. Bradley	Mar. 7, 1876	May 16, 1876	Awaiting orders at Fort Whipple, Va.
John McGlone	Mar. 8, 1876	May 13, 1876	On duty as telegraph operator at Brackettville, Tex.
John A. Cody	Apr. 5, 1876	.....	Still under instruction.
Nicholas G. Brewer	Apr. 6, 1876	.....	Do.
Joseph E. Mayhew	Apr. 20, 1876	.....	Do.

PAPER 4.

Enlisted men instructed for the position of assistant to non-commissioned officers in charge of stations, from July 1, 1875, to June 30, 1876.

Names.	Placed under instruction for assistant.	Reported qualified as assistant.	Ordered on station.	Remarks.
Francis Pierce	May 20, 1875	July 10, 1875	July 16, 1875	On duty as assistant at Detroit, Mich.
Edward Mayne	June 18, 1875	Aug. 14, 1875	Oct. 30, 1875	Discharged the service of the United States February 9, 1876.
Denis Moore	June 21, 1875	July 31, 1875	Sept. 17, 1875	On duty as assistant at Norfolk, Va.
Thomas Burke	June 21, 1875	Aug. 14, 1875	Sept. 16, 1875	On duty as assistant at Cape Hatteras, N. C.
Edwin L. Robison	June 21, 1875	Aug. 14, 1875	Dec. 7, 1875	Discharged the service of the United States June 10, 1876.
James B. McLaughlin	July 13, 1875	.....	.....	On duty at Office of Chief Signal Officer.
Achilles M. Hancock	July 27, 1875	Oct. 2, 1875	Oct. 6, 1875	Discharged the service of the United States April 22, 1876.
Marbury B. White	July 27, 1875	.....	Oct. 22, 1875	On duty as assistant at Louisville, Ky.
Max Frost	July 31, 1875	.....	Sept. 20, 1875	On duty at Santa Fé, N. Mex.
David T. Flannery	July 31, 1875	Oct. 2, 1875	Oct. 18, 1875	On duty as assistant at Boston, Mass.
Lynds F. Jones	Dec. 8, 1875	.....	Jan. 11, 1876	Discharged the service of the United States June 13, 1876.
Charles F. Ottinger	Dec. 17, 1875	.....	Jan. 11, 1876	Ordered to Fort Whipple, Va., for misconduct.
Patrick B. McSweeny	Dec. 17, 1875	.....	.....	Dropped from instruction.
Theophile A. Flaesch	Dec. 20, 1875	Jan. 29, 1876	Feb. 2, 1876	On duty as assistant at Portland, Me.
John H. Krebs	Dec. 20, 1875	Jan. 29, 1876	Feb. 28, 1876	On duty as assistant at Cincinnati, Ohio.
John H. Sherman	Dec. 20, 1875	.....	Jan. 18, 1876	On duty at Office of Chief Signal Officer.
Henry A. Rathvon	Dec. 20, 1875	Jan. 29, 1876	Feb. 15, 1876	On duty as telegraph-operator at Griffin, Tex.
Patrick F. Lyons	Jan. 7, 1876	Feb. 26, 1876	Mar. 16, 1876	On duty as assistant at Montgomery, Ala.
Edward J. Gill	Feb. 11, 1876	.....	Mar. 10, 1876	In charge of station at Saint Paul's Island, Alaska.
George R. Hancock	Feb. 13, 1876	.....	Mar. 16, 1876	On duty as assistant at Cleveland, Ohio.
John Munroe	Feb. 29, 1876	Apr. 22, 1876	Apr. 24, 1876	Ordered to Fort Whipple, Va., for misconduct.
Richard R. Herman	Apr. 25, 1876	.....	May 15, 1876	On duty as assistant at Cincinnati, Ohio.
Alexander W. Browne	Apr. 25, 1876	.....	May 15, 1876	On duty as assistant at Baltimore, Md.
Daniel P. Waters	Apr. 25, 1876	.....	May 15, 1876	On duty as assistant at Memphis, Tenn.
Joseph B. Pleasants	Apr. 25, 1876	.....	May 22, 1876	On duty as assistant at Cincinnati, Ohio.
Patrick Connor	May 11, 1876	.....	June 2, 1876	On duty as assistant at Sandy Hook, N. J.
Frank Greene	May 11, 1876	.....	June 7, 1876	On duty as assistant at Cape May, N. J.
Joseph H. Bokel	May 11, 1876	June 10, 1876	June 26, 1876	On duty as assistant at Philadelphia, Pa.
Andrew T. Sherwood	May 27, 1876	.....	.....	Still under instruction.
Henry E. Williams	May 27, 1876	.....	.....	Do
Frederic E. Seegelken	May 27, 1876	.....	.....	Do.
William A. Reid	May 27, 1876	.....	.....	Do.
James A. Perkins	June 12, 1876	.....	.....	Do.

PAPER 5.

Exhibiting the communications sent from and received at the Office of the Chief Signal Officer, (exclusive of telegrams,) from July 1, 1875, to June 30, 1875.

SENT.

Division of telegrams and reports for the benefit of commerce and agriculture.

To heads of Departments and bureaus	231
To non-commissioned officers in charge of stations, in reference to their duties	10,136
In reply to applications for stations, and others similar	38
To telegraph companies, in reference to transmission of weather reports and the erection of telegraph lines, &c	113

To boards of trade, chambers of commerce, agricultural societies, &c	157
To postmasters, in reference to weather-bulletins	3,287
To foreign correspondents, relating to this division in general	544
To foreign correspondents, relating to synchronous reports	145
To volunteer observers throughout the United States	118
General and special orders and circulars with reference to this division	18,158
Miscellaneous	2,160
Total	35,087

Signal division.

To heads of Departments and bureaus	74
Relating to duties and discipline at Signal Service school of instruction and post of Fort Whipple, Va	773
Relating to recruiting and enlistment	91
Answers to applications for enlistment in the Signal Service, United States Army	757
General and special orders and circulars with reference to this division	3,423
Miscellaneous	1,037
Total	6,155

Property division.

To heads of Departments and bureaus	516
To manufacturers and others, in reference to instruments, equipments, &c	984
To non-commissioned officers in charge of stations, and other enlisted men, in reference to property and money accounts	13,671
In reference to quarterly returns of officers	2,784
Miscellaneous	3,626
Total	21,581
Aggregate	62,823

RECEIVED.

Division of telegrams and reports for the benefit of commerce and agriculture.

From heads of Departments and bureaus	138
Applications for the establishment of new stations	32
From telegraph-companies, in reference to the transmission of weather-reports and the construction of telegraph-lines, &c	1,133
From non-commissioned officers in charge of stations, in reference to their duties	14,969
From boards of trade, chambers of commerce, and agricultural societies	115
From foreign correspondents, relating to synchronous weather-reports	4,767
From volunteer observers throughout the United States, relating to observations and reports	6,868
From foreign correspondents, relating to this division in general	285
Reports relative to instruction of non-commissioned officers and assistants	3,311
Mailed reports from non-commissioned officers in charge of stations	303,748
Meteorological charts, abstracts of journals, forms, &c., received from non-commissioned officers in charge of stations	36,687
Reports from postmasters throughout the United States, in reference to weather-bulletins received and posted by them	312,824
Miscellaneous	1,977
Total	686,854

Signal division.

From heads of Departments and bureaus	253
Relating to duties and discipline at Signal-Service school of instruction and post of Fort Whipple, Va	759
Relating to instructions in signaling at Fort Whipple, Va., and in different military departments	482
Relating to recruiting and enlistment	653
Applications for enlistment in the Signal Service, United States Army	545
Miscellaneous	1,389
Total	4,081

Property division.

From heads of Departments and bureaus	952
From manufacturers and others, relating to instruments, equipments, &c	376
From officers, concerning property, quarterly returns, &c	1,097
From non-commissioned officers in charge of stations, and other enlisted men, relating to property and money accounts	35,232
Regarding property transferred to stations	2,206
Miscellaneous	15,370
Total	55,233
Aggregate	746,168
Aggregate sent	62,823
Aggregate received	746,168
Aggregate sent and received	808,991

Table showing the number of cipher words and messages sent and received by telegraph at the central office, Washington, D. C., from July 1, 1875, *to June* 30, 1876.

Cipher-words of weather-reports sent	118,164
Telegraphic messages other than weather-reports sent	7,941
Cipher-words of weather-reports received	782,931
Cipher-words of special river-reports received	25,116
Telegraphic messages other than weather-reports received	4,456

PAPER 6.

List of foreign publications received during the fiscal year ended June 30, 1876.

Theorie eines neuen Thermometers, welches aus der Vereinigung des Luftthermometers mit dem Wagebarometer entsteht und sich zu automatischen Aufzeichnung der Temperaturen sehr leicht verwenden lässt. Von Dr. Paul Schreiber. München, 1875.

Ergebnisse der Witterungs-Beobachtungen, welche in dem Decennium von 1861 bis 1873 auf dem meteorologischen Observatorium zu Emden gemacht sind, nebst Erfahrungen von Prof. Dr. M. A. F. Prestel. Hannover, 1875.

Kurzer Abriss der Geschichte der elektrischen Telegraphie von Dr. Karl Eduard Zetzsche. Berlin, 1874.

(Non-official, No. 9.) Report of the Permanent Committee of the First International Meteorological Congress at Vienna for the year 1874. Published by authority of the Meteorological Committee. London, 1875.

(Osservatorio di Moncalieri.) Il commodoro M. F. Maury e la corrispondenza meteorologica delle Alpi e degli Appennini Italiani. Del P. F. Denza. Torino, 1875.

Jahrbücher der k. k. Central-Anstalt für Meteorologie und Erdmagnetismus von Carl Jelinek und Ferdinand Osnaghi. Neue Folge, X. Band, Jahrgang 1873. Wien, 1875.

Annalen des physikalischen Centralobservatoriums. Herausgegeben von H. Wild. Jahrgang 1873. St. Petersburg, 1875.

Monthly Notices of Papers and Proceedings of the Royal Society of Tasmania for 1873.

Resultate der meteorologischen Beobachtungen an den selbst-registrirenden Instrumenten der Sternwarte zu Bern für das Jahr 1874. Von Prof. Dr. A. Forster.

Abstracts and Results of Magnetical and Meteorological Observations at the Magnetic Observatory, Toronto, Canada, 1841 to 1871 inclusive.

Reports on the Meteorological, Magnetic, and other Observatories of the Dominion of Canada, for the calendar year ended 31st December, 1874.

Monatliche Berichte über die Resultate aus den meteorologischen Beobachtungen angestellt an den königlich-sächsischen Stationen im Jahre 1874. Von Dr. C. Bruhns.

Sur la sécheresse des mois de février, mars et avril 1875. Par M. A. Lancaster, aide à l'Observatoire royal de Bruxelles.

Anales del Observatorio de marina de San Fernando, publicados de órden de la superioridad, por el director Don Cecilio Pujazon, capitan de navio. Seccion 2, observaciones meteorologicas, año 1873.

Instructions in the Use of Meteorological Instruments, compiled by direction of the Meteorological Committee, by Robt. H. Scott, esq. London, 1875.

Quarterly Weather Reports of the Meteorological Office. Part IV, Oct.-Dec., 1873 Parts I and II, Jan.-March and April-June, 1874.

Hourly Readings from the Self-recording Instruments, at the seven observatories, in connection with the Meteorological Office, December, 1874, January, February, March, April, May, June, July, August, September, October, 1875.

Report of the Meteorological Committee of the Royal Society for the year ending December, 1874.

Daily Weather Reports of the Meteorological Office, London, January 1 to June 30, 1875.

Quarterly Journal of the Meteorological Society of London, Nos. 15 and 16, vol. 2, July and October, 1875.

Journal of the Scottish Meteorological Society, Nos. 41 to 47 inclusive, Jan., 1874-Oct., 1875.

On some Recent Evidence of the Variation of the Sun's Heat. By Henry F. Blandford, Meteorologist of the Government of India.

Report of the Meteorological Reporter to the Government of Bengal. Meteorological Abstract for the year 1874. By W. G. Wilson.

Report of the Midnapore and Burdwan Cyclone of the 15th and 16th of October, 1874. By W. G. Wilson.

The Theory of the Causes by which Storms progress in an Easterly Direction over the British Isles, and why the Barometer does not always indicate real Vertical Pressure. By Robert Tennent, esq. Edinburgh, 1875.

Diurnal Oscillations of the Barometer. By Alexander Buchan. Part 1. Edinburgh, 1875.

The Winds of Northern India in Relation to Temperature and Vapour Constituent of the Atmosphere. By Henry F. Blandford, F. G. S., Meteorological Reporter to the Government of Bengal.

Proceedings of the Belfast Natural History and Philosophical Society for the session 1874-75.

Results of Observations in Meteorology, Terrestrial Magnetism, etc., taken at the Melbourne Observatory during the years 1873 and 1874, (vols. 2 and 3,) under the superintendence of Robt. L. J. Ellery.

Report of the Kew Committee for the year ending October 31, 1875.

The Journal of Education for Ontario. Edited, under the direction of the Rev. Egerton Ryerson, by J. George Hodgins, LL. D. Vol. 28, for the year 1875.

Greenwich Observations, 1873.

Greenwich Magnetical and Meteorological Observations, 1873.

Greenwich Astronomical Results, 1873.

Geological Survey of Newfoundland.—Report of Progress for the year 1874. By Alex. Murray.

Théorie du mouvement de la planète Uranus, par le prof. S. Newcomb. Traduit de l'anglais par M. H. Brocard. Alger, 1875.

Sur les variations ou inégalités périodiques de la température (dixième note). Période ou vingtième jour dodécuple; M. Ch. Sainte-Claire Deville, et onzième note.

Revue de météorologie dynamique du 25 nov. au 31 déc. 1874, par M. H. Tarry, et 1er jan. au 22 fév. 1875.

Nederlandsch meteorologisch jaarboek voor 1874, uitgegeven door het koninklijk nederlandsch meteorologisch instituut. Utrecht, 1875.

Résumé de quelques observations astronomiques et météorologiques faites dans la zone surtempérée et entre les tropiques, par J.-C. Houzeau.

Note sur les nivellements barométriques par M. Alexandre Buchan. Traduit de l'anglais par M. H. Brocard. Alger, 1875.

Nouvelles météorologiques. Huitième année, 1875, juillet-décembre, et neuvième année, 1876, janvier-mai.

Schweizerische meteorologische Beobachtungen, herausgegeben von der meteorologischen Centralanstalt der schweizerischen naturforschenden Gesellschaft, unter Direktion von Prof. Dr. Rudolf Wolf. Zehnter Jahrgang, 1875; eilfter Jahrgang, 1874: erste und zweite Lieferung und Supplementband erste Lieferung.

Meteorologishe Beobachtungen angestellt in Dorpat im Jahre 1874. Redigirt von Prof. Arthur von Oettingen und Prof Carl Weihrauch.

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Untersuchungen über die Veränderlichkeit der Tagestemperatur, von Dr. J. Hann. 1875.

Witterungsbericht vom Jahre 1875, nach den Beobachtungen württembergischer meteorologischen Stationen zusammengestellt von Prof. Dr. Schoder.

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Bulletin météorologique du département des Pyrénées-Orien., publié sous les auspices du département et de la ville de Perpignan. Année 1874.
Amphiorama ou la vue du monde, 2e notice.—La marée dans le bassin du Spitzberg et le flot qui contourne la tête du Grœnland, aussi l'arrivée de la lumière au pôle, pour la première fois observé et décrit, par F. W. C. Trafford.
Erster und zweiter Jahresbericht der geographischen Gesellschaft in Hamburg, 1873-74 und 1874-75, von L. Friederichsen. Hamburg, 1874-75.
(Deuxième session du congrès international des sciences géographiques.) Exposition. Liste des récompenses accordées par le jury international. Paris, 1875.
Cartes synoptiques journalières. Août, septembre, octobre, novembre, décembre 1874. Construites par N. Hoffmeyer, directeur de l'Institut météorologique danois.
VI. Jahresbericht der meteorologischen Centralstation Carlsruhe über die Ergebnisse der an den meteorologischen Stationen des Grossherzogthums Baden im Jahre 1874 angestellten Beobachtungen. Bearbeitet von Oscar Ruppel.
Astronomische, magnetische und meteorologische Beobachtungen an der k. k. Sternwarte zu Prag im Jahre 1874, herausgegeben von Carl Hornstein.
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Beiträge zur Kenntniss der Aloë und Werthbestimmung ihrer wichtigeren Handelssorten. Von Eugen Kondracki. Dorpat, 1874.
Vergleichende Untersuchungen über die physiologische Wirkung der Salze der Alvalien und alcalischen Erden. Von Louis Mickwitz. Dorpat, 1874.
Untersuchungen über das Casien. Von Renatus Kappeller. Dorpat, 1874.
Die Lehre von der Nothwehr in ihrer gegenwärtigen Entwickelung. Von Max Stillmark. Dorpat, 1875.
Die völkerrechtliche Bedeutung der Kongresse. Eine behufs Erlangung der Würde eines Doctors des Staats und Völkerrechts verfasste und mit Genehmigung einer hochverordneten Juristenfacultät der kaiserlichen Universität Dorpat zur öffentlichen Vertheidigung bestimmte Abhandlung von Witold Zaleski. Dorpat, 1874.
Über die Bedeutung des Kochsalzes und das Verhalten der Kalisalze im menschlichen Organismus. Von G. Bunge. Dorpat, 1873.
Vergleichende Untersuchungen über das Saponin der Wurzel von Gypsophila Struthium, der Wurzel von Saponaria officinalis, der Quillajarinde und der reifen Samen von Agrostemma Githago. Von Johann Christophsohn. Dorpat, 1874.
Der Kali-, Natron- und Chlorgehalt der Milch, verglichen mit dem anderer Nahrungsmittel und des Gesammtorganismus der Säugethiere. Von Gustave Bunge. Dorpat, 1874.
Beiträge zur Kenntniss der Bildung des Harnstoffs im thierischen Organismus. Von Woldemar V. Knieriem. Dorpat, 1874.
Festrede zur Jahresfeier der Stiftung der Universität Dorpat am 12. December 1871, gehalten von Leo Meyer, nebst den Mittheilungen über die Preisaufgaben sowie dem Universitäts-Jahresbericht für das Jahr 1871. Dorpat, 1872.
Festrede zur Jahresfeier der Stiftung der Universität Dorpat am 12. December 1872. "Ueber den mathematischen Unterricht in der Schule." Gehalten von Arthur von Oettingen. Dorpat, 1873.
Festrede zur Jahresfeier der Stiftung der Universität Dorpat, am 12. December 1873. "Ueber die Bedeutung der semitischen Philologie für die alttestamentliche Exegese." Gehalten von Wilhelm Volck. Dorpat, 1874.
Festrede zur Jahresfeir der Stiftung der Universität Dorpat am 12. December 1874. "Ueber die Stellung der Rechtswissenschaft vor dem Richterstuhl der Laien und Schwesterwissenschaften." Gehalten von Carl Erdmann. Dorpat, 1875.
Ein Beitrag zur Kenntniss der Milch. Von Prof. Alexander Schmidt. Dorpat, 1874.
Ad Sallemnia Caesareae Universitatis Dorpatensis quae quo die haec Academia olim condita est die XII. in mensis Decembris anni MDCCCLXXIV. hora XII. in aula magna oratione Caroli Erdmanni.
Ein Beitrag zur Physik der höheren Luftschichten. Von Dr. Gustav Hellmann.
Note sur le compteur solaire de M. Allegret.
J. B. Biot's Tafeln zur Berechnung barometrischer Höhenmessungen. Neu berechnet und erweitert von H. Kiefer. Tiflis, 1874.
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Zum Gedächtniss an M. H. von Jacobi. Von H. Wild. St. Petersburg, 1876.
Photometrische Bestimmung des diffusen Himmelslichtes. Von H. Wild.
Das physikalische Central-Observatorium in St. Petersburg und die neuere Entwickelung der Meteorologie in Russland. Von H. Wild.
(Congresso degli scienziati in Palermo.) Proposte della commissione per l'ordinamento dei servizi meteorologici in Italia. Roma, 1875.
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Bullettino del R. comitato geologico d'Italia. Anno 1873 e 1874 e Nro. 1 e 4, Gennaio e Aprile 1875 e Nro. 1 e 2, Gennaio e Febbraio 1876.
Direzione della statistica.—Norme per le osservazioni meteoriche. Roma, 1875.
Osservatorio di Moncalieri.—Conferonti dei barometri delle stazioni meteorologiche italiane pel P. F. Denza. Torino, 1876.
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Observaciones magnéticas y meteorológicas del Colegio de Belen de la Compañía de Jesus en la Habana. Año de 1873. Habana, 1875.
Réseau météorologique africain. Observations centralisées par M. le général Farre, et résumées par M. H. Brocard. Mars, avril, mai, juin 1875.
Oversight over Veirforholdene i Norge i Aaret 1874 af H. Mohn.
Anales del Instituto y observatorio de marina de San Fernando. Publicados de órden de la superioridad, por el director Don Cecilio Pujazon. Seccion 2, observaciones meteorológicas. Año 1874. San Fernando, 1875.
Meteorologisk Aarbog for 1874. Udgivet af det danske meteorologiske Institut, Kjobenhaven, 1875. Par N. Hoffmeyer.
Rapports mensuels du Conseil fédéral suisse aux gouvernements des états qui ont participé à la subvention de la ligne du St. Gothard sur la marche de cette entreprise dans la période du 1 oct. 1872 au 30 sep. 1875. Berne, 1875.
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Regulativ für die Prüfung von nautischen und meteorologischen Instrumenten sowie für Deviationsbestimmungen der Compasse an Bord eiserner Schiffe, und über die an die deutsche Seewarte zu zahlenden Gebühren. Hamburg, 1876.
Seconde notice sur les observations météorologiques faites sur la côte du Labrador. Par des missionaires moraves. Lue à la séance de la Société de physique et d'histoire naturelle du Genève du 7 octobre 1875. Par M. le professeur Gautier.
Sur la trombe près de Hallsberg le 18 août 1875 par H. H. Hildebrandsson. Upsal, 1875.
Notice sur l'Observatoire royal de Bruxelles, par E. Quetelet.
Ergebnisse der Witterungs-Beobachtungen von 1864 bis 1873. Von Prof. Dr. M. A. F. Prestel.
Jahrbücher der k.-ung. Central-Anstalt für Meteorologie und Erdmagnetismus, von Dr. Guido Schenzl. III. Band, Jahrgang 1873. Budapest, 1875.
Annuaire météorologique et agricole de l'Observatoire de Montsouris pour l'an 1876.
Le climat de l'empire russe, par M. le Dr. Vojeikof. (Extrait du Rapport annuel de l'Institution smithsonienne de Washington, année 1872.) Traduit de l'anglais par M. H. Brocard. Alger, 1875.
Éléments climatologiques de la ville de Bruxelles pendant la période décennale 1864-1875, par M. E. Quetelet.
Rapport fait par M. Le Roux, au nom du comité des arts économiques sur les baromètres dits holostériques présentés par MM. Naudet, Hulot et cie.
Nederbördsmängden i Sverige härledd ur de vid Statens meteorologiska Stationer under Åren 1860-1872, anställda iakttagelser af Robert Rubenson. Stockholm, 1876.
Observaciones del tránsito de Vénus hechas en el Japon por la comision astronómica mexicana. Opúsculo escrito por Francisco Diaz Covarrubias. Paris, 1875.
Note sur l'état actuel de la météorologie départementale, par M. de Tastes. Tours, 1876.
Étude sur les courants aériens, par M. de Tastes.
Memorandum on the Organization of the Office, &c., and Digest of the Annual Reports since 1867 of the Meteorological Office, London.
On the Physical Geography of the Part of the Atlantic which lies between 20° N. 10° S., and extends from 10° to 40° W., by Capt. Toynbee. Published by authority of the Meteorological Committee. London, 1876.
Observations météorologiques faites à Saint Martin de Hinx (département des Landes), par M. H. Carlier, du 1er déc. 1874 au 30 nov. 1875. Bayonne, 1875.

Observações meteorologicas e magneticas feitas no observatorio meteorologico e magnetico da universidade de Coimbra 1875 e Dezembro de 1874. Coimbra, 1876.
Atlas météorologique de l'observatoire de Paris. Années 1872, 1873 et 1874. Paris, 1875.
Des hauteurs barométriques moyennes dans l'océan atlantique, par Buis Ballot. Utrecht, 1876.
Nederlandsch meteorologisch Jaarboek voor 1871, uitgegeven door het koninklijk nederlandsch meteorologisch Instituut.
Schweizerische meteorologische Beobachtungen. Jahrgang 1874, fünfte Lieferung; Jahrgang 1875, zweite und dritte Lieferung, und Supplementband: zweite Lieferung.
Notes of a Voyage to Kerguelen Island to observe the Transit of Venus, December 8, 1874, by the Rev. S. J. Perry.
Results of Meteorological Observations made at the Radcliffe Observatory, Oxford, in the year 1873, under the superintendence of Rev. Robert Main. Oxford, 1875.
R. comitato geologico de Italia. Bollettino No. 3 e 4, Marzo e Aprile 1876.
Amphiorama ou la vue du monde.—Phénomène inconnu, pour la première fois observé et décrit par F. W. C. Trafford. Lausanne, 1875.
Monatliche Berichte über die Resultate aus den meteorologischen Beobachtungen. angestellt an den königlich-sächsischen Stationen, im Jahre 1875. Von. Dr. C. Bruhns.
La tempête du 12 mars 1876. Communication par M. E. Quetelet.
De la vulgarisation par la presse des observations météorologiques par H. Carry.
Mémoire de météorologie nautique lu au Congrès international de géographie par L. Brault.
Über die periodischen Aenderungen der Lufttemperatur in Krakau vom Prof. Dr. Karlinski.
Pic du Midi de Bigorre.—Mémoires et travaux hivernage de 1875-76. Situation financière par C.-X. Vanssenat.
Deviations-Coefficienten der Schiffe S. M. Kriegsmarine, berechnet aus den vom Jahre 1857 bis 1875 angestellten Beobachtungen, herausgegeben vom hydrographischen Amte S. M. Kriegsmarine. Pola, 1875.
Risultato della discussione delle osservazioni di Jones sulla luce zodiacho. Lettera del S. C. P. Allessandro Serpieri al M. E. prof. G. V. Schiaparelli.
Remarques à propos de la découverte du allium, par M. D. Mendeleef.
Bulletin mensuel de l'observatoire de Montsouris, par M. Marie-Davy, juin 1875-juin 1876.
Bulletino meteorologico dell'osservatorio del Collegio Romano. Compilato dal P. Angelo Secchi, Giugno 1875-Maggio 1876.
Meteorologia Italiana Giugno-Novembre 1875.
Bullettino meteorologico del 'osservatorio del R. Collegio-Carlo Alberto in Moncalieri, Novembre, Decembre 1874, Gennaio, Febbraio 1875.
Bulletin météorologique mensuel de l'observatoire de l'université d'Upsal, janv.-déc. 1875.

PAPER 7.

Showing stations inspected, by whom, and when inspected.

Stations.	Name of inspector.	Date.
Albany, N. Y	Second Lieut. James Allen, acting signal-officer	March 29, 1876.
Augusta, Ga	First Lieut. James A. Buchanan, acting signal-officer	April 26–29, 1876.
Buffalo, N. Y	Second Lieut. James Allen, acting signal-officer	Mar. 30–Apr. 3, 1876.
Burlington, Iowa	First Lieut. F. C. Grugan, acting signal-officer	July 4, 1875.
Cape Henry, Va	First Lieut. James A. Buchanan, acting signal-officer	April 3, 4, 1876.
Charleston, S. C	do	May 1–4, 1876.
Chicago, Ill	Second Lieut. James Allen, acting signal-officer	April 10–14, 1876.
Cincinnati, Ohio	First Lieut. F. C. Grugan, acting signal-officer	July 19–21, 1875.
	Second Lieut. James Allen, acting signal-officer	Apr. 28–May 3, 1876.
Cleveland, Ohio	do	June 5–9, 1876.
Corsicana, Tex	First Lieut. A. W. Greely, acting signal-officer	April 18, 19, 1876.
Davenport, Iowa	First Lieut. F. C. Grugan, acting signal-officer	July 1–3. 1875.
Detroit, Mich	Second Lieut. James Allen, acting signal-officer	April 4–8, 1876.
Erie, Pa	do	June 10–14, 1876.
Galveston, Tex	First Lieut. A. W. Greely, acting signal-officer	April 20–25, 1876.
Grand Haven, Mich.	Second Lieut. James Allen, acting signal-officer	May 20–24, 1876.
Indianapolis, Ind	First Lieut. F. C. Grugan, acting signal-officer	July 10–13, 1875.
	Second Lieut. James Allen, acting signal-officer	May 8–12, 1876.
Indianola, Tex	First Lieut. A. W. Greely, acting signal-officer	April 26–28, 1876.
Jacksonville, Fla	First Lieut. James A. Buchanan, acting signal-officer	May 19–23, 1876.
Keokuk, Iowa	First Lieut. F. C. Grugan, acting signal-officer	July 5–7, 1875.
Key West, Fla	First Lieut. James A. Buchanan, acting signal-officer	June 7, 8, 1876.
Logansport, Ind	First Lieut. F. C. Grugan, acting signal-officer	July 8, 1875.
	Second Lieut. James Allen, acting signal-officer	May 12, 13, 1876.
Louisville, Ky	First Lieut. F. C. Grugan, acting signal-officer	July 13–17, 1875.
	Second Lieut. James Allen, acting signal-officer	May 4–7, 1876.
Lynchburg, Va	First Lieut. James A. Buchanan, acting signal-officer	April 21–24, 1876.
Milwaukee, Wis	Second Lieut. James Allen, acting signal-officer	May 16–19, 1876.
Mobile, Ala	First Lieut. James A. Buchanan, acting signal-officer	June 17–20, 1876.
Montgomery, Ala	do	June 22–25, 1876.
New Orleans, La	First Lieut. A. W. Greely, acting signal-officer	May 1–8, 1876.
New York City	Second Lieut. James Allen, acting signal-officer	March 20–24, 1876.
Norfolk, Va	First Lieut. James A. Buchanan, acting signal-officer	Mar. 29–Apr. 2, 1876.
Oswego, N. Y	Second Lieut. James Allen, acting signal-officer	June 28–July 3, 1876.
Philadelphia, Pa	do	March 14–19, 1876.
Pittsburgh, Pa	do	June 15–20, 1876.
Port Huron, Mich	do	May 25–28, 1876.
Punta Rassa, Fla	First Lieut. James A. Buchanan, acting signal-officer	June 1–3, 1876.
Rochester, N. Y	Second Lieut. James Allen, acting signal-officer	June 23–27, 1876.
Saint Louis, Mo	do	April 22–27, 1876.
Saint Mark's, Fla	First Lieut. James A. Buchanan, acting signal-officer	May 15, 16, 1876.
Savannah, Ga	do	May 6–9, 1876.
Smithville, N. C	do	March 23–26, 1876.
Toledo, Ohio	Second Lieut. James Allen, acting signal-officer	May 30–June 3, 1876.
Tybee Island, Ga	First Lieut. James A. Buchanan, acting signal-officer	May 11, 12, 1876.
Vicksburg, Miss	do	June 28, 30, 1876.
Wilmington, N. C	do	March 17–21, 1876.

PAPER 8.

List of places for which stations have been requested, but not established, June 30, 1876.

Place.	Applicant.	Date.
Muskegon, Mich	Hon. H. H. Holt, Michigan legislature, inclosing petition of 99 citizens.	Jan. 21, 1871
	Board of Trade, Toledo	Jan. 27, 1871
	Board of Trade, Chicago	Feb. 10, 1871
	Hon. T. W. Ferry, United States Senate	Mar. 3, 1871
	Hon. T. W. Ferry, United States Senate; S. H. Wagner, mayor, and 43 others.	Mar. 15, 1875
Manitowoc, Wis	Hon. P. Sawyer, M. C	Jan. 25, 1871
	Hosea Barnes	May 4, 1876
Huron City, Mich	Board of Trade, Toledo	Jan. 27, 1871
	Board of Trade, Cleveland	Feb. 19, 1871
	Board of Trade, Detroit	Feb. 19, 1871
Mackinac, Mich	Board of Trade, Chicago	Feb. 10, 1871
Richmond, Va	W. G. Turpin	Apr. 3, 1871
Body Island, N. C	Board of Trade, Norfolk, and resolution of general assembly of Virginia.	Apr. 17, 1871
Lewes, Del	Board of Trade, Philadelphia	May 25, 1871
The Parks of Colorado	E. J. Mallott, late consul-general	May 24, 1871
Staten Island	C. Kentgen, jr	June 9, 1871
	do	June 20, 1871
Chambersburgh, Pa	Hon. John Scott, United States Senate	June 12, 1871
	Hon. Simon Cameron, United State Senate	June 12, 1871

List of places for which stations have been requested, &c.—Continued.

Place.	Applicant.	Date.
Watertown, N. Y.	L. L. Pratt	June 21, 1871
	Common council, forwarded by Mayor Fred. D. Hills	June 21, 1873 Mar. 9, 1876
Xenia, Ohio	C. E. Case	June 30, 1871
Port Hope	Board of Trade, Detroit, Mich	July 22, 1871
Champaign, Ill., (Illinois Industrial University.)	Hon. W. E. Flagg, secretary	July 21, 1871
	Hon. J. M. Gregory, president	Feb. 21, 1872
	E. A. Gastman, chairman meteorological committee Macon County Fruit-Growers' Association.	Aug. 30, 1874
Little Rock, Ark	Hon. J. M. Hanks, M. C	July 26, 1871
	Albert Cohen	July 1, 1872
	A. Van Cleff	May 31, 1873
	Hon. Powell Clayton, United States Senate	Mar. 11, 1874
	Hon. Powell Clayton, United States Senate; Hon. S. W. Dorsey, United States Senate; Hon. W. S. Slemons, M. C.; Hon. L. C. Gause, M. C.; Hon. T. M. Gunter, M. C.; Hon. W. W. Wilshire, M. C.	Feb. 7, 1876
Sacramento, Cal	J. N. Hoag, corresponding secretary California State Board of Agriculture.	July 26, 1871
	J. N. Hoag, secretary meteorological committee of California State Agricultural Society.	Jan. 10, 1872
	Concurrent resolution of the legislature of California presented by Dr. T. M. Logan, secretary State Board of Health.	May 15, 1872
Niles, Mich	J. B. Fitzgerald, secretary Berrien County Agricultural Society.	July 27, 1871
Louisiana, Mo	W. Stark and R. E. Pleasants	Aug. 3, 1871
Hot Springs, Ark	J. H. Morton, M. D	Aug. 2, 1871
Janesville, Wis	J. B. Whiting, H. D., and Rock County Agricultural Society.	Aug. 7, 1871
Hillsdale, Mich	Prof. George McMillan, secretary of Hillsdale College	Aug. 6, 1871
	Hillsdale County Agricultural Society	——, 1871
Metamora, Ill	Edward Kipp, secretary Woodford County Agricultural Society.	Aug. 8, 1871
Marietta, Ohio	J. W. Andrews, president Marietta College; Washington County Agricultural Society.	Aug. 10, 1871
Mount Pleasant, Pa., (Mount Pleasant Academy.)	W. H. McCreery, acting principal	Aug. 11, 1871
Nebraska City, Nebr	H. K. Raymond, secretary Otoe County Farmers' Club	Aug. 14, 1871
Peoria, Ill	L. J. Colton	Aug. 11, 1871
	W. H. Herron, J. C. Proctor, and 80 others	Mar. 7, 1876
Princeton, Ill	L. J. Colton	.....
Mount Moosilauk, N. H	Prof. C. H. Hitchcock A. T. Clough	Aug. 16, 1871
Catasauqua, Pa	Hon. E. McPherson, Clerk United States House of Representatives.	Sept. 11, 1871
Galena, Ill	D. Wilmot Scott, publisher of the Galena Commercial Advertiser.	Sept. 14, 1871
Columbus, Nebr	J. O. Shannon, secretary Platte County Agricultural Society.	Sept. 5, 1871
Coburg and Collingwood, Canada.	Oswego Board of Trade, by J. L. McWhorter	Aug. 30, 1871
Springfield, Mo	John E. Worth, for Greene County Agricultural and Mechanical Society.	Sept. 18, 1871
Mason City, Iowa	T. G. Emsley, secretary Cerro Gordo County Agricultural Society.	Oct. 6, 1871
Orono, Me., (State Agricultural College.)	M. C. Fernald, Maine State College of Agriculture	Oct. 19, 1871
Balize, La., Fort Morgan, Ala., Waco, Tex.	L. Libby, postmaster	Feb. 17, 1873
	Agents and captains of Morgan Steamship Company	Oct. 31, 1871
Fort Randall, Dak	R. J. Percy, for Missouri Valley Telegraph Company	Nov. 9, 1871
Ann Arbor, Mich., (University of Michigan.)	Prof. Ger. Merriman	Nov. 28, 1871
Fountain, Colo	R. F. Long, editor El Paso Ranchman	Dec. 4, 1871
Vineyard Haven, Mass	Prof. J. E. Hilgard, United States Coast Survey; Daniel W. Stevens, and Rev. Thomas Hill.	Dec. 18, 1871
Cape Ann, Mass	Hon. B. F. Butler, M. C	Dec. 19, 1871
Iowa City, Iowa, (State University.)	John P. Irish	Dec. 14, 1871
	S. J. Kirkwood	Jan. 6, 1873
	A. D. Schenck, first lieutenant, Second United States Artillery.	July 3, 1875
Manassas, Va	George C. Round	Dec. 27, 1871
Quincy, Ill	A. H. Hill, secretary National Board of Trade	Jan. 4, 1872
Dover Point, N. H	John B. Stivens, mayor	Jan. 13, 1872
Wilmington, Del	Board of Trade, Wilmington, Del	Jan. 24, 1872
Additional stations on eastern shore of Lake Michigan.	Hon. H. H. Holt, Michigan legislature	Feb. 11, 1871
Additional stations on mountains of Virginia.	G. C. Wedderburn, secretary Virginia Telegraph Company; L. A. Gobright, Associated Press.	May 17, 1871
Additional stations on western slope of Mississippi.	George P. Plant, W. H. Scudder, R. P. Handy, committee of the Merchants' Exchange, Saint Louis.	July 16, 1871

List of places for which stations have been requested, &c.—Continued.

Place.	Applicant.	Date.
Monomdy Point, Cape Cod Light, Mass.	R. B. Forbes	Nov. 29, 1871
Southwest Pass, La., (Pass à l'Outre.)	Thornton A. Jenkins, Rear-Admiral, United States Navy	Mar. 20, 1871
Staunton, Va., Christiansburgh, Va., Bristol, Tenn., Easton, Pa., Harrisburgh, Pa., Winchester, Va.	Jed. Hotchkiss, secretary of the Augusta County Fair, Virginia.	Aug. 15, 1871
Towanda, Kans	M. D. Ellis	Feb. 12, 1872
Black Dome, N. C., (Black Mountain.)	William Cain	Feb. 12, 1872
Charlotte, N. Y	J. Eaton and 35 others	Feb. 14, 1872
	George G. Clarkson, mayor, and 15 others	Oct. 27, 1874
	William H. Newcomb and 22 others	Oct. 27, 1874
Gallitzin and Altoona, on Pennsylvania Central Railroad.	David Peelor	Feb. 17, 1872
Minneapolis, Minn., (University of Minnesota.)	William W. Folwell, president	Feb. 21, 1872
Each of the State Agricultural Colleges.	J. B. Bowman, regent Kentucky University, and others	Feb. 29, 1872
Columbus, Ohio	J. H. Klippart, secretary Ohio State Board of Agriculture.	Mar. 5, 1872
	William McCrory	Jan. 4, 1876
	Legislature of Ohio by joint resolution, Tyndall Association of Columbus, Columbus Academy of Medicine, and Board of Education, Columbus.	Feb. 8, 1876
Northfield, Vt., (Norwich University.)	Capt. C. A. Curtis	Mar. 15, 1872
Grand Tower, Ill	A. R. Harris, secretary Mutual Aid and Improvement Society, Saint Louis, Mo.	Mar. 21, 1872
Iuka, Miss	Rev. J. T. Freeman, (through Hon. George E. Harris, M. C.)	Mar. 25, 1872
Great Natihalee, N. C., (Bald Mountain.)	Charles W. Jenks	Apr. 1, 1872
Deposit, N. Y	G. W. Hanford	Apr. 1, 1872
Heilman Dale, Pa	S. P. Heilman	Apr. 1, 1872
Booneville, Mo	J. L. Stephens	Apr. 11, 1872
Fort Wayne and New Albany, Ind.	F. C. Johnson, chairman meteorological committee Indiana State Board of Agriculture.	Apr. 12, 1872
Maryland Agricultural College.	A. R. Davis, president board of trustees	Apr. 19, 1872
	.....do	June 21, 1872
San Antonio, Tex	Thomas G. Williams	May 10, 1872
	H. B. Adams and others	.....
	Fred. Pottersoo n and 52 others	Mar. 16, 1874
	Hon. M. C. Hamilton, United States Senator	Mar. 17, 1874
	Hon. John Hancock, M. C	Apr. 1, 1874
Atlanta, Ga	Hon. John H. James, mayor	May 10, 1872
	Chamber of Commerce, per Hon. R. H. Whiteley, M. C	Feb. 15, 1874
Auburn, Ala., (Agricultural and Mechanical College of Alabama.)	William C. Stubbs, John B. Read, and W. H. Jennison	May 14, 1872
Racine, Wis	Mayor and council	May 18, 1872
Ogdensburgh, N. Y	Hon. W. A. Wheeler, M. C	May 25, 1872
Plattsburgh, N. Y	Hon. John Rodgers, M. C	May 28, 1872
Sewanee, Tenn	John L. Cooper, (through Prof. Joseph Henry, Smithsonian Institution.)	June 10, 1872
Newark, Del., (Delaware College.)	William D. Mackey, secretary of faculty	June 11, 1872
Green Bay, Wis	Hon. P. Sawyer, M. C	June 13, 1872
	Hon. Philetus Sawyer, M. C	June 24, 1874
Kenosha, Wis	Wallace Mygatt	June 20, 1872
Warsaw, Ind	Marshall H. Parks	June 24, 1872
Beaver City Utah	Daniel Tyler	July 8, 1872
New Ulm, Minn	Dr. Alfred Muller	July 10, 1872
Evansville, Ind	F. C. Johnson; P. Hornbrook, surveyor of customs; Thomas P. Britton, president Vanderburgh County Agricultural Society; John Ingle, secretary Vanderburgh County Agricultural Society, and Charles H. Butterfield, mayor.	July 13, 1872
	C. H. Butterfield, mayor	Nov. 26, 1873
	H. L. Morrill and citizens of Evansville	Jan. 16, 1874
	T. W. Veneman	May 31, 1875
Aiken, S. C	Hon. F. A. Sawyer, United States Senate, and 16 citizens	July 16, 1872
	John C. Derby	Sept. 2, 1872
	James Whitall	Mar. 31, 1875
Winona, Miss	A. M. Rafter	July 20, 1872
Eutaw, Ala	W. S. Bird	July 20, 1872
Belfast, Me	George E. Brackett	Aug. 6, 1872

List of places for which stations have been requested, &c.—Continued.

Place.	Applicant.	Date.
Ithaca, N. Y., (Cornell University.)	A. D. White, president, and petition of 75 citizens	Aug. 8, 1872
	Farmers' Club of Ithaca	Nov. 18, 1872
	A. D. White, president, and faculty of Cornell University	Aug. 8, 1872
	Hon. Roscoe Conkling, United States Senate	Jan. 25, 1873
	P. B. Crandel, corresponding secretary Farmers' Club	Feb. 3, 1875
	E. A. Fuertes, department of engineering	Mar. 17, 1875
Straits of Mackinac	Roys I. Cram	Aug. 7, 1872
	Chamber of Commerce, Milwaukee	May 5, 1873
	Board of Trade, Buffalo	May 26, 1873
	Board of Trade, Chicago	May 22, 1873
	J. L. Hathaway and J. B. Merrill, meteorological committee Chamber of Commerce, Milwaukee.	Sept. 5, 1874
Carthage, Ill	L. F. M. Easterday and petition of 105 citizens	Sept. 2, 1872
Kutztown, Pa., (Keystone State Normal School.)	A. R. Horne, principal	Sept. 13, 1872
Pensacola, Fla	S. C. Cobb, president Pensacola Ice Company, and 128 others.	Oct. 7, 1872
	Thomas C. Watson, commodore of Pensacola Regatta Club.	July 25, 1873
Gainesville, Ga	M. F. Stephenson	Nov. 5, 1872
Chattanooga, Tenn	Steamboatmen's convention assembled at Cairo, Ill	Nov. 17, 1872
	J. M. Pettigrew, president, and J. S. Toof, secretary, Memphis Chamber of Commerce, and 101 others.	Aug. 15, 1875
Some point between Leavenworth and Shreveport.	Steamboatmen's convention assembled at Cairo, Ill	Nov. 17, 1875
On plains of Western Kansas and regions southward and southwestward.	Kansas State Horticultural Society	Dec. 21, 1872
Dallas, Tex	W. A. Jones & Co., W. C. Connor, and 133 others	Dec. 26, 1872
Oil City and Parker's Landing on the Allegheny River. Greensborough and Brownsville on the Monongahela.	Resolution of select council of Pittsburgh, transmitting and approving petition of 46 citizens of Pittsburgh.	Dec. 28, 1872 Jan. 10, 1873
Lawrence, Kans., (University of Kansas.)	John Fraser, chancellor, Hon. Stephen A. Cobb, M. C., inclosing petition of Alfred Gray, secretary State Board of Agriculture.	Jan. 16, 1873 May 6, 1873
Manchester, N. H	Hon. S. M. Bell, M. C., inclosing resolution of New Hampshire State Agricultural Society.	Jan. 21, 1873
Sandwich, Ill	N. E. Ballou, (through Commissioner of Agriculture)	Jan. 22, 1873
Detroit, Minn	Daniel Cony	Feb. 2, 1873
Dayton, Ohio, (National Soldiers' Home.)	Hon. Isaac Strohen	Feb. 11, 1873
	Thomas L. Neal, president, and Thomas D. Davis, secretary, Montgomery County Medical Society'	Feb. 1, 1875
Palatka, Fla	J. F. Starr, (through Secretary of the Navy)	Feb. 17, 1873
Put in Bay, Ohio	H. B. West	Mar. 3, 1873
	H. D. Cooke, governor District of Columbia	July 17, 1873
Emporia, Kans	Robert Milliken	Mar. 6, 1873
North and west of Galveston, Tex.	Chamber of Commerce, (through Hon. John Hancock)	Mar. 6, 1873
Charlottesville, Va., (University of Virginia.)	Hon. R. T. W. Duke, M. C	Mar. 2, 1873
Raleigh, N. C	Cotton Exchange, New Orleans, La	Mar. 30, 1873
Columbia, S. C	do	Mar. 30, 1873
	Hon. John Alexander, mayor, transmitting resolution of city council,	June 11, 1873
	Hon. F. A. Sawyer, and petition of 58 citizens, and resolution of city council.	Aug. 5, 1873
Columbus, Miss	Cotton Exchange, New Orleans, La	Mar. 30, 1873
Pierce City, Mo	E. P. Lingee, president board of education	Apr. 9, 1873
Neshanic Mountain, Somerset County, N. J.	John V. D. Pumyer	Apr. 12, 1873
Bay City, Mich	Hon. N. B. Bradley, M. C	Apr. 27, 1873
	do	Feb. 19, 1874
	do	June 17, 1874
	W. S. Crosthwaite	Jan. 21, 1875
Vincennes, Ind	W. Hays	June 15, 1873
Springfield, Ill	S. M. Cullom, transmitting petition of governor, State officers, and others.	July 5, 1873
	E. A. Gastman, chairman meteorological committee Macon County Fruit-Growers' Association.	Aug. 30, 1874
Cedar Keys, Fla	Hon. Albert E. Willard, mayor, and 16 others	July 7, 1873
	D. L. Yulee, Fernandina, Fla	Feb. 7, 1874
Salina, Kans	Freeman Kingman, secretary Patrons of Husbandry and Farmers' Club.	July 17, 1873
Alleghanies in North Carolina	George W. Warren, jr	July 26, 1873
Carthage, Mo	E. P. Searl and 174 others	Aug. 15, 1873
New Berne, N. C	George W. Nason, jr	Sept. 13, 1873
Port Townsend, Wash	J. W. Sweeny, general superintendent Puget Sound Telegraph Company.	Sept. 30, 1873

List of places for which stations have been requested, &c.—Continued.

Place.	Applicant.	Date.
Mineral Point, Wis	Hon. T. O. Howe, United States Senate; Moses M. Strong	Dec. 16, 1873
Latitude 40° 30′, longitude 74° 42′, Somerset County, N. J.	Hon. F. T. Frelinghuysen, United States Senate; citizens of Somerset, Hunderdon, and Middlesex Counties.	Dec. 22, 1873
Carlton, Wis	Edward Back, farmers and ship-owners of the district	Jan. 10, 1874
	Hon. Phile tus Sawyer, M. C., Edward Back	Jan. 26, 1874
Fernandina, Fla	Henry Hazen, collector; W. S. Simmons, first lieutenant United States Revenue Marine.	Jan. 17, 1874
	Hon. D. C. Conover, United States Senate; G. Stark, mayor; Isaiah Winch, president of council, and 22 others.	Jan. 19, 1874
	D. L. Yulee	Feb. 7, 1874
Helena, Ark	Hon. J. L. Alcorn, United States Senate	Feb. 12, 1874
Oakland, Cal., (University of California.)	J. West Martin, secretary of the board of regents	Feb. 12, 1874
Fayetteville, Ark., (Arkansas Industrial University.)	Hon. A. S. Prather, trustee	Feb. 17, 1874
Beatrice, Nebr	Hon. P. W. Hitchcock, United States Senate; A. S. Paddock.	Mar. 3, 1874
One or more stations in Arizona.	Charles Donnison, M. D	Mar. 16, 1874
Manistee, Mich	Hon. J. A. Hubbell, M. C.; L. T. Estis	Mar. 18, 1874
Fort Macon, N. C	Hon. J. M. Leach, M. C	Mar. 28, 1874
Gorham, N. H	Elias S. Mason	Mar. 30, 1874
Mason City, Mo	J. F. Benjamin, Brown & Sheppard, E. B. Van Vent, and 33 others.	Mar. 30, 1874
Rockland, Me	Citizens of Rockland, Belfast, &c	Apr. 9, 1874
	E. Waite, and 27 others	Apr. 16, 1874
Rome, Ga	Thomas J. Perry, chairman meteorological committee, Rome Agricultural, Horticultural, and Mechanical Fair Association.	Apr. 24, 1874
	do	Jan. 1, 1875
	do	Dec. 4, 1875
	Hon. William H. Felton, M. C	May 31, 1876
Kansas City, Mo	Thomas S. Case, postmaster	May 1, 1874
Muscatine, Iowa	J. P. Walton	May 7, 1874
Syracuse, N. Y	N. Graves, mayor; William Kirkpatrick, J. R. Whittock, and J. Hill.	May 9, 1874
	Hon. R. R. Duell, M. C	May 11, 1874
Bakersfield, Cal	A. C. Bratton, M. D.; P. D. McClanahan, M. D	May 14, 1874
Palmyra, Wis	John C. Minton	May 19, 1874
Crawfordsville, Ind., (Wabash College.)	Col. H. B. Carrington, United States Army, chairman military science, Wabash College.	June 6, 1874
Harbor of Refuge, Sand Beach, Lake Huron.	Maj. G. Weitzel, Corps of Engineers	June 11, 1874
Calais, Me	Hon. Eugene Hale, M. C.; Boardman Bros	June 16, 1874
Fort Thompson, Dak	Col. D. S. Stanley	June 18, 1874
Chatawa, Miss., (College of the Redemptionist Fathers.)	Alexander W. Gordon	July 13, 1874
Ellsworth, Kans	Hon. W. A. Phillips, M. C	July 14, 1874
	M. W. Henry	July 21, 1874
Mount Lake, or Bald Knob, Giles County, Virginia.	Mrs. H. Haupt	July 21, 1874
Camden, N. J., (The River Iron Works.)	Wood, Dialogue & Co	July 29, 1874
Bloomington, Decatur, Ill	E. A. Gastman, chairman meteorological committee, Macon County Fruit Growers' Association.	Aug. 30, 1874
Mount Kearsarge, Warner, N. H.	John Eaton, Commissioner; Hon. N. G. Ordway, Hon. W. E. Chandler.	Oct. 28, 1874
Coredo, W. Va	S. A. Forbes	Nov. 21, 1874
	Frank Hereford	June 10, 1876
Astoria, Oreg	Hon. J. H. Mitchell, United States Senate	Nov. 29, 1874
Fond du Lac, Wis	Hon. C. A. Eldridge, M. C.; J. W. Carney	Dec. 15, 1874
Corpus Christi, Tex	H. Taylor, postmaster	Jan. 4, 1875
	do	Jan. 15, 1875
Lansing, Mich., (Michigan State Agricultural College.)	R. C. Kedzie, professor of chemistry, &c	Jan. 12, 1875
Pana, Ill	E. C. Reese, postmaster	Jan. 17, 1875
Columbus, Ga	Hon. H. R. Harris, M. C	Jan. 19, 1875
	do	Jan. 20, 1876
Salisbury, N. C	Hon. W. M. Robbins, M. C	Jan. 20, 1875
Hartford, Conn	G. H. Kingsbury, chairman meteorological committee, Tolland County Agricultural Society.	Jan. 21, 1875
Oshkosh, Wis	T. Floyd Woodworth, M. D	Jan. 22, 1875
Ames, Iowa, (Iowa State Agricultural College.)	J. K. Macomber, professor of physics	Jan. 23, 1875
Mount Anthony, Bennington, Vt.	George W. Robinson	Jan. 27, 1875
Pentwater, Mich	Hon. J. A. Hubbell, M. C.; Amos Dresser	Feb. 3, 1875
Fortress Monroe, Va	Hon. James H. Platt, jr., M. C., —— Phoebus, —— Watkins, and —— Wright.	Feb. 8, 1875

List of places for which stations have been requested, &c.—Continued.

Place.	Applicant.	Date.
Afton, Iowa	Hon. James W. McDill, M. C.; N. W. Rowell, W. R. Roberts, and 12 others.	Feb. 17, 1875
Mount Pisgah, Bradford County, Pa.	R. Redington	Mar. 2, 1875
Marysville, Cal	Hon. J. K. Luttrell, M. C.; E. H. Pratt	Mar. 8, 1875
Jacksonville, Ill	Hon. John A. Logan, United States Senate; G. V. Black, Samuel N. Martin, and H. G. Whitlock.	Mar. 15, 1875
Ironton, Ohio	Albert Lawson, W. T. McQuigg, and 24 others	Mar. 25, 1875
Isle of Shoals, N. H	John R. Poor, J. Albert Walker, John Walker, and 7 others.	Mar. 25, 1875
Saint Augustine, Fla	James Whitall	Mar. 31, 1875
Abingdon, Ill., (Abingdon College.)	D. S. Harris, professor of natural sciences	Apr. 1, 1875
Helena, Mont	W. F. Sanders, Col. John Gibbon, Seventh United States Infantry, and 24 others.	Apr. 1, 1875
Cape Vincent, N. Y	M. E. Lee, G. A. Bagley, and 26 others	Apr. 6, 1875
Hingham, Wis	Charles Rogers and F. A. Balch, meteorological committee, Farmers' Club of Hingham.	Apr. 19, 1875
Pilot Point, Tex	G. M. Dinker, T. D. Sullivan, and 128 others	May 3, 1875
Three or four additional stations in the interior of Florida.	John P. Wall, M. D	May 6, 1875
Saint Joseph, Mich	Hon. Thomas W. Ferry, United States Senate; N. W. Napier, A. H. Potter, and 187 others.	May 16, 1875
Lake Charles, La	William Meyer, assistant postmaster	June 12, 1875
Tallahassee, Fla	Hon. S. B. Conover, United States Senate, and 41 others	June 12, 1875
Franklin, Idaho	J. Richardson	July 23, 1875
Lenoir, N. C	Clinton A. Cilley, late brevet lieutenant-colonel and acting assistant quartermaster, United States Army.	July 28, 1875
Johnsonville, Tenn., and Decatur, Ala.	J. M. Pettigrew, president, and J. S. Toof, secretary, of the Memphis Chamber of Commerce, and 101 others.	Aug. 15, 1875
Fort Dodge, Iowa	Frederick Hess	Nov. 4, 1875
Friendsville, Ill	James Pool	Nov. 6, 1875
Greencastle, Ind., (Asbury University.)	Alexander Martin, president	Nov. 18, 1875
	Hon. O. P. Morton, United States Senate; Alexander Martin, D. D., president of university.	Mar. 7, 1876
Block Island, R. I	Nicolas Ball	Nov. 24, 1875
	Hon. H. B. Anthony, United States Senate; Hon. A. E. Burnside, United States Senate; Hon. B. T. Eames, M. C.; Hon. L. W. Ballou, M. C.	Dec. 18, 1875
Danville, Va	J. R. Winston	Dec. 13, 1875
Delaware Breakwater	William Brockie, president Philadelphia Maritime Exchange; James Welsh, president Philadelphia Board of Trade, and 36 others.	Dec. 15, 1875
	J. E. Jouett, captain, United States Navy	Dec. 22, 1875
Cape Henlopen	do	Dec. 22, 1875
Fulton, Ark	Jay Guy Lewis	Dec. 28, 1875
Provincetown, Mass	T. N. Stone, M. D.; John W. Davis, and 12 others	Jan. 21, 1876
Boise City and Silver City, Idaho, Walla Walla, Wash., and Baker City, Oreg.	Hon. T. W. Bennett, Delegate from Idaho	Feb. 9, 1876
Carson City, Nebr	Hon. J. P. Jones, United States Senate; Hon. William Sharon, United States Senate; Hon. William Woodburn, M. C.; the governor and numerous other State officials of Nevada.	Mar. 6, 1876
Madison, Wis., (University of Wisconsin.)	Board of regents, by N. B. Van Slyke, chairman executive committee.	Mar. 11, 1876
Paw Paw, Mich	E. E. Rowland	Apr. 3, 1876
Carlisle, Pa	William H. Cook	May 4, 1876
Fairbury, Nebr	Will. W. Watson, civil engineer	
Sault St. Marie, Mich	Samuel B. W. Covell	May 20, 1876
Kelly's Island, Ohio	D. K. Kuntington, deputy collector of customs	May 25, 1876
Three Rivers, Mich	John Anable	May 30, 1876
Moffat, Tenn	John Francis	June 29, 1876

PAPER 9.

List of agricultural societies which, on June 30, 1876, had appointed permanent committees to confer with the Chief Signal-Officer of the Army.

Name of organization and State.	Committee.	Post-office address.
Muskingum County Agricultural Society, Ohio	R. S. Mershon	Zanesville, Ohio.
Louisville and Jefferson County Agricultural Society, Kentucky.	L. Young	Louisville, Ky.
Schuyler County Agricultural and Mechanical Society, Missouri.	John B. Glaze	Glenwood, Mo.
Highland County Agricultural Society, Ohio	J. S. Bell	Hillsborough, Ohio.
	J. W. Ellis	Do.
Arkansas State Agricultural and Mechanical Society, Arkansas.	Albert Cohen	Little Rock, Ark.
Bertie County Agricultural Society, North Carolina.	S. J. Wheeler	Windsor, N. C.
	J. B. Cheney	Do.
	D. E. Taylor	Do.
Geauga County Agricultural Society, Ohio	Dexter Wetter	Burton, Ohio.
	George H. Ford	Do.
	Luther Russell	Do.
Otsego County Agricultural Society, New York	G. P. Keese	Cooperstown, N. Y.
	H. M Hooker	Do.
	Elisha Finney	Do.
Crawford County Agricultural Society, Pennsylvania.	A. P. Foster	Conneautville, Pa.
	Col. F. K. Mantor	Do.
	Prof. W. H. Armstrong	Do.
Berrien County Agricultural Society, Michigan	James B. Fitzgerald	Niles, Mich.
	D. O. Woodruff	Do.
	William Bort	Do.
Tolland County Agricultural Society, Connecticut.	George H. Kingsbury	Rockville, Conn.
	J. C. Hammond, jr	Do.
Burlington County Agricultural Society, New Jersey.	G. C. Brown	Mount Holly, N. J.
	M. S. Pancoast	Do.
	Jos. Lippincott	Do.
Agricultural and Mechanical Society of West Alabama, Alabama.	W. S. Bird	Eutaw, Ala.
	H. Y. Webb	Do.
	A. T. Lupton	Tuscaloosa, Ala.
Crawford County Agricultural Society, Ohio	G. Keller	Bucyrus, Ohio.
	E. R. Kearnley	Do.
	H. M. Scraggs	Do.
	Josiah Keller, president.	Do.
Saratoga County Agricultural Society, New York	B. S. Robinson	Greenfield Centre, N. Y.
Martin County Agricultural Society, Minnesota	H. A. Munger	Fairmont, Minn.
California State Board of Agriculture, California	J. N. Hoag	Sacramento, Cal.
	C. F. Reed, president	Do.
	F. M. Logan	Do.
Macon County Fruit-growers' Association, Illinois	Prof. E. A. Gastman	Decatur, Ill.
	Theo. Hildebrand	Do.
	J. B. R. Sherrick	Do.
Missouri State Board of Agriculture, Missouri	John H. Tice	Saint Louis, Mo.
	Rev. Charles Peabody	Do.
	Hon. G. W. Kinney	Snow Hill, Mo.
Jackson County Agricultural Society, Ohio	Davis Mackley	Jackson C. H., Ohio.
	J. E. Ferree	Do.
	J. Dungan	Do.
Pike County Agricultural Society, Georgia	J. S. Pope	Zebulon, Ga.
	J. H. Mitchell	Do.
	H. Green	Do.
Greene County Agricultural Society, New York	G. C. Mott	Acra, N. Y.
York County Agricultural Society, Pennsylvania	John Evans	York, Pa.
	G. A. Heckert	Do.
	W. S. Roland	Do.
Bay District Horticultural Society of California, California.	F. A. Miller	San Francisco, Cal.
	Prof. H. N. Bolander	Do.
Maine Board of Agriculture, Maine	M. C. Fernald	Orono, Me.
	Prof. G. L. Goodale	Brunswick, Me.
	Prof. C. E. Hamlin	Waterville, Me.
	C. F. Breckett	Brunswick, Me.
	Hon. S. F. Perley	Naples, Me.
Tuscola County Agricultural Society, Michigan	Townsend North	Vassar, Mich.
	Dr. William Johnson	Do.
Central Iowa District Agricultural Association, Iowa.	P. H. Bristow	Des Moines, Iowa.
	W. W. Robinson	Do.
	D. V. Cole	Do.
South Carolina Agricultural and Mechanical Society, South Carolina.	Dr. F. P. Porcher	Charleston, S. C.
	T. T. Robertson	Winnborough, S. C.
	Col. J. P. Thomas	Columbia, S. C.
Connecticut State Board of Agriculture, Connecticut.	Prof. W. H. Brewer	New Haven, Conn.
	W. H. Yoemans	Columbia, Conn.
	T. S. Gold	West Cornwall, Conn.
Connecticut State Agricultural Society, Connecticut.	Hon. E. H. Hyde	Stafford, Conn.
	Hon. T. H. Butler	Norwalk, Conn.
	H. S. Collins	Collinsville, Conn.

List of agricultural societies, &c.—Continued.

Name of organization and State.	Committee.	Post-office address.
Terre Haute Horticultural Society, Indiana	H. D. Scott	Terre Haute, Ind.
	J. F. Soule	Do.
	John Weir	Do.
	Rev. —. Stimson	Do.
	Jos. Gilbert	Do.
Vigo County Agricultural Society, Indiana	H. D. Scott	Do.
	J. F. Soule	Do.
	John Weir	Do.
	Rev. —. Stimson	Do.
	Jos. Gilbert	Do.
Middlesex County Farmers' Club, New Jersey	G. H. Lambert	New Brunswick, N. J.
Farmers' Club, Utah	D. Tyler	Beaver City, Utah.
	Wm. Fotheringham	Do.
	J. L. Smith	Do.
Indiana State Board of Agriculture, Indiana	F. C. Johnson	New Albany, Ind.
	Thomas Dowling	Terre Haute Ind.
	J. D. G. Nelson	Fort Wayne, Ind.
Rhode Island Society for the Encouragement of Domestic Industry, Rhode Island.	Dr. J. W. Sawyer	Providence, R. I.
	Dr. W. F. Channing	Do.
Washington County Agricultural Society, New York.	M. Ingalsbe	South Hartford, N. Y.
	R. W. Pratt	Do.
Farmers and Fruit-growers' Association of Illinois.	Dr. W. West	Belleville, Ill.
	F. H. Piper	Do.
	E. W. West	Do.
Iowa State Horticultural Society, Iowa	J. K. Macomber	Ames, Iowa.
	Hon. John Scott	Nevada, Iowa.
	G. B. Brackett	Denmark, Iowa.
Addison County Agricultural Society, Vermont	Prof. W. H. Parker	Middlebury, Vt.
	Prof. H. M. Seeley	Do.
	Prof. E. Brainerd	Do.
Orleans County Agricultural Society, Vermont	D. M. Camp	Newport, Vt.
	T. H. Hoskins	Do.
	Z. E. Jameson	Irasburgh, Vt.
Bradley County Agricultural and Mechanical Society, Tennessee.	T. L. Cato	Cleveland, Tenn.
	J. C. Morgan	Do.
	Dr. G. A. Long	Do.
Iowa State Agricultural Society, Iowa	Peter Melenay	Cedar Falls, Iowa.
	S. B. Hewitt	Eagle Grove, Iowa.
	J. M. Shaffer	Fairfield, Iowa.
Carroll and Choctaw Counties Agricultural Society, Mississippi.	A. M. Rafter	Winona, Miss.
	T. J. Blackmore	Do.
	O. J. Moore	Do.
Belmont Farmers' Club, Mississippi	A. M. Rafter	Do.
	W. W. Dabney	Do.
	Jas. Thompson	Do.
Broome County Agricultural Society, New York	E. G. Crafts	Binghamton, N. Y.
	T. S. Roberts	Do.
	A. Stone	Do.
	P. Van Vredenberg	Do.
Bureau County Agricultural Society, Illinois	George W. Stone	Princeton, Ill.
	A. Bryant, jr.	Do.
	H. L. Baltwood	Do.
Essex County Agricultural Society, Massachusetts	C. P. Preston	Danvers, Mass.
	William Sutton,	Salem, Mass.
	A. W. Dodge	Hamilton, Mass.
Kokomo Horticultural Society, Indiana	L. J. Templin	Kokomo, Ind.
	L. W. Leach	Do.
	C. S. Boggs	Do.
Jo Daviess, Lafayette, and Stephenson Union Agricultural Society, Illinois.	A. M. Jones	Warren, Ill.
Marshall County Agricultural Society, Iowa	A. T. Birchard	Marshalltown, Iowa.
	J. Turner	Do.
	S. P. Knisely	Do.
Coles County Agricultural Society, Illinois	Charles Pinatel	Charleston, Ill.
Rock County Agricultural Society, Wisconsin	Dr. J. B. Whiting	Janesville, Wis.
Waupaca Agricultural and Mechanical Association, Wisconsin.	H. C. Mead	Waupaca, Wis.
	W. Scott	Do.
	E. Cooledge	Do.
Ingham County Agricultural Society, Michigan	George W. Bristol	Mason, Mich.
	A. M. Chapin	Eden, Mich.
	William Rayner	Mason, Mich.
Fillmore and Mower Agricultural Society, Minnesota.	Dr. A. F. Whitman	Spring Valley, Minn.
	H. S. Hart	Do.
	W. L. Kellogg	Do.
	B. F. Farmer	Do.
	W. McNee	Do.
	E. S. Bumstead	Do.
	G. W. Farmer	Do.
	W. Allen	Do.
	D. Rathbun	Do.

List of agricultural societies, &c.—Continued.

Name of organization and State.	Committee.	Post-office address.
Marion County Agricultural Society, Ohio	H. M Ault	Marion, Ohio.
	H. A. True	Do.
	J. K. Newcomer	Do.
Humphreys County Farmers' Club, Tennessee	Rev. A. A. Wilson	Waverly, Tenn.
	T. U. Harris	Do.
	W. H. Hollinger	Do.
	A. R. Lankford	Johnsonville, Tenn.
Luzerne County Agricultural Society, Pennsylvania.	S. Jenkins	Wyoming, Pa.
	Rev. Abel Barker	Do.
	Dr. J M Lewis	Do.
	Dr. J. B. Crawford	Wilkesbarre, Pa.
	Dr. C. R. Gorman	Pittston, Pa.
	Dr. B. H. Throop	Scranton, Pa.
	Dr. R. H. Tubbs	Kingston, Pa.
Atlanta Union Central Agricultural Society, Illinois.	C. L. Downey	Atlanta, Ill.
	W. P. Hunt	Do.
	Daniel McFarland	McLean, Ill.
Howard County Agricultural Society, Iowa	H. D. Noble	Cresco, Iowa.
	Stephen Radford	Chester, Iowa.
	C. S. Thurber	Cresco, Iowa.
Outagamie County Agricultural Society, Wisconsin.	W. H. P. Bogan	Appleton, Wis.
	Edwin Nye	Freedom, Wis.
	N. B. Clark	Ellington, Wis.
	Luis Perrot	Greenville, Wis.
Lawrence County Agricultural and Industrial Association, Ohio.	Dr. G. S. B. Hempstead	Hanging Rock, Ohio.
	Cyrus Ellison	Ironton, Ohio.
	Hiram Campbell	Do.
	H. W. Gillett	Quaker Bottom, Ohio.
	Samuel Burke	Arabia, Ohio.
Miami County Agricultural Society, Ohio	W. W. Crane	Tippecanoe City, Ohio.
Michigan State Pomological Society, Michigan	A. T. Linderman	Grand Rapids, Mich.
	C. L. Whitney	Muskegon, Mich.
	E. Bradfield	Ada, Mich.
Lamoille County Agricultural Society, Vermont	George Wilkins,	Stowe, Vt.
	H. H. Powers	Morrisville, Vt.
	G. L. Waterman	Hyde Park, Vt.
Sheboygan County German Agricultural and Trades Association, Wisconsin.	Ferd. Stoesser	Sheboygan, Wis.
	Fred. Muth	Do.
	Fred. Zimmerman	Do.
	A. Mahlendorf	Do.
	Thomas Blackstock	Do.
Walworth County Agricultural Society, Wisconsin	Peter Golder	Elk Horn, Wis.
	David Williams	Darien, Wis.
	Charles Buhre	Geneva, Wis.
Floyd County Agricultural Society, Iowa	E. C. Chapin	Charles City, Iowa.
Edgar County Agricultural Society, Illinois	Walter Booth	Paris, Ill.
	B. Holcomb	Do.
	D. B. Elliott	Do.
Perry County Agricultural and Mechanical Association, Indiana.	I. T. Patterson	Rome, Ind.
	I. I. Wheeler	Do.
	A. Ackerman	Do.
Davis County Agricultural Society, Iowa	Howard Willey	Bloomfield, Iowa.
	William J. Hamilton	Do.
	T. O. Walker	Do.
	A. Rankin	Belknap, Iowa.
	William Hill	Bloomfield, Iowa.
Utah County Agricultural and Home Manufacturing Society, Utah Territory.	Hon. George Bean	Provo, Utah.
	C. D. Evans	Springville, Utah.
	Daniel Graves	Provo, Utah.
Ontario County Agricultural Society, New York	John S. Coe	Canandaigua, N. Y.
Washington County Agricultural and Mechanical Association, Virginia.	Rev. George R. Barr	Abingdon, Va.
	J. L. White	Do.
	Thomas Cosby	Do.
Otoe County Horticultural Society, Nebraska	J. W. Pearman	Nebraska City, Nebr.
	W. W. Wardell	Do.
Lake County Agricultural Society, Ohio	C. R. Stone	Painesville, Ohio.
	George Blish	Do.
	C. C. Jennings	Do.
Page County Agricultural Society, Iowa	S. H. Kriddlebaugh	Clarinda, Iowa.
	S. W. Peterson	Do.
	J. L. Barrett	Do.
King's Creek Valley Farmers' Club, Ohio	Thomas Cowgill	Kennard, Ohio.
Cerro Gordo County Agricultural Society, Iowa	George R. Miller	Mason City, Iowa.
	F. G. Emsley	Do.
	Henry Martin	Do.
	A. W. Wilson	Owen's Grove, Iowa.
	C. W. Tenny	Plymouth, Iowa.
Northumberland County Aricultural Society, Pennsylvania.	Dr. E. H. Horner	Turbotville, Pa.
	William A. Dean	Do.
	Thomas Barr	Do.

List of agricultural societies, &c.—Continued.

Name of organization and State.	Committee.	Post-office address.
Johnson County Agricultural and Mechanical Association, Kansas.	John M. Giffon	Olathe, Kans.
	Harry McBride	Do.
	J. M. Hadley	Do.
Albany County Agricultural and Industrial Society, New York.	Hon. George H. Tweddle	Albany, N. Y.
	J. Winne	Bethlehem Centre, N. Y.
	J. H. Farrell	Albany, N. Y.
Pike County Agricultural Society, Mississippi	D. M. Pound	Magnolia, Miss.
Warren County Agricultural Society, New York	Charles W. Osborn	Warrensburg, N. Y.
Shenandoah Valley Agricultural Society, Virginia.	E. Pendleton	Winchester, Va.
	Dr. William J. Best	Brucetown, Va.
	James C. Baker	Winchester, Va.
	J. Jennings	Willwood, Va.
	E. S. Baker	Winchester, Va.
Rome Agricultural, Horticultural, and Mechanical Fair Association, Georgia.	Thomas J. Perry	Rome, Ga.
	Thomas W. Alexander	Do.
Oswego County Agricultural Society, New York	H. L. Davis	Oswego City, N. Y.
	P. M. Newton	Sandy Creek, N. Y.
	H. Walker	Union Square, N. Y.
	Thomas H. Austin	New Haven, N. Y.
	H. Palmer	Parish, N. Y.
West Virginia Central Agricultural and Mechanical Society, West Virginia.	Lee Hammond	Clarksburgh, W. Va.
	R. T. Lowndes	Do.
	Thomas S. Spates	Do.
	Dr. W. M. Lato	Bridgeport, W. Va.
	Henry Bassel	Brown's Creek, W. Va.
Allamakee County Agricultural Society, Iowa	Hon. Charles Paulk	Waukon, Iowa.
	A. M. May	Do.
	D. W. Reed	Do.
Hall County Agricultural Society, Georgia	Dr. M. F. Stephenson	Gainesville, Ga.
	E. M. Johnson	Do.
	J. E. Redwine	Do.
Portage County Agricultural Society, Ohio	H. Y. Beebe	Ravenna, Ohio.
	E. Wait	Do.
	J. Mehary	Do.
Chickasaw County Agricultural Society, Iowa	L. J. Young	Ionia, Iowa.
	H. M. Mixer	New Hampton, Iowa.
	B. Sherman	Fredericksburgh, Iowa.
Virginia State Agricultural Society, Virginia	F. G. Ruffin	Richmond, Va.
	William C. Knight	Do.
	Dr. William T. Walker	Dover Mines, Va.
Agricultural and Mechanical Society of Alleghany County, of Maryland, West Virginia, and Pennsylvania.	Charles C. Shriver	Cumberland, Md.
	J. B. H. Campbell	Do.
	R. L. Gross	Do.
Central Farmers' Club, Delaware	M. Hayes	Dover, Del.
	J. H. Bateman	Do.
	C. H. B. Day	Do.
Madison County Agricultural Society, Indiana	J. R. Holston	Anderson, Ind.
	William Crim	Do.
	James Hazlitt	Do.
	M. G. Walker	Pendleton, Ind.
	N. G. Tomlinson	Alexandria, Ind.
	Thomas Beckworth	Perkinsville, Ind.
Convention of Pomologists, Michigan	H. S. Club	Grand Haven, Mich.
	S. B. Peck	Muskegon, Mich.
	C. L. Whiting	Do.
State Pomological and Horticultural Society of Michigan.	W. K. Kedzie	Lansing, Mich.
Champaign County Agricultural Society, Ohio	W. A. Humes	Urbana, Ohio.
Buchanan County Agricultural Society, Iowa	L. J. Curtis	Independence, Iowa.
	Dr. George Worne	Do.
	Jed Lake	Do.
New Hampshire State Agricultural Society, New Hampshire.	Hon. Samuel N. Bell	Manchester, N. H.
	Hon. Frederick Smyth	Do.
	Gen. Nathaniel Head	Hooksett, N. H.
Republic County Agricultural Society, Kansas	O. A. A. Gardner	Bellville, Kans.
Doylestown Farmers' Club, Pennsylvania	T. W. Trego	Doylestown, Pa.
	H. T. Darlington	Do.
	D. E. Brower	Do.
Franklin County Agricultural Society, Maine	D. H. Knowlton	Farmington, Me.
	L. F Greep	East Wilton, Me.
	P. P. Tufts	Farmington, Me.
Oxford County Agricultural Society, Maine	H. D. Smith	Norway, Me.
	A. C. T. Smith	South Paris, Me.
Iowa County Agricultural Society, Iowa	J. Root, jr	Marengo, Iowa.
	J. C. Clark	Foote, Iowa.
	A. H. Simpson	Victor, Iowa.
Ephrata Agricultural and Scientific Society, Pennsylvania.	W. H. Spera	Ephrata, Pa.
Warsaw Horticultural Society, Illinois	B. Whitaker	Warsaw, Ill.
	J. M. Hollowbush	Do.
	Charles Hay	Do.

List of agricultural societies, &c.—Continued.

Name of organization and State.	Committee.	Post-office address.
State Grange of Patrons of Husbandry, South Carolina.	J. B. Moore	Wedgefield, S. C.
	D. W. Aiken	Cokesbury, S. C.
	Benjamin Allston	Georgetown, S. C.
Illinois State Board of Agriculture, Illinois	J. Periam	Jefferson, Ill.
	William H. Russell	Springfield, Ill.
	A. M. Garland	Do.
Fayette County Agricultural Society, Iowa	Frank McClintock	West Union, Iowa.
Wabaunsee County Central Agricultural and Horticultural Society, Kansas.	M. Thompson	Eskridge, Kans.
	J. Sedgwick	Do.
	A. Schwarting	Do.
Farmers' Club of Hingham, Wisconsin	Charles Rogers	Hingham, Wis.
	John De Lyser	Do.
	Frederick A. Balch	Do.
Winona County Agricultural Society, Minnesota	Edward Ely	Winona, Minn.
	Norman Buck	Do.
	H. C. Jones	Rollingstone, Minn.
San Diego Society of Natural History, California	G. W. Barnes	San Diego, Cal.
	C. J. Fox	Do.
	O. N. Sanford	Do.
Farmers' Club, Iowa	Capt. James Davidson	Monticello, Iowa.
	M. M. Moulton	Do.

PAPER 10.

List of boards of trade, chambers of commerce, and other organizations, apart from those directly connected with agriculture, which had, on June 30, 1876, appointed permanent committees to confer with the Chief Signal-Officer of the Army.

Name of organization.	State.	Committee.
Chamber of Commerce of New York City	New York	George W. Dow.
		M. Maury.
		J. D. Jones.
		C. G. Curtis.
Board of Trade of Buffalo	do	A. Richmond.
		G. S. Hazard.
		J. H. Vought.
Board of Underwriters of New York City	do	J. D. Jones.
		D. D. Smith.
		Elwood Walter.
		A. Ogden.
Board of Trade of Toledo	Ohio	W. T. Walker.
		M. D. Carrington.
		A. W. Colton.
		C. A. King.
Board of Trade of Washington	District of Columbia	J. W. Thompson.
		A. S. Solomons.
		R. M. Hall.
Board of Trade of Detroit	Michigan	Theo. Hall.
		James Flynn.
		A. G. Hibbard.
Board of Trade of Chicago	Illinois	C. Randolph.
		D. H. Denton.
		E. T. Lawrence.
Board of Trade of Boston	Massachusetts	Nathaniel Spooner.
		Thomas Gaffield.
		John Cummings.
		E. H. Sampson.
		E. Howes.
Chamber of Commerce of Milwaukee	Wisconsin	J. L. Hathaway.
		J. B. Merrill.
		L. R. Durand.
Board of Trade of Nashville	Tennessee	J. Whitworth.
		R. T. Kirkpatrick.
		Dr. W. W. Berry.
		E. D. Hicks.
		M. S. Cochrill.
Chamber of Commerce of Duluth	Minnesota	C. M. Cushman.
		A. D. Woolsey.
Board of Trade of Baltimore	Maryland	H. L. Whitridge.
		R. R. Kirkland.
		B. M. Hodges, jr.
		W. H. Brune.
		J. H. Pleasants.
Board of Trade of New London	Connecticut	J. T. Skinner.
		G. P. Rogers.

List of boards of trade, chambers of commerce, &c.—Continued.

Name of organization.	State.	Committee.
Board of Trade of San Francisco	California	R. R. Swain. J. De Freney. R. G. Sneath. C. A. Low.
Board of Trade of Cleveland	Ohio	R. K. Winslow. R. T. Lyon. J. C. Sage.
Chamber of Commerce of Charleston	South Carolina	E. H. Frost. W. P. Hall. F. W. Dawson.
Board of Trade of Charleston	do	Hon. G. A. Trenholm. Prof. F. S. Holme. E. Lafitte.
Chamber of Commerce of Memphis	Tennessee	B. J. Semmes. H. H. Higbee. Thomas H. Allen.
Board of Trade of Oswego	New York	J. L. McWhorter. A. H. Failing. W. J. Malcolm.
Board of Trade of Omaha	Nebraska	A. D. Jones. G. H. Collins. M. Stephens. Col. J. Patrick. C. C. Housel.
Committee appointed by mayor of Rochester	New York	George Schofield. John Siddons. Henry S. Hebard.
Board of Trade of Portland	Maine	C. H. Tarley. J. S. Bedlow. M. N. Rich.
Board of Trade of Philadelphia	Pennsylvania	Henry Winsor. Thomas C. Hand. Thomas L. Gillespie. George N. Tatham. J. P. Wetherill.
Board of Trade of Mobile	Alabama	J. M. Thomson. J. Y. Thompson. Daniel Jones.
Chamber of Commerce of Wilmington	North Carolina	A. H. Van Bokkelen. George Harriss. W. L. De Rossett.
Board of Trade of Norfolk	Virginia	Dr. S. K. Jackson. W. A. Graves. E. C. Lindsey.
Board of Trade of Indianapolis	Indiana	E. T. Cox. A. H. Pettit. N. M. Neeld.
Chamber of Commerce of Saint Paul	Minnesota	R. O. Sweeney. Rev. John Mattock. J. F. Williams.
Board of Trade of Burlington	Vermont	G. G. Benedict. Prof. Peter Collier. Prof. McK. Petty.
Merchants' Exchange of Saint Louis	Missouri	George H. Morgan. R. P. Tansey. W. H. Scudder.
Chamber of Commerce of Galveston	Texas	J. S. Thrasher. W. Richardson. C. J. Forshey.
Board of Trade of Shreveport	Louisiana	George Williamson. R. D. Sale. George A. Pike.
Chamber of Commerce of San Diego	California	E. F. Spence. Douglass Gunn. T. J. Higgins.
Philadelphia County Medical Society	Pennsylvania	Benjamin Lee. M. O'Hara. J. R. Wells. R. Burns. L. Turnbull.
Board of Trade of Davenport	Iowa	James M. Dalzell. Edward Russell. F. A. Angell.
Board of Trade of Jacksonville	Florida	A. S. Baldwin.
Board of Trade of La Crosse	Wisconsin	William W. Jones James I. Lynds. S. L. Nevins.
Chamber of Commerce of Indianola	Texas	G. Seeligson. W. P. Milby. D. Sullivan.

List of boards of trade, chambers of commerce, &c.—Continued.

Name of organization.	State.	Committee.
Cotton Exchange of New Orleans	Louisiana	J. J. Noble. W. Hall. J. J. Stewart.
Chamber of Commerce of New Haven	Connecticut	J. T. Platt. Mayor Lewis. E. S. Wheeler.
Chamber of Commerce of Cairo	Illinois	W. P. Halliday. Charles M. Howe. Peter Cuhl.
Board of Trade of Cincinnati	Ohio	D. B. Pierson.
Board of Trade of Dubuque	Iowa	Dr. Asa Horr. F. Hinds. N. C. Ryder.
Board of Trade of Albany	New York	William H. Hale. E. L. Judson. E. P. Durant.
Board of Trade of Louisville	Kentucky	J. L. Smith. Dr. B. M. Wible. R. A. Robinson.
Chamber of Commerce of Savannah	Georgia	J. A. Carter. J. V. Cowling. Gen. J. E. Johnston. Gen. J. F. Gilmer. Gen. H. C. Wayne.
Meteorological Committee of Springfield	Massachusetts	E. W. Bond. D. B. Wesson. J. G. Benton. W. G. Chamberlain. M. C. Stebbins.
Meteorological Committee of Newport	Rhode Island	S. C. Bailey. S. W. Macy. Benjamin Finch. Thomas Cogshall. P. Clark.

PAPER 11.

List of voluntary observers who have forwarded monthly reports to the Chief Signal-Officer during the year ending June 30, 1876.

Name of observer.	Post-office address.	State.
Albree, George	Pittsburgh, Allegheny County	Pennsylvania.
Anderson, Rev. John	Clarksville, Red River County	Texas.
Aston, Edward J	Asheville, Buncombe County	North Carolina.
Arden, Thomas B	Garrison's, Putnam County	New York.
Allan, W. T	Geneseo, Henry County	Illinois.
Allison, Dr. John A	Statesville, Iredell County	North Carolina.
Abbott, Dr. E. K	Salinas City, Monterey County	California.
Alison, Dr. H. L	Minter Station, Dallas County	Alabama.
Armstrong, Rev. G. C	Fayette, Jefferson County	Mississippi.
Andrews, Luman	Southington, Hartford County	Connecticut.
Ashby, M. V	Afton, Union County	Iowa.
Alden, Thomas E	Rising Sun, Ohio County	Indiana.
Ashhurst, Dr. F	Mount Holly, Burlington County	New Jersey.
Allin, Lucius C	Springfield, Hampden County	Massachusetts.
Adriance, C. E	Hector, Schuyler County	New York.
Amos, Franklin	Ringgold, Morgan County	Ohio.
Atlanta University	Atlanta, Fulton County	Georgia.
Abington College	Abington, Knox County	Illinois.
Alden, George J	New Smyrna, Volusia County	Florida.
Agricultural College Farm	New Brunswick, Middlesex County	New Jersey.
Agricultural Department, State of Georgia.	Atlanta, Fulton County	Georgia.
Beans, Thomas J	Moorestown, Burlington County	New Jersey.
Breed, J. E	Embarrass, Waupacca County	Wisconsin.
Bentley, E. T	Tioga, Tioga County	Pennsylvania.
Barrows, Storrs	South Trenton, Oneida County	New York.
Beecher, Charles	Newport, Wakulla County	Florida.
Bateman, J. H	Dover, Kent County	Delaware.
Beal, William	Murphy, Cherokee County	North Carolina.
Bullard, R	Litchfield, Hillsdale County	Michigan.
Barringer, William	Bellefontaine, Logan County	Ohio.
Blanchard, O. A	Elmira, Stark County	Illinois.
Bell, Joseph	Franklin, Venango County	Pennsylvania.
Bowman, Peter	Savannah, Ashland County	Ohio.

List of voluntary observers who have forwarded monthly reports, &c.—Continued.

Name of observer.	Post-office address.	State.
Bœrner, Prof. Charles G	Vevay, Switzerland County	Indiana.
Beall, Dr. and Mrs. R. L	Lenoir, Caldwell County	North Carolina.
Brendell, Frederick	Peoria, Peoria County	Illinois.
Barker, Ebenezer	Saint Mary's, Camden County	Georgia.
Bryant, A. F	Clear Creek, Saunders County	Nebraska.
Benton, E. H	Le Roy, Dodge County	Wisconsin.
Bartlett, E. B	Vermillion, Oswego County	New York.
Beloit College	Beloit, Rock County	Wisconsin.
Ballou, N. E	Sandwich, De Kalb County	Illinois.
Bluhm, P. C	Smithville, De Kalb County	Tennessee.
Boies, A. H	Hudson, Lenawee County	Michigan.
Brown, Charles N	Utica, Dane County	Wisconsin.
Blodgett, Charles	Howard, Nemaha County	Nebraska.
Behrens, Charles M	Emporium, Cameron County	Pennsylvania.
Bulloch, Thomas	Coalville, Summit County	Utah.
Brown, Henry W	Richmond, Furnas County	Nebraska.
Bricker, Dr. Joseph W	Wooster, Wayne County	Ohio.
Blood, Charles F	Waltham, Middlesex County	Massachusetts.
Baker, D. W. C	Austin, Travis County	Texas.
Benedictine Fathers	Saint Meinrad, Spencer County	Indiana.
Breckenridge, Cabell	Rockwood, Roane County	Tennessee.
Child, Dr. A. L	Plattsmouth, Cass County	Nebraska.
Clark, Dr. J. T. and Miss E. J	Mount Solon, Augusta County	Virginia.
Chandler, Dr. William J	South Orange, Essex County	New Jersey.
Carlton, A. Y	Wet Glace, Camden County	Missouri.
Cutting, Hiram A	Lunenburgh, Essex County	Vermont.
Cummings, James	Tarentum, Allegheny County	Pennsylvania.
Connell, Mrs. Jane	Houston, Harris County	Texas.
Cheney, William	Minneapolis, Hennepin County	Minnesota.
Crosier, Adam	Laconia, Harrison County	Indiana.
Collin, John	Shelburne, Coos County	New Hampshire.
Crane, George W	Bethel, Clermont County	Ohio.
Carman, James S	Jacksonville, Tompkins County	New York.
Cutler, J. L	Quitman, Brooks County	Georgia.
Cochrane, Joseph	Havana, Mason County	Illinois.
Cooke, Dr. William H	Carlisle, Cumberland County	Pennsylvania.
Curtiss, W. W	Rocky Run, Columbia County	Wisconsin.
Cooke, E. R	Trenton, Mercer County	New Jersey.
Couch, E. D	Contoocookville, Merrimac County	New Hampshire.
Collin, Prof. Alonzo	Mount Vernon, Linn County	Iowa.
Chase, Dr. D. H	Louisville, Clay County	Illinois.
Curtiss, George G	Fallston, Harford County	Maryland.
Clark, T. A	Weldon, Halifax County	North Carolina.
Chappellsmith, John	New Harmony, Posey County	Indiana.
Colby, Alfred	Amoskeag, Merrimac County	New Hampshire.
Chamberlin, S. N	Daytona, Volusia County	Florida.
Cline, Frederick P	Mesquite, Dallas County	Texas.
Cutler, Rev. B. B	Wendell, Franklin County	Massachusetts.
Calhoun, P. B	Austin, Wilson County	Tennessee.
Cornell University	Ithaca, Tompkins County	New York.
Clift, Henry A	Harbor Grace	Newfoundland.
Colt, Henry H	Nora Springs, Floyd County	Iowa.
Castleman, A. L	San José, Santa Clara County	California.
Claiborne, Dr. John H	Petersburgh, Dinwiddie County	Virginia.
Dawson, William	Spiceland, Henry County	Indiana.
Doton, Hosea	Woodstock, Windsor County	Vermont.
Dunn, William	Emerson, Otoe County	Nebraska.
Dickinson, J. P	Guttenberg, Clayton County	Iowa.
Duncan, Rev. A	Mount Sterling, Brown County	Illinois.
Davis, Jacob	Florida, Berkshire County	Massachusetts.
Dunning, I. S	Dennison, Crawford County	Iowa.
Davis, A. Rhea	Wabash, Wabash County	Indiana.
Emery, Josiah	Williamsport, Lycoming County	Pennsylvania.
Ellicott, James F	Saint Inigoes, Saint Mary's County	Maryland.
Ellis, Edwin	Ashland, Ashland County	Wisconsin.
Edgington, R. P	Stanley, Johnson County	Kansas.
Engelstad, R. M	Mount Carmel, Kane County	Utah.
Ferriss, E. J	Painesville, Lake County	Ohio.
Fallon, J	Lawrence, Essex County	Massachusetts.
Foster, R. W	New Orleans, Orleans County	Louisiana.
Fleming, John	Readington, Somerset County	New Jersey.
Fuller, A. N	Hermosa, La Plata County	Colorado.
Fernald, Prof. M. C	Orono, Penobscot County	Maine.
Fales, Prof. J. C	Danville, Boyle County	Kentucky.
Franklin, Dr. W. E	La Grange, Fayette County	Tennessee.
Fortescue, J	York Factory	Canada.
Friend, Charles W	Carson City, Ormsby County	Nevada.
Friel, Joseph	Cloverport, Hancock County	Kentucky.
Foster, Granville F	Carbondale, Jackson County	Illinois.
Gardiner, R. H	Gardiner, Kennebec County	Maine.
Gilman, R. H	Milford, Kent County	Delaware.
Gillingham, C	Accotink, Fairfax County	Virginia.

List of voluntary observers who have forwarded monthly reports, &c.—Continued.

Name of observer.	Post-office address.	State.
Green, H. A	Atco, Camden County	Georgia.
Gedding, Dr. W. H	Aiken, Aiken County	South Carolina.
Gardner, O. A. A	Center Mound, Republic County	Kansas.
Grathwohl, John	Blooming Grove, Pike County	Pennsylvania.
Glasco, J. M	Gilmer, Upshur County	Texas.
Gorgas, Dr. A. C., medical inspector, United States Naval Hospital.	Annapolis, Anne Arundel County	Maryland.
Goodlander, Harry	Leesburgh, Koscinsko County	Indiana.
Gundrum, Jacob	Hanover, York County	Pennsylvania.
Green, Dr. J. C	West Chester, Chester County	Do.
Gleitsmann, Dr. W	Asheville, Buncombe County	North Carolina.
Graut, John	Frankford, Pike County	Missouri.
Hyde, G. A., and wife	Cleveland, Cuyahoga County	Ohio.
Howard, jr., T. T	Jersey City, Hudson County	New Jersey.
Hoskinson, R. M	Burlingame, Osage County	Kansas.
Harper, George W	Cincinnati, Hamilton County	Ohio.
Howard, S. A	Greensborough, Guilford County	North Carolina.
Hurlin, Rev. William	Plaistow, Rockingham County	New Hampshire.
Hosford, O	Olivet, Eaton County	Michigan.
Hammitt, John W	College Hill, Hamilton County	Ohio.
Horn, David B	Keswick Station, Albemarle County	Virginia.
Haworth, John	Hazleton, Luzerne County	Pennsylvania.
Higgins, F. W	Detroit, Wayne County	Michigan.
Hyland, William	Baxter Springs, Cherokee County	Kansas.
Howell, Robert	Nichols, Tioga County	New York.
Hunt, George M	North Argyle, Washington County	Do.
Haywood, John, son, and daughter	Westerville, Franklin County	Ohio.
Hornung, C	Tiffin, Seneca County	Do.
Hoadley, James H	Santa Cruz, Santa Cruz County	California.
Hardy, Dr. J. F. E	Asheville, Buncombe County	North Carolina.
Horn, Dr. H. B. and Miss Martha	Atchison, Atchison County	Kansas.
Hubbs, Dr. J. A	Brownsville, Fayette County	Pennsylvania.
Hurley, D. P	Troy, Pike County	Alabama.
Hopkins, Dr. H. H	New Market, Frederick County	Maryland.
Hills, F. T	Manchester, Rockingham County	New Hampshire.
Hering, C. J	Paramaribo, Colony of Surinam	South America.
Harcourt, Jay	Wappinger's Falls, Dutchess County	New York.
Harrold, Uriah B	Americus, Sumter County	Georgia.
Hinrichs, Prof. G	Iowa City, Johnson County	Iowa.
Hardee, Dr. John	Olive Furnace, Lawrence County	Ohio.
Ingram, Dr. John	Vineland, Cumberland County	New Jersey.
Ingalsbe, Granville	South Hartford, Washington County	New York.
Iowa State Agricultural College	Ames, Story County	Iowa.
Indiana State University	Bloomington, Monroe County	Indiana.
James, John W	Marengo, McHenry County	Illinois.
Johnson, Rev. Samuel	Rodman, Jefferson County	New York.
Jones, A. S	Newburyport, Essex County	Massachusetts.
Johnston, Prof. John	Middletown, Middlesex County	Connecticut.
Jennison, H. L	Starkey, Yates County	New York.
Jennings, Dr. S. K	Purdy, McNairy County	Tennessee.
Jones, Ira B	Neillsville, Clark County	Wisconsin.
Kron, F. J	Albemarle, Stanley County	North Carolina.
Kirkpatrick, J. A	Philadelphia, Philadelphia County	Pennsylvania.
Keeler, W. F	Mayport, Duval County	Florida.
Kedzie, R. C	Lansing, Ingham County	Michigan.
Keese, G. P	Cooperstown, Otsego County	New York.
Kennedy, Dr. Thomas G	Castalian Springs, Sumner County	Tennessee.
Kohler, Edw	Egypt, Lehigh County	Pennsylvania.
Kentgen, Charles	Stapleton, Richmond County	New York.
Keene, E. M	Salem, Greenbrier County	West Virginia.
King, Dr. J. S	Decatur, Macon County	Illinois.
Keenan, Mrs. W. E. A	Brookhaven, Lincoln County	Mississippi.
Kaucher, William	Oregon, Holt County	Missouri.
Kedzie, Prof. W. K	Manhattan, Riley County	Kansas.
Lups, Misses C. and J	Manitowoc, Manitowoc County	Wisconsin.
Lewis, Miss Blanche L	McMinnville, Warren County	Tennessee.
Lewis, James	Kanab, Kane County	Utah.
Lee, Fred. S	Canton, Saint Lawrence County	New York.
Lee, E. N. and George W	Webster City, Hamilton County	Iowa.
Letton, J. E	Bethel, Bath County	Kentucky.
Metcalf, John G	Mendon, Worcester County	Massachusetts.
Moore, C. R	Bridgetown, Northampton County	Virginia.
Moulton, J. P	Sebago Lake, Cumberland County	Maine.
Mead, S. B	Augusta, Hancock County	Illinois.
Martin, Horace	Corning, Holt County	Missouri.
Morris, Prof. O. W	New York, New York County	New York.
Morelle, Rev. Daniel	Wilmington, New Hanover County	North Carolina.
McConnell, E. M	New Castle, Lawrence County	Pennsylvania.
Müeller, Dr. R	Carthagena, Mercer County	Ohio.
Marshall, Gregory	Cresco, Howard County	Iowa.
Marsden, J. H	York Sulphur Springs, Adams County	Pennsylvania.
McCall, Charles	Cathlamet, Wahkiakum County	Washington Territory.

List of voluntary observers who have forwarded monthly reports, &c.—Continued.

Name of observer.	Post-office address.	State.
McCready, Miss Lucy A	Fort Madison, Lee County	Iowa.
Mathews, J. McD	Hillsborough, Highland County	Ohio.
Moore, Nathan	Grampian Hills, Clearfield County	Pennsylvania.
Minesinger, James M	Missoula, Missoula County	Montana Territory.
Merriwether, Charles I	Boonsborough, Bedford County	Virginia.
Munn, Arch	Harbor Grace	Newfoundland.
McIlvaine, Charles J	Kensico, Westchester County	New York.
Meehan, Thomas	Germantown, Philadelphia County	Pennsylvania.
Maxwell, Samuel A	Lyndon, Whiteside County	Illinois.
McCutchan, W. T	Goshen Bridge, Rockbridge County	Virginia.
Moss, G. B	Belvidere, Boone County	Illinois.
McGill College	Montreal	Canada.
Merritt, jr., J. C	Farmingdale, Queens County	New York.
Morris, Rev. John	Firesteel, Dawson County	Montana Territory.
Muscott, John M	Atlanta, Rice County	Kansas.
Mount Saint Mary's College	Emmettsburgh, Frederick County	Maryland.
Moulton, M. M	Monticello, Jones County	Iowa.
Morrison, J. S	Milledgeville, Lincoln County	Kentucky.
Moody, Henry	Silverton, San Juan County	Colorado.
McDonough School	Owing's Mills, Baltimore County	Maryland.
Mackall, jr., B. F	Moorhead, Clay County	Minnesota.
MacGregor, Alexander Q	Longmont, Boulder County	Colorado.
Madlem, W. F	Ephrata, Lancaster County	Pennsylvania.
Masonic Academy Library	Milton, Santa Rosa County	Florida.
Newcomb, G. S	Westborough, Worcester County	Massachusetts.
Noll, A. B	New Germantown, Hunterdon County	New Jersey.
Nettleton, E. S	South Pueblo, Pueblo County	Colorado.
Neill, Thomas	Venice, Erie County	Ohio.
Nason, Rev. Elias	North Billerica, Middlesex County	Massachusetts.
Nixon, J. Sharpe	Chambersburgh, Franklin County	Pennsylvania.
Newbegin, Dr. J. S	Anna, Union County	Illinois.
Osborn, Ethan	Hennepin, Putnam County	Do.
Owsley, Dr. J. B	Jacksonsburgh, Butler County	Ohio.
Owens, Dr. J. A	Monticello, Drew County	Arkansas.
Partrick, J. M	North Volney, Oswego County	New York.
Phelps, Samuel B	Norwich, Windsor County	Vermont.
Puffer, A. W	Mattoon, Coles County	Illinois.
Parker, J. D	Mount Desert, Hancock County	Maine.
Peck, George H	El Monte, Los Angeles County	California.
Pearce, Thomas	Eola, Polk County	Oregon.
Phillips Academy	Andover, Essex County	Massachusetts.
Peddie Institute	Hightstown, Mercer County	New Jersey.
Pool, James	Friendsville, Wabash County	Illinois.
Perry, William S	Hudson, Columbia County	New York.
Quarterman, E. A	Flushing, Queens County	Do
Richardson, C. F	Freehold, Monmouth County	New Jersey.
Robertson, Thomas D	Rockford, Winnebago County	Illinois.
Rodman, Samuel	New Bedford, Bristol County	Massachusetts.
Roos, Charles	New Ulm, Brown County	Minnesota.
Robertson, R. S	Fort Wayne, Allen County	Indiana.
Runge, C	New Ulm, Austin County	Texas.
Rockwell, Charlotte	Colebrook, Litchfield County	Connecticut.
Rollins, John F	Fort George, Duval County	Florida.
Remington, C. V. S	Fall River, Bristol County	Massachusetts.
Ring, John J	San Bernardino, San Bernardino County	California.
Rotch, William	Fall River, Bristol County	Massachusetts.
Ralston, E	Weston, Lewis County	West Virginia.
Rube, E	Wartburgh, Morgan County	Tennessee.
Seltz, Charles	De Soto, Washington County	Nebraska.
Stewart, W. M	Clarksville, Montgomery County	Tennessee.
Smith, E. Allen	Moriches, Suffolk County	New York.
Shriver, E. T	Cumberland, Alleghany County	Maryland.
Smith, Dr. William	Cannonsburgh, Washington County	Pennsylvania.
String, L. H	Grand Rapids, Kent County	Michigan.
Smith, Dr. C. H	Kenton, Hardin County	Ohio.
Soule, Prof. William	Cazenovia, Madison County	New York.
Stern, Jacob F	Logan, Harrison County	Iowa.
Scott, Thomas G	Forsyth, Monroe County	Georgia.
Scott, T. M	Melissa, Collin County	Texas.
Snell, E. S	Amherst, Hampshire County	Massachusetts.
Spooner, Dr. Stillman	Oneida, Madison County	New York.
Slenker, Elmina P. D	Snowville, Pulaski County	Virginia.
Smith, Rev. G. N	Northport, Leelenaw County	Michigan.
Slade, Elisha	Somerset, Bristol County	Massachusetts.
Shoemaker, J. L	Le Roy, Coffey County	Kansas.
Smith, C. J	Hudson, Summit County	Ohio.
Shuman, J. M	Hampton, Elizabeth City County	Virginia.
Sessions, Lewis	Norfolk, Madison County	Nebraska.
Spaulding, John	Wautoma, Waushara County	Wisconsin.
Snow, Prof. Frank H	Lawrence, Douglas County	Kansas.
Sturtevant, E. T	Biscayne, Dade County	Florida.

List of voluntary observers who have forwarded monthly report, &c.—Continued.

Name of observer.	Post-office address.	State.
Smith, Dr. W	Spartanburgh, Spartanburgh County	South Carolina.
Scribner, H. F. J	Strafford, Orange County	Vermont.
Sanford, Shelton P	Macon, Bibb County	Georgia.
Smith, B. B	Ellinwood, Barton County	Kansas.
Shriver, Howard	Wytheville, Wytho County	Virginia.
Siler, Mrs. A	Franklin, Macon County	North Carolina.
School of Mines	Golden, Jefferson County	Colorado.
Smith, Mrs. M. D	Whatcom, Whatcom County	Washington Territory.
Sanborn, J. F	Tabor, Fremont County	Iowa.
Saint Lawrence University	Canton, Saint Lawrence County	New York.
San Diego Society of Natural History.	Viejas, San Diego County	California.
	Viejas, (Pine Valley,) San Diego County	Do.
	Oakwood, San Diego County	Do.
	San Luis Rey, San Diego County	Do.
	El Cajon, San Diego County	Do.
Tayloe, Ed	Comorn, King George's County	Virginia.
Truman, George S	Genoa, Platte County	Nebraska.
True, Dr. H. A	Marion, Marion County	Ohio.
Talbot, Benjamin	Council Bluffs, Pottawattamie County	Iowa.
Thompson, Rev. D	Arkansas City, Cowley County	Kansas.
Tutwiler, H., LL.D	Green Spring, Hale County	Alabama.
Tripp, O. H. and L. S	Surry, Hancock County	Maine.
Thralls, George R	Welborn, Suwannee County	Florida.
Townsend, Isaac	Caperville, Northampton County	Virginia.
Trowbridge, David	Waterburgh, Tompkins County	New York.
Teele, Rev. A. H.	Blue Hill, Norfolk County	Massachusetts.
Turner, Ernest	Point Pleasant	Louisiana.
Trembley, J. B	Oakland, Alameda County	California.
Tarleton, C. W	Worcester, Worcester County	Massachusetts.
Topeka Scientific Institute	Topeka, Shawnee County	Kansas
Unican, F	Port Orford, Curry County	Oregon.
University of Wisconsin	Madison, Dane County	Wisconsin.
Vanhekle, J. M	Delaware City, New Castle County	Delaware.
Valenti, A. H	Woodstock, Howard County	Maryland.
Walter, Dr. James	Holton, Jackson County	Kansas.
Waite, S. E	Traverse City, Grand Traverse County	Michigan.
Watkins, Prof. A. B	Adams, Jefferson County	New York.
West, Silas	Cornish, York County	Maine.
Warne, Dr. George	Independence, Buchanan County	Iowa.
Wild, Rev. E. P	Newport, Orleans County	Vermont.
Winchell, Professor and Mrs. N. H.	Minneapolis, Hennepin County	Minnesota.
Walton, J. P	Muscatine, Muscatine County	Iowa.
Whitehead, W. A	Newark, Essex County	New Jersey.
Wooster, C. A	North Hammond, Saint Lawrence County	New York.
Wadey, H	Rockford, Floyd County	Iowa.
Wilson, Louis	Astoria, Clatsop County	Oregon.
White, I. H	Cincinnati, Hamilton County	Ohio.
Wilber, Benjamin F	West Waterville, Kennebec County	Maine.
Williams, Mile G	Urbana, Champaign County	Ohio.
Wheaton, Mrs. D. B	Independence, Buchanan County	Iowa.
Whiting, William H	Geneva Lake, Walworth County	Wisconsin.
Wing, Miss Minerva E	West Charlotte, Chittenden County	Vermont.
Willis, O. R	White Plains, Westchester County	New Hampshire.
Wylie, William	Mount Forest, Ontario County	Canada.
Whittington, Granville	Mount Ida, Montgomery County	Arkansas.
Williams College	Williamstown, Berkshire County	Massachusetts.
Warner, Dr. C. O	Durham, Washington County	Arkansas.
Witter, Dr. R	Council Bluffs, Pottawattamie County	Iowa.
Whitney, C. E	Croswell, Marion County	Kansas.
Woolman, H. M	Hot Springs, Garland County	Arkansas.
Winnipiscogee Lake Cotton and Woolen Manufacturing Company.	Weir's Landing, Belknap County	New Hampshire.
	Wolfborough, Carroll County	Do.
	Lake Village, Belknap County	Do.
	Bristol, Grafton County	Do.
	Ashland, Grafton County	Do.
Young, George R	Penn Yan, Yates County	New York.
Yantis, Prof. V. C	Rolla, Phelps County	Missouri.
United States Naval Hospital	Mare Island	California.
Do	Annapolis	Maryland.
Do	New York	New York.
Do	Philadelphia	Pennsylvania.
Do	Yokohama	Japan.

PAPER 12.

List of military posts from which regular meteorological reports have been received monthly at the Office of the Chief Signal-Officer during year ending June 30, 1876.

Post.	State.	Post.	State.
Augusta Arsenal	Augusta, Ga.	McPherson Barracks	Atlanta, Ga.
Abercrombie, Fort	Dakota.	McPherson, Fort	Nebraska.
Adams, Fort	Newport, R. I.	Macon, Fort	New Mexico.
Angel Island	California.	McKavett, Fort	Texas.
Alcatraz Island	Do.	McDowell, Camp	Arizona.
A. Lincoln, Fort	Dakota.	McIntosh, Fort	Texas.
Apache, Camp	Arizona.	McHenry, Fort	Baltimore, Md.
Baton Rouge Barracks	Baton Rouge, La.	Munroe, Fort	Virginia.
Baker, Camp	Montana.	Madison Barracks	New York.
Bayard, Fort	New Mexico.	Mojave, Fort	Arizona.
Brady, Fort	Michigan.	McDermitt, Camp	Nevada.
Buford, Fort	Dakota.	Niagara, Fort	New York.
Brown, Fort	Texas.	Ontario, Fort	Do.
Benton, Fort	Montana.	Oglethorpe Barracks	Georgia.
Bidwell, Camp	California.	Porter, Fort	New York.
Bridger, Fort	Wyoming.	Pembina, Fort	Dakota.
Boise, Fort	Idaho.	Preble, Fort	Maine.
Benecia Barracks	California.	Presidio of San Francisco	California.
Brown, Camp	Wyoming.	Ft. San José	Do.
Bowie, Camp	Arizona.	Plattsburgh Barracks	New York.
Bliss, Fort	Texas.	Rock Island Arsenal	Illinois.
Colville, Fort	Washington Ter.	Randall, Fort	Dakota.
Canby, Fort	Do.	Richardson, Fort	Texas.
Concho, Fort	Texas.	Rice, Fort	Dakota.
Craig, Fort	New Mexico.	Ripley, Fort	Minnesota.
Columbus, Fort	New York.	Raleigh	North Carolina.
Carlisle Barracks	Carlisle, Pa.	Ringgold Barracks	Texas.
Clark, Fort	Texas.	Riley, Fort	Kansas.
Columbia	South Carolina.	Sanders, Fort	Wyoming.
Douglas, Camp	Utah.	Sidney Barracks	Nebraska.
Duncan, Fort	Texas.	Sill, Fort	Indian Territory.
Ellis, Fort	Montana.	Snelling, Fort	Minnesota.
Foote, Fort	Maryland.	Stevens, Fort	Oregon.
Fetterman, Fort	Wyoming.	Shaw, Fort	Montana.
Fred Steele, Fort	Do.	Supply, Camp	Indian Territory.
Gaston, Camp	California.	Stambaugh, Camp	Wyoming.
Garland, Fort	Colorado.	Sitka	Alaska.
Grant, Camp	Arizona.	Seward, Fort	Dakota.
Griffin, Fort	Texas.	Sully, Fort	Do.
Humboldt	Tennessee. (Station abandoned May 31, 1876.)	Stevenson, Fort	Do.
Hays, Fort	Kansas.	Selden, Fort	New Mexico.
Halleck, Camp	Nevada.	Thomas Barracks	Alabama.
Hamilton, Fort	New York.	Totten, Fort	Dakota.
Harney, Camp	Oregon.	Townsend, Fort	Washington Territory.
Hartsuff, Fort	Nebraska.	Union, Fort	New Mexico.
Independence, Camp	California.	Verde, Camp	Arizona.
Independence, Fort	Massachusetts.	Wayne, Fort	Michigan.
Jackson	Mississippi.	Warren, Fort	Massachusetts.
Johnston, Fort	North Carolina.	Wallace, Fort	Kansas.
Klamath, Fort	Oregon.	Wingate, Fort	New Mexico.
Larned, Fort	Kansas.	Wadsworth, Fort	New York.
Lowell, Camp	Arizona.	Whipple, Fort	Arizona.
Lapwai, Fort	Idaho.	West Point, United States Military Academy.	New York.
Leavenworth, Fort	Kansas.	Wadsworth, Fort	Dakota.
Laramie, Fort	Wyoming.	Willet's Point	New York.
Lyon, Fort	Colorado.	Wrangell, Fort	Alaska.
Lower Brulé Agency	Dakota.	Walla-Walla, Fort	Washington Territory.
Mount Vernon Barracks	Alabama.	Yuma, Fort	California.

PAPER 13.

List of naval vessels from which meteorological reports have been received at Office of the Chief Signal-Officer during year ending June 30, 1876.

Ashuelot, United States steamer	Third-rate	Reports received to December 31, 1875.
Hartford, United States steamer	Second-rate	Reports received to September 30, 1875.
Kearsarge, United States steamer	Third-rate	Reports received to December 31, 1875.
Monongahela, United States steamer	Second-rate	Do.
Onward, United States ship		Reports received to December 31, 1875.
Shenandoah, United States steamer	Second-rate	No reports received.
Wasp, United States steamer	Fourth-rate	Reports received to December 31, 1875.
Wachusett, United States steamer	Third-rate	None received.
Saco, United States steamer	do	Reports received to December 31, 1875.

PAPER 14.

Monthly and annual mean pressure—July, 1875, to June, 1876.

Stations.	1875.						1876.						Annual means.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Albany, N. Y	29.935	29.998	29.980	29.948	30.055	29.987	30.067	30.058	29.990	29.941	29.989	20.928	29.989
Alpena, Mich	29.916	29 906	29.952	29.864	30.025	29.846	29.947	30.011	29.985	29.926	29.968	29.821	29.931
Atlantic City, N. J	29.996	30 036	30.040	30.001	30.087	30.020	30.149	30.115	30.028	29.995	30.061	30.010	30.045
Augusta, Ga	30.044	30.028	30.061	30.094	30.105	30.089	30.270	30.178	30.068	30.060	30.065	30.015	30.088
Baltimore, Md	29.983	30.009	30.068	30.042	30.129	30.059	30.181	30.145	30.059	30.029	30.069	30.010	30.065
Barnegat, N. J	29.987	30.030	30.026	29.993	30.067	30.003	30.136	30.108	30.019	29.986	30.055	30.004	30.034
Benton, Mont	30.068	30.017	30.105	30.021	29.936	29.840	29.979	29.949	30.012	29.864	29.924	30.002	29.976
Bismarck, Dak	29.816	29.724	29.880	29.863	29.940	29.792	30.011	30.060	30.047	29.811	29.728	29.709	29.865
Boston, Mass	29.943	30.054	29.988	29.958	30.021	29.962	30.054	30.039	29.963	29.918	30.001	29.975	29.990
Breckenridge, Minn	29.934	29.843	29.956	29.956	30.028	29.908	30.072	30.133	30.126	29.936	29.831	29.766	29.957
Buffalo, N. Y	29.933	29.963	29.976	29.919	30.042	29.890	30.010	30.028	29.967	29.965	29.996	29.888	29.956
Burlington, Vt	29.915	30.009	29.968	29.952	30.060	29.963	30.033	30.056	29.976	29.924	29.970	29.916	29.978
Cairo, Ill	29.996	29.999	30.074	30.086	30.072	30.012	30.201	30.151	30.037	30 019	30 000	29.941	30.024
Cape Hatteras, N. C	30.036	30.033	30.035	29.994	30.026	29.990	40.173	30.086	30.004	29.989	30.039	29.993	30.033
Cape Henry, Va	30.022	30.036	30.046	30.042	30.108	30.049	30.209	30.146	30.052	30.031	30.081	30.021	30.070
Cape Lookout, N. C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	30.166	30.058	.....
Cape May, N. J	29.999	30.028	30.043	30.009	30.092	30.032	30.165	30.127	30.039	30.009	30.064	30.018	30.052
Charleston, S. C	30.087	30.048	30.064	30.089	30.103	30.098	30.278	30.180	*30.094	30.081	30.095	30.044	†30.105
Cheyenne, Wash	30.108	30.052	30.113	30.045	29.857	29.850	29.851	29.854	29.781	29.894	29.904	30.010	29.943
Chicago, Ill	29.929	29.926	29.999	29.950	30.041	29.886	30.038	30.030	29.980	29.950	29.939	29.832	29.950
Cincinnati, Ohio	29.926	29.935	30.005	29.999	30.025	29.933	30.110	30.067	29.962	29.952	29.941	29.877	‡29.978
Cleveland, Ohio	29.943	29.932	29.984	29.954	30.057	29.918	30.073	30.053	29.993	30.007	30.012	29.925	29.988
Colorado Springs, Colo	30.095	30.050	30.092	30.049	29.870	29.853	29.874	29.874	29.778	29.901	29.902	30.006	29.945
Corsicana, Tex	29.985	29.965	30.026	30.088	30.008	29.979	30.184	30.133	29.999	29.971	29.937	29.929	30 017
Davenport, Iowa	29.943	29.954	30.037	29.987	30.076	29.929	30.090	30.063	30.009	29.945	29.937	29.839	29.984
Denver, Colo	30.104	30.076	30.143	30.091	29.925	29.918	29.949	29.935	29.857	29.957	29.945	30.050	29.995
Detroit, Mich	29.937	29.935	29.982	29.935	30.048	29.894	30.036	30.036	29.979	29.964	29.975	29.863	29.957
Dodge City, Kans	29.591	29.571	29.716	29.681	29.708	29.609	29.782	29.695	29.643	29.560	29.492	29.521	29.631
Dubuque, Iowa	29.939	29.975	30.008	29.965	30.068	29.908	30.044	30.044	30.005	29.929	29.918	29.814	29.968
Duluth, Minn	29.906	29.886	29.984	29.941	30.034	29.870	30.021	30.093	30.100	29.941	29.951	29.805	29.953
Eastport, Me	29.903	30.043	29.917	29.925	29.910	29.870	29.969	29.951	29.907	29.854	29.932	29.969	29.929
Erie, Pa	29.935	29.948	29.976	29.925	30.033	29.886	30.033	30.024	29.961	29.968	29.984	29.889	29.963
Escanaba, Mich	29.925	29.907	29.983	29.905	30.035	29.895	29.975	30.027	30.054	29.900	29.969	29.809	29.949
Evanston, Ill	.....	.....	30.027	29.979	30.073	29.928	30.092	30.059	30.004	29.979	29.970	29.857	.....
Fort Gibson, Ind. Ter	29.926	29.934	29.984	30.041	29.989	29.935	30.138	30.055	29.963	29.923	29.897	29.872	§29.079
Fort Saint Michael's, Alaska	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fort Sully, Dak	29.858	29.793	29.955	29.945	30.022	29.892	30.088	30.104	30.110	.....	29.835	29.754	‖29.946
Galveston, Tex	30.052	29.998	29.984	30.104	30.013	30.031	30.201	30.154	30.013	30.041	30.012	30.001	30.050
Grand Haven, Mich	29.950	29.938	30.001	29.935	30.050	29.878	30.018	30.018	29.982	29.941	29.953	29.838	29.950
Indianapolis, Ind	29.935	29.945	30.020	29.999	30.041	29.936	30.107	30.070	29.982	29.978	29.963	29.881	29.989

Indianola, Tex	30.052	30.008	29.995	30.118	30.031	30.046	30.204	30.173	30.017	30.031	29.993	29.985*	30.054
Jacksonville, Fla	30.116	30.059	30.046	30.081	30.091	30.116	30.273	30.177	30.084	30.073	30.067	30.027	30.101
Keokuk, Iowa	29.895	29.904	30.000	29.967	30.041	29.908	30.071	30.041	29.966	29.919	29.893	29.811	29.951
Key West, Fla	30.117	30.070	30.023	30.033	30.077	30.116	30.207	30.142	30.088	30.081	30.032	30.043	30.086
Kittyhawk, N. C	30.031	30.031	30.049	30.036	30.095	30.055	30.232	30.155	30.075	30.054	30.108	30.048	30.081
Knoxville, Tenn	30.026	29.997	30.054	30.099	30.070	30.053	30.240	30.163	30.052	30.042	30.033	29.995	30.069
La Crosse, Wis	29.927	29.911	29.996	29.952	30.063	29.892	30.030	30.041	30.032	29.924	29.904	29.797	29.957
Leavenworth, Kans	29.893	29.916	30.013	29.984	30.039	29.923	30.097	30.041	29.986	29.909	29.874	29.831	29.950
Lexington, Ky	29.988	29.988	30.098	30.079	30.076	30.016	30.201	30.151	30.036	30.030	30.016	29.937	30.051
Louisville, Ky	29.964	29.968	30.044	30.042	30.026	29.980	30.163	30.111	30.009	30.003	29.986	29.922	30.018
Long Branch, N. J	29.987	30.043	30.032	29.994	30.076	30.024	30.132	30.112	30.018	29.982	30.048	29.998	30.037
Lynchburg, Va	29.991	30.006	30.064	30.034	30.110	30.042	30.198	30.135	30.036	30.012	30.044	29.981	30.054
Malone, N. Y	.....	.....	29.933	29.898	30.028	29.906	29.983	30.006	29.943	29.884	29.940	29.862	.....
Manhattan, Kans	.....	.....	.....	.....	.....	.....	30.101	30.017	29.976	29.874	.....	.....	.....
Marquette, Mich	29.931	29.904	29.984	29.904	30.020	29.850	29.965	30.053	30.082	29.934	29.976	29.805	29.951
Memphis, Tenn	30.024	30.013	30.077	30.108	30.061	30.031	30.226	30.187	30.043	30.026	30.006	29.962	30.064
Milwaukee, Wis	29.981	29.958	30.033	29.967	30.081	29.914	30.051	30.064	30.028	29.966	29.947	29.842	29.986
Mobile, Ala	30.104	30.035	30.036	30.121	30.071	30.090	30.260	30.194	30.078	30.074	30.053	30.014	30.094
Montgomery, Ala	30.085	30.033	30.054	30.128	30.092	30.102	30.283	30.207	30.091	30.078	30.059	30.025	30.103
Morgantown, W. Va	29.960	29.975	30.032	30.014	30.063	29.965	30.135	30.079	30.022	29.985	29.996	29.933	30.005
Mount Washington, N. H	30.210	30.329	30.102	29.992	29.795	29.777	29.745	29.705	29.780	29.864	30.075	30.245	29.957
Nashville, Tenn	29.988	29.974	30.032	30.069	30.036	30.003	30.197	30.137	30.018	30.011	28.994	29.942	30.033
New Haven, Conn	29.979	30.055	30.021	29.979	30.065	30.007	30.108	30.092	30.003	29.961	30.029	29.986	30.024
New London, Conn	29.986	30.067	30.025	29.985	30.056	30.005	30.107	30.089	30.002	29.954	30.045	30.007	30.027
New Orleans, La	30.090	30.025	30.017	30.115	30.045	30.064	30.236	30.174	30.049	30.051	30.040	30.005	30.076
Newport, R. I	.....	30.063	30.011	29.968	30.034	29.981	30.087	30.064	29.984	29.931	30.030	29.998	.....
New York, N. Y	29.991	30.045	30.031	29.992	30.060	30.020	30.123	30.111	30.020	29.986	30.047	30.001	30.037
Norfolk, Va	30.021	30.028	30.064	30.046	30.108	30.052	30.208	30.143	30.058	30.040	30.090	30.034	30.074
North Platte, Nebr	29.542	29.502	29.637	29.613	29.683	29.573	29.758	29.650	25.658	29.515	29.481	29.499	29.592
Omaha, Nebr	29.897	29.889	29.999	29.973	30.030	29.913	30.087	30.035	29.982	29.893	29.828	29.808	29.938
Oswego, N. Y	29.939	30.006	30.000	29.955	30.065	29.942	30.045	30.050	30.011	29.974	30.020	29.929	29.996
Peck's Beach, N. J	30.007	30.041	30.051	30.014	30.100	30.033	30.164	.....	.....	.....	.....	.....	.....
Pembina, Dak	29.901	29.858	29.970	29.967	30.049	29.906	30.084	30.194	30.192	29.904	29.876	29.766	29.972
Philadelphia, Pa	29.996	30.035	30.035	30.015	30.107	30.042	30.161	30.141	30.040	30.004	30.054	29.998	30.051
Pike's Peak, Colo	30.254	30.232	30.219	30.107	29.787	29.805	29.720	29.760	29.651	29.874	29.966	30.146	29.960
Pittsburgh, Pa	29.929	29.956	30.009	29.982	30.062	29.945	30.114	30.067	29.993	29.981	29.989	29.909	29.995
Port Huron, Mich	29.952	29.944	29.988	29.931	30.061	29.897	30.025	30.039	29.982	29.964	29.988	29.859	29.969
Portland, Me	29.940	30.062	29.979	29.972	30.010	29.949	30.132	30.033	29.955	29.924	30.002	29.984	29.987
Portland, Oreg	30.071	30.061	30.102	30.051	29.972	30.075	30.105	30.078	30.020	30.108	30.110	30.074	30.069
Punta Rassa, Fla	30.142	30.096	30.049	30.060	30.097	30.135	30.245	30.159	30.105	30.098	30.055	30.048	30.107
Rochester, N. Y	29.934	29.981	29.976	29.925	30.058	29.913	30.021	30.038	29.971	29.953	29.993	29.894	29.971
Salt Lake City, Utah	29.974	29.919	29.992	30.058	29.897	30.035	29.967	30.006	¶29.849	29.939	29.885	29.956	**29.956
Sandy Hook, N. J	29.971	30.024	30.011	29.977	30.070	30.006	30.112	30.092	29.999	29.963	30.026	29.981	30.019
San Diego, Cal	29.985	29.944	29.972	29.986	30.083	30.093	30.136	30.118	30.032	30.062	29.976	29.951	30.027
San Francisco, Cal	29.961	29.938	29.972	30.031	30.025	30.153	30.050	30.104	40.017	30.095	30.012	29.945	30.025
Santa Fé, N. Mex	29.859	29.841	29.865	29.871	29.776	29.753	29.782	29.786	29.636	29.766	29.775	29.823	29.794
Savannah, Ga	30.091	30.047	30.060	30.090	30.100	30.106	30.280	30.188	30.088	30.080	30.083	30.034	30.104
Shreveport, La	30.039	30.016	30.076	30.148	30.057	30.054	30.245	30.195	30.056	30.041	30.026	30.002	30.079
Saint Louis, Mo	29.965	29.983	30.060	30.041	30.078	29.964	30.138	30.109	30.014	29.982	29.971	29.898	30.017

* Mean of 22 days. † One observation missed on March 10, 1876. ‡ One observation missed on May 20, 1876. § Twenty-four observations missed in September, 1875.
‖ Station closed in April, 1876. ¶ Mean of 28 days. ** Nine observations missed in March, 1876.

Monthly and annual mean pressure—July, 1875, to June, 1876—Continued.

Stations.	1875.						1876.						Annual mean.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Saint Mark's, Fla	30.112	30.049	30.057	30.094	30.082	30.116	30.275	30.185	30.080	30.080	30.032	30.023	30.102
Saint Paul, Minn	29.870	29.855	29.953	29.919	30.020	29.855	30.014	30.022	30.018	29.886	29.855	29.749	29.918
Saint Paul's Island, Alaska	29.911	29.729	29.725	29.585	30.184	29.931	29.630	30.045	30.111	29.856	29.641	29.799	29.851
Smithville, N. C	.....	.....	.....	.....	30.102	30.080	30.271	30.169	30.084	30.066	30.104	30.057	.....
Springfield, Mass	29.966	30.047	30.008	29.973	30.054	29.994	30.086	30.076	29.998	29.945	30.016	29.969	30.011
Squan Beach, N. J	29.944	29.963	29.965	29.932	30.019	29.958	30.070	.....	.....	.....	.....	.....	.....
Thatcher's Island, Mass	.....	.....	.....	.....	.....	.....	30.056	30.039	29.959	29.922	30.004	29.981	.....
Toledo, Ohio	29.935	29.937	29.989	29.945	30.048	29.914	30.020	30.033	29.965	29.946	29.960	29.854	29.963
Tybee Island, Ga	30.096	30.052	30.002	30.079	30.084	30.088	30.272	30.173	30.077	30.063	30.073	30.025	30.094
Vicksburg, Miss	30.119	30.070	30.100	30.195	30.117	30.120	30.289	30.216	30.075	30.064	30.047	30.091	30.118
Virginia City, Mont	29.844	29.786	29.845	29.800	29.554	29.645	29.602	29.604	29.544	29.666	29.663	29.783	29.695
Washington, D. C	30.003	30.033	30.063	30.040	30.120	30.050	30.179	30.144	30.053	30.025	30.061	30.004	30.064
Wilmington, N. C	30.064	30.046	30.060	30.068	30.097	30.074	30.261	30.162	30.073	30.058	30.096	30.047	30.092
Wood's Hole, Mass	29.986	30.079	30.024	29.978	30.037	29.985	30.094	30.068	29.988	29.934	30.042	30.015	30.019
Wytheville, Va	29.817	29.808	29.876	29.871	29.885	29.824	30.012	29.927	29.805	29.818	29.844	29.809	29.858
Yankton, Dak	29.939	29.902	30.023	29.998	30.098	29.935	30.142	30.113	30.111	29.941	29.878	29.838	29.993

PAPER 15.

Monthly and annual mean temperature—July, 1875, to June, 1876.

Stations.	1875. July.	August.	September	October.	November.	December.	1876. January.	February.	March.	April.	May.	June.	Annual means.
	°	°	°	°	°	°	°	°	°	°	°	°	°
Albany, N. Y	69.8	69.8	58.6	46.5	32.2	27.3	29.4	25.0	29.8	43.2	57.0	71.3	46.7
Alpena, Mich	64.9	62.5	54.3	40.8	29.4	26.9	24.5	19.5	22.7	35.6	47.5	60.8	40.8
Atlantic City, N. J	73.0	72.0	64.1	54.5	40.7	35.8	37.2	34.6	36.5	46.1	55.5	68.2	51.5
Augusta, Ga	84.6	76.2	73.4	60.0	56.6	52.1	53.6	52.3	51.8	63.9	72.1	78.7	64.9
Baltimore, Md	78.0	73.4	65.9	55.5	42.9	38.3	41.5	37.8	39.8	52.1	64.2	75.9	55.4
Barnegat, N. J	72.5	71.6	64.5	53.9	40.4	36.4	36.7	33.9	36.3	46.0	56.0	67.3	52.1
Benton, Mon	74.5	68.9	60.6	51.1	17.1	36.8	13.9	16.7	13.3	47.4	56.8	63.8	43.4
Bismarck, Dak	69.3	66.2	56.1	42.7	17.1	20.1	7.9	4.8	13.1	40.3	56.0	61.4	37.9
Boston, Mass	71.7	69.7	58.8	49.3	34.4	29.8	30.5	27.5	32.9	44.2	53.9	67.6	47.4
Breckenridge, Minn	67.7	63.8	55.4	42.0	18.3	18.0	6.3	4.3	10.5	38.3	56.3	63.1	37.0
Buffalo, N. Y	68.9	67.0	58.2	46.8	33.5	30.6	31.7	26.2	28.9	38.9	50.9	67.7	45.8
Burlington, Vt	69.8	70.6	57.8	45.6	29.8	23.8	25.9	20.0	29.1	41.5	54.5	70.9	44.9
Cairo, Ill	78.9	73.6	67.5	55.2	45.9	45.6	44.1	43.9	43.2	59.4	68.2	74.2	58.3
Cape Hatteras, N. C	78.9	77.2	71.1	62.1	55.4	51.9	51.3	50.9	50.8	57.1	65.8	76.2	62.4
Cape Henry, Va	79.9	75.9	70.4	60.8	50.8	46.6	49.3	45.2	47.0	54.9	63.4	74.5	59.9
Cape Lookout, N. C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	66.6	76.9	.....
Cape May, N. J	72.8	71.6	64.7	55.4	43.2	38.5	39.7	37.5	38.3	47.7	57.3	70.5	53.1
Charleston, S. C	84.6	79.9	75.1	63.3	59.7	54.1	55.4	54.6	56.6	64.3	71.4	79.9	66.6
Cheyenne, Wyo	64.0	63.2	56.0	47.9	30.3	33.4	23.8	30.7	26.8	42.4	50.6	60.8	44.1
Chicago, Ill	68.6	68.7	61.0	48.0	37.3	37.0	33.2	31.9	33.9	46.5	59.4	67.9	49.4
Cincinnati, Ohio	77.2	71.7	65.6	53.6	43.8	44.0	42.4	39.9	40.6	54.4	67.2	75.2	*56.3
Cleveland, Ohio	70.4	67.1	61.1	49.4	36.5	36.0	35.0	30.2	31.6	43.1	56.5	69.8	48.9
Colorado Springs, Colo.	64.6	65.3	57.9	51.3	37.1	35.4	28.2	34.9	33.5	46.5	54.9	64.0	47.8
Corsicana, Tex	85.0	80.2	73.5	63.9	55.6	54.2	52.2	55.1	53.9	67.0	71.8	77.3	65.8
Davenport, Iowa	74.0	69.9	61.7	48.8	33.5	34.5	29.8	29.9	32.2	51.2	62.4	69.4	49.8
Denver, Colo	68.1	68.9	61.7	54.1	37.3	37.8	28.3	37.7	34.4	49.3	57.1	65.8	50.0
Detroit, Mich	70.2	67.1	60.3	46.7	34.6	33.4	32.4	24.6	29.8	44.0	57.5	69.3	47.8
Dodge City, Kans	75.5	74.6	68.7	56.6	39.9	40.7	35.3	41.5	34.7	56.6	64.5	71.2	55.1
Dubuque, Iowa	72.9	69.5	61.0	47.2	33.9	34.2	29.4	28.3	31.5	49.3	61.9	69.4	49.0
Duluth, Minn	67.3	64.4	54.3	41.4	23.8	24.7	15.1	12.2	20.8	38.4	48.7	55.1	38.8
Eastport, Me	58.7	61.0	53.5	45.1	31.0	23.1	22.1	22.3	28.3	37.5	45.7	54.6	40.2
Erie, Pa	70.5	67.0	60.1	49.6	37.7	36.2	35.3	30.5	31.1	42.8	56.4	70.5	48.9
Escanaba, Mich	64.6	61.3	53.3	39.5	28.4	24.7	20.1	16.1	20.0	35.8	47.8	58.9	39.2
Evanston, Ill	.....	.....	60.8	47.5	36.5	34.8	30.6	28.1	30.8	43.4	55.9	64.3	.....
Fort Gibson, Ind. T	80.0	74.6	†72.9	57.7	49.4	48.4	45.4	47.6	44.4	63.4	69.6	73.6	‡60.6
Fort St. Michaels, Alaska	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fort Sully, Dak	73.9	71.4	61.3	48.9	24.4	27.0	18.7	14.4	15.9	.....	61.7	68.1	‖40.5
Galveston, Tex	85.6	82.9	74.7	70.6	65.7	61.6	60.9	60.0	61.0	69.7	76.1	82.2	70.9
Grand Haven, Mich	67.3	64.6	58.6	47.1	35.0	34.4	31.9	29.6	30.6	41.7	55.2	65.7	47.1
Indianapolis, Ind	75.9	70.3	63.4	51.4	40.5	41.5	39.1	37.3	37.7	53.0	66.0	72.1	54.0
Indianola, Tex	84.0	83.2	76.6	71.8	65.0	62.0	61.5	60.0	62.9	69.4	75.5	82.5	71.2
Jacksonville, Fla	85.0	79.5	78.1	66.5	64.4	58.0	59.0	60.2	60.9	68.8	76.0	81.4	69.8
Keokuk, Iowa	76.3	71.6	64.3	51.1	35.3	36.5	34.1	35.0	34.9	53.0	63.9	70.1	52.2
Key West, Fla	82.1	82.6	81.9	79.4	76.9	72.0	72.1	73.6	73.1	76.6	79.4	82.7	77.7
Kittyhawk, N. C	79.7	75.9	70.5	60.7	52.1	47.3	48.5	46.6	46.8	54.6	63.4	75.3	60.1
Knoxville, Tenn	75.8	70.4	65.6	51.9	48.8	45.6	44.3	42.4	43.1	56.7	65.9	71.9	56.8
La Crosse, Wis	72.8	68.4	60.3	45.5	30.9	32.1	22.9	24.2	27.7	46.9	60.6	67.6	46.7
Leavenworth, Kans	77.6	73.1	66.6	53.6	37.3	39.9	35.4	38.3	35.2	55.2	65.5	71.2	54.1
Lexington, Ky	75.9	71.2	64.4	51.3	42.8	42.6	40.6	38.5	39.5	52.9	65.1	71.3	54.6
Louisville, Ky	79.1	73.7	66.4	54.0	44.9	44.9	43.0	41.5	42.2	55.9	68.7	74.0	57.3
Long Branch, N. J	72.8	71.2	64.1	54.1	41.3	36.6	38.3	34.9	37.7	45.5	56.5	68.4	51.8
Lynchburg, Va	78.9	72.7	65.4	54.9	44.5	42.0	44.5	42.2	43.2	56.2	67.0	76.7	57.3
Malone, N. Y	.....	.....	55.8	44.6	28.5	23.4	24.8	19.9	28.0	40.1	53.6	69.7	.....
Manhattan, Kans	.....	.....	.....	.....	.....	.....	34.8	37.8	32.6	55.4	.....	.....	.....
Marquette, Mich	62.9	62.2	51.8	40.8	28.3	26.6	21.1	16.7	22.1	37.9	49.4	58.2	38.8
Memphis, Tenn	82.2	74.9	69.8	57.1	50.9	49.7	47.9	48.6	47.4	63.2	70.9	77.1	61.6
Milwaukee, Wis	65.3	64.7	57.3	44.7	31.7	31.9	25.9	24.9	27.5	41.9	52.7	63.0	44.3
Mobile, Ala	83.9	78.4	75.1	62.7	62.6	57.6	56.6	55.3	55.8	66.2	74.5	80.3	67.4
Montgomery, Ala	86.1	78.6	74.7	60.8	59.3	54.8	54.8	54.5	54.6	65.4	73.5	79.6	66.4
Morgantown, W. Va	74.0	69.6	61.4	50.7	41.9	41.6	41.6	39.6	39.3	50.9	63.1	73.1	53.9
Mount Washington, N. H.	45.5	49.1	35.6	28.3	12.1	12.5	8.1	6.9	13.8	19.5	33.1	48.8	26.1
Nashville, Tenn	81.3	74.0	69.2	56.4	50.4	49.2	47.3	46.2	46.6	60.5	70.3	76.5	60.7
New Haven, Conn	72.5	71.9	62.3	52.9	37.8	32.7	34.2	31.2	35.5	47.3	58.8	72.1	50.8
New London, Conn	69.9	70.1	62.5	52.7	39.0	32.7	34.1	32.6	35.2	45.3	55.5	67.5	49.8
New Orleans, La	81.8	79.3	76.6	67.3	65.6	61.5	60.3	58.9	59.9	69.1	74.8	80.6	69.5
Newport, R. I	.....	69.6	61.7	52.5	38.9	33.0	33.5	31.1	34.5	43.6	52.5	67.0	.....

* One observation missed on May 20, 1876.
† Mean of 22 days.
‡ Twenty-four observations missed in Sept., 1875.
‖ Station closed in April, 1876.

Monthly and annual mean temperature, &c.—Continued.

Stations.	1875.						1876.						Annual means.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
	°	°	°	°	°	°	°	°	°	°	°	°	°
New York, N. Y.	72.6	74.0	63.8	52.7	38.9	33.1	35.1	31.6	35.0	46.1	58.4	70.8	51.0
Norfolk, Va	81.2	76.1	68.7	58.3	49.0	46.3	47.7	45.0	46.5	55.3	65.7	78.1	59.8
North Platte, Nebr	72.5	71.7	62.5	53.4	31.5	34.0	23.6	32.4	27.9	50.3	59.6	67.9	48.9
Omaha, Nebr	74.4	70.2	62.9	49.6	32.6	33.5	26.8	30.1	29.3	51.3	63.6	68.6	49.4
Oswego, N. Y	67.4	68.6	58.7	47.9	34.5	31.0	32.0	26.4	30.3	41.8	52.8	68.6	46.7
Peck's Beach, N. J.	73.7	71.8	64.0	54.3	40.4	36.0	37.6	.....	.....	.....	.....	.....	.....
Pembina, Dak	64.9	64.3	52.7	37.5	11.1	8.1	—2.6	—4.5	6.5	35.4	54.6	60.5	32.4
Philadelphia, Pa.	74.6	72.4	64.1	53.7	39.7	34.7	37.7	34.0	37.4	49.1	60.9	74.2	52.7
Pike's Peak, Colo.	35.7	35.9	32.1	25.0	10.8	9.7	2.1	4.5	4.5	14.9	21.4	31.0	19.0
Pittsburgh, Pa	72.9	69.8	65.5	50.2	38.7	38.3	38.4	36.2	36.2	48.8	62.3	74.1	52.6
Port Huron, Mich	67.2	66.0	58.2	45.2	32.5	31.1	30.3	26.1	27.7	40.2	53.1	66.0	45.3
Portland, Me	67.8	68.4	58.0	48.5	33.4	27.8	27.4	25.0	33.4	42.8	52.6	64.9	45.8
Portland, Oreg	71.8	67.7	63.8	58.1	44.6	47.8	38.9	45.2	44.9	50.4	55.5	65.1	54.5
Punta Rassa, Fla	81.1	79.6	80.1	75.4	73.9	67.0	67.5	69.2	68.4	73.0	76.9	80.8	74.4
Rochester, N. Y	69.4	67.9	57.9	46.4	31.8	31.0	31.4	26.5	29.6	42.0	55.5	71.0	46.8
Salt Lake City, Utah	74.7	76.2	68.8	59.3	41.9	35.5	30.4	35.5	37.9	50.3	56.9	69.9	*53.1
Sandy Hook, N. J	73.0	71.7	64.0	53.4	40.9	34.3	36.4	34.3	36.7	46.8	58.7	71.7	52.6
San Diego, Cal	68.3	71.3	67.6	67.3	60.2	56.6	51.2	55.3	54.8	59.3	61.5	65.4	61.6
San Francisco, Cal	57.7	57.9	58.0	60.7	57.3	51.5	48.9	52.7	52.9	54.9	56.3	60.9	55.8
Santa Fé, N. Mex	65.2	66.5	58.7	53.5	38.7	32.6	29.0	32.8	36.5	50.2	55.9	66.0	48.8
Savannah, Ga	84.7	78.4	74.7	63.5	60.9	56.0	56.8	56.5	58.7	66.7	74.0	80.6	67.6
Shreveport, La	85.1	78.9	73.4	62.7	58.1	55.4	53.6	55.3	54.3	67.5	72.8	78.8	66.3
Saint Louis, Mo	78.2	73.1	67.2	54.7	41.7	43.7	41.4	40.9	39.9	57.3	67.2	72.9	56.5
Saint Mark's, Fla	81.3	77.2	75.2	63.7	62.6	56.2	55.9	56.7	56.9	65.6	73.6	79.7	67.0
Saint Paul, Minn	73.8	66.6	57.2	42.8	25.2	25.5	16.6	17.4	24.3	43.9	59.2	66.3	43.2
Saint Paul's Island, Alaska.	47.0	47.9	46.0	41.7	34.9	26.2	31.4	16.5	23.0	26.2	32.7	38.7	34.2
Smithville, N. C	.....	.....	.....	.....	56.5	51.8	51.7	51.3	53.4	61.3	69.0	78.4	.....
Springfield, Mass	71.1	70.7	59.8	50.8	35.9	30.9	32.6	29.3	33.8	45.7	58.7	72.6	49.3
Squan Beach, N. J	71.4	70.9	63.0	49.9	39.3	34.8	36.5	.....	.....	.....	.....	.....	.....
Thatcher's Island, Mass.	.....	.....	.....	.....	.....	.....	30.4	27.9	32.6	41.7	50.0	62.7	.....
Toledo, Ohio	72.8	68.2	62.1	49.0	36.6	36.9	37.2	32.5	32.9	47.2	60.3	71.2	50.6
Tybee Island, Ga	82.6	77.9	73.4	63.2	60.2	53.0	54.9	54.8	59.5	63.8	71.3	78.3	66.1
Vicksburg, Miss	83.5	78.3	73.4	61.9	59.7	56.8	56.1	55.4	54.2	66.0	72.8	79.4	66.5
Virginia City, Mont	63.8	60.8	55.9	47.7	25.9	30.5	17.1	28.1	24.7	37.9	46.4	57.1	41.3
Washington, D. C	76.9	72.0	64.9	54.1	41.4	37.1	40.7	37.2	39.3	51.4	63.3	75.9	54.5
Wilmington, N. C	81.9	76.6	71.5	60.0	55.5	51.8	51.9	51.1	52.6	60.8	67.5	76.6	63.1
Wood's Hole, Mass	68.9	69.4	61.7	52.9	39.5	33.4	33.6	31.3	34.7	43.6	52.2	65.2	48.9
Wytheville, Va	71.2	66.1	58.9	47.4	43.0	40.3	40.1	38.8	40.1	49.7	60.6	67.5	51.9
Yankton, Dak	71.8	68.3	60.6	47.2	25.9	27.3	18.9	20.8	20.4	46.7	61.6	65.7	44.6

* Nine observations missed in March, 1876.

PAPER 16.

Monthly and annual amounts of rain-fall, in inches, from July, 1875, to June, 1876, inclusive.

Stations.	1875.						1876.						Annual amounts.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Albany, N. Y	2.46	6.55	2.63	5.97	2.29	1.11	1.57	4.09	4.28	3.51	2.96	4.40	41.82
Alpena, Mich	2.38	5.34	8.43	6.55	2.34	2.87	3.53	2.61	2.98	1.62	6.56	3.47	48.68
Atlantic City, N. J	1.30	4.78	2.45	2.17	4.19	4.28	1.05	3.53	4.78	1.86	3.92	1.78	36.09
Augusta, Ga	2.35	5.14	3.12	1.06	3.30	3.55	1.20	2.98	2.96	4.72	1.97	7.96	40.31
Baltimore, Md	4.78	8.67	3.62	1.44	4.86	3.14	1.67	2.96	6.37	1.90	4.94	4.09	48.44
Barnegat, N. J	5.97	4.18	3.99	1.67	5.40	4.63	1.55	4.04	9.18	3.06	3.79	2.42	49.88
Boston, Mass	2.24	1.19	0.13	0.71	0.85	0.43	0.71	0.28	1.53	1.25	11.06	1.45	21.83
Bismarck, Dak	1.53	2.89	1.85	2.37	1.33	0.39	0.78	1.50	3.30	2.77	5.74	1.24	25.69
Boston, Mass	3.93	3.50	3.12	4.99	5.47	0.75	1.87	4.54	7.19	3.61	2.70	1.72	43.39
Breckenridge, Minn	0.70	3.31	1.80	0.37	0.24	0.22	0.10	0.19	1.63	1.87	1.87	0.85	13.15
Buffalo, N. Y	3.42	3.45	4.09	3.04	2.09	2.99	3.49	5.16	4.09	3.28	1.45	1.24	37.79
Burlington, Vt	2.73	2.84	4.56	3.54	1.34	0.75	1.60	1.31	3.11	2.38	2.30	2.91	29.37
Cairo, Ill	9.88	3.32	0.16	1.76	7.96	3.21	15.05	2.34	9.84	2.67	5.84	6.62	68.65
Cape Hatteras, N. C	5.15	3.29	5.46	7.94	5.37	4.70	1.19	4.47	4.29	4.07	2.67	4.37	52.97

Monthly and annual amounts of rain-fall, in inches, &c.—Continued.

Stations.	1875.						1876.						Annual amounts.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Cape Henry, Va	4.74	9.61	3.18	3.55	5.46	3.59	1.61	4.62	6.98	4.12	5.68	4.65	57.79
Cape Lookout, N. C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5.28	2.01	.....
Cape May, N. J	3.13	10.16	2.70	2.03	4.75	3.39	1.14	2.78	7.31	3.10	3.25	5.67	49.41
Charleston, S. C	1.05	1.91	3.58	3.90	3.38	1.92	0.63	2.43	2.54	4.93	3.77	14.98	45.02
Cheyenne, Wyo	4.47	2.12	1.34	0.60	0.84	0.03	0.02	0.06	0.54	0.23	2.50	0.10	12.85
Chicago, Ill	7.18	3.29	4.39	4.36	0.74	2.62	3.22	3.90	4.04	2.07	1.85	5.96	43.62
Cincinnati, Ohio	9.63	3.17	0.65	3.05	4.35	3.75	9.49	2.92	5.07	3.26	1.25	6.67	53.26
Cleveland, Ohio	1.67	3.81	5.42	3.79	3.30	2.89	3.72	4.10	2.88	1.77	4.43	3.21	40.99
Colorado Springs, Colo	6.07	2.39	2.23	0.13	1.19	0.29	0.12	0.19	0.62	0.52	3.83	1.89	19.48
Corsicana, Tex	3.05	6.84	1.61	0.22	3.96	0.28	3.46	1.84	3.61	3.96	4.56	3.09	42.48
Davenport, Iowa	9.36	1.73	4.05	1.63	0.57	3.08	3.47	3.63	4.35	5.39	6.70	4.25	48.21
Denver, Colo	4.32	1.97	2.89	0.22	1.28	0.59	0.21	0.11	1.80	1.22	8.57	1.10	24.28
Detroit, Mich	3.73	6.04	2.10	3.35	1.72	3.20	2.00	5.59	5.50	1.80	5.62	1.51	42.16
Dodge City, Kans	3.28	2.06	1.32	0.06	0.10	0.09	0.00	0.15	3.59	0.16	1.15	2.53	14.29
Dubuque, Iowa	5.74	1.07	7.11	2.71	0.48	2.71	3.20	1.53	4.00	3.63	5.96	7.88	46.02
Duluth, Minn	0.47	6.19	3.77	2.60	1.68	1.10	0.69	1.03	2.16	1.99	3.74	4.69	30.11
Eastport, Me	6.61	4.29	5.21	7.50	3.94	1.11	2.94	7.70	9.39	3.10	3.42	2.09	57.29
Erie, Pa	2.41	5.18	3.40	5.04	3.95	3.91	4.53	5.34	3.76	3.62	2.84	4.70	48.68
Escanaba, Mich	1.91	12.06	5.01	5.28	2.52	1.88	2.84	1.69	3.44	4.65	6.07	6.33	53.68
Evanston, Ill	.....	.....	4.01	3.30	0.46	2.64	3.08	3.86	2.78	2.68	3.00	4.94	.....
Fort Gibson, Ind. T	10.93	4.27	*1.34	1.19	2.26	2.41	4.94	0.64	5.67	1.85	1.94	6.82	44.29
Fort Saint Michael's, Alaska	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fort Sully, Dak	0.51	3.26	0.89	0.38	0.20	0.15	0.09	0.10	0.91	(†)	1.37	4.25	12.11
Galveston, Tex	1.11	6.15	18.41	1.79	5.61	9.75	1.49	4.79	5.94	2.65	10.27	2.63	70.59
Grand Haven, Mich.	2.53	2.39	3.29	6.17	1.44	2.79	3.67	2.41	1.99	3.18	5.42	9.35	44.63
Indianapolis, Ind	1.12	3.66	1.34	2.67	2.04	4.01	5.94	4.49	7.44	2.27	5.11	7.54	60.63
Indianola, Tex	2.34	2.03	10.65	2.26	2.42	6.96	1.30	1.89	5.86	0.32	0.32	1.19	37.54
Jacksonville, Fla	0.14	10.19	4.50	4.49	2.18	3.42	0.61	3.05	5.41	7.89	1.86	4.17	47.91
Keokuk, Iowa	12.70	3.83	4.62	2.71	0.59	3.93	3.68	1.45	3.45	3.99	5.28	6.73	52.96
Key West, Fla	2.15	9.20	10.67	2.95	1.13	0.66	0.51	1.65	0.42	0.00	3.32	5.97	39.23
Kittyhawk, N. C	9.98	12.08	5.56	7.55	8.61	3.46	1.61	3.50	6.98	3.54	3.09	5.99	71.95
Knoxville, Tenn	7.64	5.60	4.14	2.81	4.25	7.21	3.99	4.92	5.89	2.78	6.25	4.07	59.55
La Crosse, Wis	1.77	5.73	5.45	2.77	0.60	3.43	2.19	1.85	4.23	2.54	5.20	7.49	43.25
Leavenworth, Kans	8.82	3.73	1.97	0.72	0.39	2.60	1.42	0.20	5.78	7.65	6.78	5.71	45.77
Lexington, Ky	11.24	0.62	1.72	2.37	5.87	3.70	6.06	1.66	3.63	4.20	2.16	4.12	47.35
Louisville, Ky	16.46	2.19	1.05	1.92	6.14	5.67	11.63	2.92	6.01	4.50	1.00	6.52	66.01
Long Branch, N. J	7.19	11.93	4.05	3.40	7.27	4.32	1.62	5.69	10.57	3.51	4.73	4.54	68.82
Lynchburg, Va	1.90	5.79	2.57	1.15	3.83	3.92	1.04	2.96	6.07	1.66	3.11	4.91	38.91
Malone, N. Y	.....	.....	6.29	3.19	3.10	4.56	4.08	6.28	4.22	2.86	4.24	3.93	.....
Manhattan, Kans	.....	.....	.....	.....	.....	.....	0.12	0.11	4.24	7.14	.....	.....	.....
Marquette, Mich	0.76	7.69	6.46	4.62	0.85	0.65	0.60	0.65	1.70	1.28	3.84	8.18	37.28
Memphis, Tenn	4.34	2.39	2.94	2.38	9.63	5.54	7.65	1.33	11.03	4.51	8.49	2.70	62.93
Milwaukee, Wis	3.18	2.52	4.31	2.87	1.16	3.11	4.39	3.63	5.29	2.83	8.54	4.74	46.57
Mobile, Ala	4.00	7.07	8.52	2.32	5.06	3.01	3.14	4.32	8.01	3.88	4.32	3.35	57.00
Montgomery, Ala	0.99	2.14	8.13	1.68	5.90	6.04	3.70	5.07	7.33	10.99	6.55	4.85	63.37
Morgantown, W. Va	7.89	5.58	5.10	3.57	4.18	3.99	4.25	3.85	4.97	2.80	3.26	3.00	52.44
Mount Washington, N. H	7.40	7.95	11.34	6.30	2.67	3.84	2.80	3.50	6.21	3.12	7.83	9.32	72.28
Nashville, Tenn	8.12	1.60	3.79	1.25	5.46	4.30	6.41	2.22	5.28	3.62	3.40	5.65	51.10
New Haven, Conn	4.42	5.56	2.10	3.18	7.44	1.39	1.54	4.29	10.15	7.65	3.12	1.76	52.60
New London, Conn	6.36	3.55	4.11	4.06	4.16	1.47	1.83	4.83	7.01	5.74	2.85	0.68	46.65
New Orleans, La	6.57	8.61	7.89	2.09	6.79	5.15	4.43	8.20	11.32	6.41	7.10	6.20	86.76
Newport, R. I	.....	5.26	2.91	4.35	6.64	1.23	1.59	6.18	8.47	5.78	2.73	1.32	.....
New York, N. Y	5.23	10.42	2.51	3.13	4.43	2.78	1.21	5.39	7.90	3.79	3.94	2.87	53.60
Norfolk, Va	4.72	10.37	2.05	3.21	3.64	3.14	1.37	3.96	4.10	2.72	4.42	4.10	47.80
North Platte, Nebr	2.12	0.66	1.40	0.14	0.52	0.09	0.09	0.13	0.49	0.51	2.97	0.49	9.61
Omaha, Nebr	10.01	7.77	2.55	1.16	0.13	1.00	0.22	0.40	3.18	2.05	2.07	3.47	34.61
Oswego, N. Y	3.43	2.46	4.23	3.04	2.56	1.62	3.91	4.51	3.08	2.60	1.22	4.01	36.67
Peck's Beach, N. J	1.32	5.85	3.45	2.17	4.84	4.87	1.62	.....	.....	.....	.....	.....	.....
Pembina, Dak	1.18	2.62	0.92	1.26	0.70	0.56	0.17	0.53	1.09	0.49	6.55	3.43	19.50
Philadelphia, Pa	3.63	6.42	2.53	1.42	5.40	3.37	1.52	5.03	6.71	2.16	4.45	2.29	44.93
Pike's Peak, Colo	8.13	3.52	3.20	0.38	1.54	0.98	0.85	0.61	2.03	1.64	4.73	2.88	29.89
Pittsburgh, Pa	5.27	2.19	2.56	2.36	2.96	3.79	3.59	2.83	3.80	2.04	3.35	1.47	36.21
Port Huron, Mich	2.14	2.79	2.38	4.41	1.10	3.04	1.78	3.93	5.25	2.17	4.07	3.42	36.51
Portland, Me	1.81	2.70	3.49	3.53	2.64	1.62	2.38	3.84	5.29	2.59	4.68	2.55	37.12
Portland, Oreg	0.02	0.53	0.71	6.73	15.77	13.41	4.80	7.50	9.12	5.34	1.88	2.35	68.16
Punta Rassa, Fla	5.33	12.49	6.99	2.08	1.00	1.26	0.04	0.51	1.35	0.88	2.73	4.34	39.00
Rochester, N. Y	2.12	5.08	2.87	2.41	2.14	2.91	4.27	5.40	3.89	1.99	1.55	3.33	37.96

* Twenty-two days' observations; twenty-four observations missed in September, 1875.

† Station closed during April, 1876.

Monthly and annual amounts of rain-fall, in inches, &c.—Continued.

Stations.	1875.						1876.						Annual amounts.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Salt Lake City, Utah	1.01	0.25	1.22	1.36	5.81	2.03	1.23	1.52	4.00	2.09	4.31	0.09	24.91
Sandy Hook, N. J.	4.44	8.96	2.98	3.50	5.36	3.40	1.35	5.80	11.04	3.92	4.47	5.96	61.18
San Diego, Cal.	0.01	0.21	0.39	0.09	2.25	0.41	2.47	2.44	1.78	0.06	0.05	0.05	10.11
San Francisco, Cal.	0.00	0.00	0.00	0.24	7.27	4.15	7.55	4.92	5.49	1.29	0.24	0.04	31.19
Santa Fé, N. Mex.	6.91	1.59	4.14	0.06	1.50	0.47	0.61	0.40	0.64	0.46	0.83	1.62	19.23
Savannah, Ga.	1.51	6.14	3.95	2.87	1.49	1.41	2.39	2.21	2.71	5.74	2.25	18.79	51.46
Shreveport, La.	2.16	6.47	8.02	4.40	2.99	9.54	7.26	2.68	11.67	5.83	9.47	2.08	72.27
Saint Louis, Mo.	9.49	2.66	0.24	1.23	0.89	2.42	4.75	2.86	6.90	2.25	3.13	6.43	43.25
Saint Mark's, Fla.	2.33	9.26	7.69	2.55	6.80	3.04	2.14	1.41	8.63	5.11	1.58	11.56	62.10
Saint Paul, Minn.	0.82	8.74	2.16	1.56	0.84	1.56	0.73	0.66	1.43	2.23	3.15	2.02	25.90
Saint Paul's Island, Alaska	4.75	5.73	3.86	4.50	0.79	1.73	4.54	1.04	3.39	2.89	3.73	1.56	38.51
Smithville, N. C.	.....	.....	.....	.....	2.74	2.41	0.44	3.07	5.66	2.70	3.95	3.38	.....
Springfield, Mass.	3.30	9.37	2.80	4.34	5.07	1.49	2.24	5.67	8.94	3.76	3.26	2.76	53.00
Squan Beach, N. J.	6.46	8.04	4.93	3.02	7.49	4.09	2.16	.....	.....	.....	.....	.....	.....
Thatcher's Island, Mass.	.....	.....	.....	.....	.....	.....	1.93	5.27	6.91	4.71	2.47	1.61	.....
Toledo, Ohio	1.31	5.60	2.36	2.54	2.23	2.57	1.76	2.04	4.10	0.55	3.21	3.58	31.84
Tybee Island, Ga.	0.81	3.05	2.20	1.06	2.26	1.51	2.01	2.84	3.81	6.42	3.69	17.57	47.22
Vicksburg, Miss.	1.92	8.85	7.55	3.76	4.55	5.61	3.81	5.18	11.21	4.89	6.24	1.74	65.31
Virginia City, Mont.	0.73	2.94	1.25	0.81	0.91	0.22	0.59	0.49	1.06	0.84	5.58	2.65	18.07
Washington, D. C.	3.05	12.93	1.98	1.86	3.95	3.51	1.68	3.51	5.52	2.43	3.02	4.57	48.01
Wilmington, N. C.	1.95	7.44	2.21	2.53	1.77	3.20	0.52	3.04	4.51	2.82	3.44	12.41	45.92
Wood's Hole, Mass.	4.68	2.37	2.79	3.62	4.77	1.23	2.11	6.02	5.12	5.08	1.43	1.37	40.59
Wytheville, Va.	8.64	4.23	2.50	0.01	3.70	2.76	2.31	2.95	3.34	2.01	3.16	4.07	40.31
Yankton, Dak.	5.53	4.95	5.33	0.14	0.12	0.20	0.32	1.19	2.18	0.97	3.15	3.18	27.17

PAPER 17.

Maximum, minimum, and mean temperatures.

STATION, ALBANY, N. Y.

Day of month.	1875. July.		August.		September.		October.		November.		December.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	73	57	70	49	84	59	52	39	37	26	8	−5
2	77	49	65	56	84	59	57	37	38	27	14	−2
3	80	50	63	54	85	66	65	37	35	21	28	1.5
4	73	62	81	62	85	65	67	49	36	27	33	15
5	90	68	77	63	76	59	62	42	43	28	33	17
6	89	66	82	56	75	59	52	39	48	32	35	25
7	77	64	79	67	76	56	54	41	50	28	34	25
8	82	58	81	64	77	50	58	37	41	27	39	27
9	82	65	80	62	85	60	53	35	34	26	37	29
10	80	64	81	60	74	46	57	40	36	27	32	25
11	76	57	76	60	60	37	52	38	39	32	33	28
12	79	49	82	70	66	36	45	33	50	27	37	28
13	82	54	84	69	70	53	45	29	55	30	40	23
14	80	60	83	68	71	50	55	25	39	27	30	12
15	84	57	84	65	72	52	50	41	39	30	30	10
16	75	63	84	69	63	51	55	41	42	30	38	29
17	79	62	82	70	57	42	47	36	36	21	33	9
18	65	55	73	66	56	37	58	43	38	15	15	1.5
19	71	47	77	65	53	42	48	37	45	34	7	−13
20	77	50	78	61	60	44	58	33	44	26	25	−17
21	82	58	79	58	58	41	61	43	40	24	45	23
22	82	56	77	62	51	33	63	37	33	16	52	40.5
23	79	64	65	51	59	35	66	38	35	20	51	33
24	76	57	70	45	65	34	68	48	41	27	35	18
25	81	54	76	50	70	45	65	41	33	18	40	27
26	80	63	78	51	61	45	65	37	47	21	38	27.5
27	82	65	78	52	70	43	52	39	47	25	42	20
28	81	62	80	51	62	43	46	34	37	18	30	15
29	78	58	82	54	58	41	42	34	42	3	36	24.5
30	81	58	83	58	69	51	50	39	10	−10	43	32.5
31	75	53	85	62	.....	.....	43	32	.....	.....	45	34
Range	43°		40°		52°		43°		65°		69°	
Monthly means	69°.8		69°.8		58°.6		46°.5		32°.2		27°.3	

Day of month.	1876. January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max	Min.
1	56	36	36	24	31	23	38	28	46	29	77	48
2	59	35	37	−1	29	14	41	23	59	38	83	53
3	44	29	21	−5	27	5	39	28	54	43	86	65
4	40	9	28	9	34	7	36	32.5	54	39	81	62
5	36	7	15	−3	43	12.5	48	32	58	43	70	57
6	39	14	38	11	51	37.5	48	33.5	71	50	68	52
7	28	7	44	33	62	40	52	34	85	52	74	50
8	39	22	41	29	55	24	44	26	75	57	80	51
9	48	37	38	22.5	32	24	39	21	59	51	84	67
10	49	14	39	27	35	21	48	26.5	63	46	81	63
11	23	6	46	29	42	22	57	30	60	44	83	63
12	25	11	45	33	38	30	63	31	53	44	77	66
13	16	5	50	27.5	39	19	63	38	57	40	75	64
14	26	8.5	37	26	24	7.5	64	46	58	39	80	67
15	36	24	37	27	30	7	54	38	56	42	84	65
16	41	31	38	25	30	13.5	51	36	61	36	83	65
17	42	32	31	21	38	24	49	33	59	40	80	64
18	53	34	29	19	34	1	42	32	63	49	79	67
19	54	38	42	20	20	1	46	32	74	50	81	67
20	39	26	39	18	29	2	54	30	74	47	79	63
21	32	16	34	13	40	26	51	38	77	55	76	57
22	22	12.5	35	24	32	22.5	57	35	77	47	74	55
23	39	18	27	−4	40	17	56	39	57	36	79	56
24	35	18	12	−5	39	23	59	32	70	40	87	63
25	32	13	25	0	45	27	54	39	71	44	85	63
26	30	11.5	24	9	46	33.5	54	36	67	39	84	63
27	41	15	19	9	40	30	62	33	80	51	85	63
28	41	30	16	8.5	40	29	59	37	83	62	84	67
29	46	23	32	11.5	47	30	56	36	82	50	79	64
30	35	9	.....	.....	38	27	51	28	61	41	85	58
31	31	14	.....	.....	43	28.5	.....	.....	72	46	.....	.....
Range	54°		55°		61°		42°		56°		39°	
Monthly means	29°.4		25°.0		29°.8		43°.2		57°		71°.3	

Maximum, minimum, and mean temperatures—Continued.

STATION, ALPENA, MICH.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	67	50	63	51	88	66	51	31	35	25	26	15	39	35	33	1	20	9	38	14	47	27	75	59
2	62	47	68	51	79	63	50	33	32	28	30	24	52	25	5	−10	28	7	33	14	46	30	76	57
3	67	58	68	51	82	65	65	47	33	30	33	23	34	8	18	5	39	−1	39	30	44	31	59	48
4	84	64	68	50	69	54	53	41	39	30	36	31	26	8	7	−7	44	13	45	31	44	36	58	46
5	83	59	72	57	82	55	45	41	39	30	36	34	33	21	30	−11	46	27	41	29	40	36	59	45
6	70	58	72	61	74	56	47	36	44	30	37	33	30	20	42	25	62	36	50	33	50	38	65	45
7	80	53	62	56	69	48	51	33	41	33	35	31	39	24	36	21	56	10	43	29	44	37	51	40
8	70	54	73	55	82	62	48	36	38	31	31	27	43	32	28	15	27	5	36	23	55	38	85	46
9	81	54	79	55	82	56	44	29	41	30	27	22	39	22	32	25	27	16	32	16	44	39	78	59
10	73	51	64	56	57	43	44	32	39	30	28	20	22	4	35	25	37	26	33	24	57	36	67	56
11	73	46	70	58	57	36	36	30	46	29	31	18	16	7	47	28	49	34	47	28	55	35	74	58
12	70	47	71	60	67	51	38	30	49	33	32	16	18	10	50	24	34	14	38	34	56	41	79	59
13	72	58	74	60	63	45	53	30	38	26	31	14	20	8	31	18	19	7	42	34	57	35	70	61
14	70	50	74	59	64	53	55	40	39	28	19	14	28	15	35	25	19	3	48	33	53	34	72	60
15	84	56	75	61	64	56	45	32	40	34	30	19	40	13	28	20	22	17	47	34	43	36	72	55
16	73	59	69	58	56	41	33	28	34	22	24	11	39	23	20	13	25	5	37	30	43	39	65	58
17	73	52	70	59	47	40	39	29	27	20	11	4	44	32	29	16	21	5	35	23	60	41	61	57
18	68	55	66	56	49	34	33	28	36	25	15	0	42	33	41	8	15	−6	42	24	63	46	60	53
19	71	49	69	56	51	44	55	28	39	33	14	−4	35	20	37	12	18	−6	37	23	55	43	57	51
20	75	54	77	51	50	46	66	42	36	32	42	14	20	12	22	8	20	13	43	31	68	43	57	50
21	81	55	62	49	47	38	66	43	34	10	51	36	17	6	39	16	26	16	58	39	85	50	64	51
22	79	58	63	45	50	33	73	35	31	10	56	33	30	17	16	−5	35	10	51	35	60	40	64	46
23	68	51	63	41	63	38	70	49	34	29	47	24	29	21	8	−5	39	17	46	30	53	35	83	53
24	68	48	67	44	70	47	57	42	29	14	35	26	25	18	16	−3	34	12	51	32	78	41	90	64
25	91	67	68	48	59	42	45	38	37	15	40	15	21	9	26	15	32	27	51	32	51	43	85	64
26	76	59	69	60	63	34	48	35	38	24	32	14	27	5	25	14	33	24	58	33	62	38	71	57
27	74	52	72	60	67	42	40	33	27	19	21	14	38	26	17	10	31	22	47	39	84	51	75	61
28	78	54	74	66	51	34	42	32	32	20	30	20	41	32	18	1	24	18	51	32	90	58	75	54
29	77	58	78	58	49	44	43	41	20	1	34	19	36	2	25	14	21	17	46	26	62	47	67	57
30	70	55	70	51	45	38	53	30	17	1	43	33	29	2	.....	.....	33	23	41	24	50	40	70	52
31	71	49	72	53	.....	.....	35	28	.....	.....	54	36	36	27	.....	.....	35	23	.....	.....	75	50	.....	.....
Range	38°		38°		55°		45°		48°		60°		50°		61°		68°		44°		63°		50°	
Monthly means	64°.9		62°.5		54°.3		40°.8		29°.4		26°.9		24°.5		19°.5		22°.7		35°.6		47°.5		60°.8	

Maximum, minimum, and mean temperatures—Continued.

STATION, ATLANTIC CITY, N. J.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	87	66	72	65	75.5	64	71.5	48	45	33	24	12	53.5	42	42	31	35	28	47	31	57	33	65	47
2	73	63	69.5	63.5	79	62	62.5	39	45	31	29	14	55	42	46	14	33	23	40	28	57	39	72	49
3	75.5	60	79	66	79	64.5	65	45	45	24	35	19	54	35	33	11	34	16	45	36	47	37	74	62
4	80	64	79.5	70.5	90	70	67.5	60	44	32	42	30	37	26	33	14	38	20	51	40	51	37	79	62
5	80	69.5	79	71	81	60	70	62.5	40	31	43	33	44	21	30	10	43	32	52	38	59	45	70	60
6	81	70	81	69	87	64.5	67	62.5	50	28	43	34	51	29	44	22	49	37	56	37	65	50	72	55
7	81.5	69	79	67	78	59	66	48	49	34	44	35	43	24	51	34	52	40	56	39	66	52	72	53
8	74	68	76	68.5	79.5	57	62	40	48	39	44	37	44	29	42	31	50	35	53	32	67	52	71	62
9	77.5	67	83	64	76	66	57	45	49	37	45	38	56	43	46	30	47	28	49	27	59	51	70	61
10	81.5	69.5	79	67	82	56.5	61	44	55	39	40	27	56	17	54	38	40	30	56	28	62	50	75	62
11	87	71	80	72	61	49	63	46	51	37	42	27	27	15	53	39	39	36	54	37	67	46	72	62
12	75	66.5	81.5	72.5	68	60	54	39	55	37	45	30	35	13	55	39	41	36	56	42	63	50	70	62
13	78	59	81	70.5	73	66	51	35.5	55	46	44	30	27	12	49	33	50	27	55	46	64	49	74	62
14	80	69	80.5	71	72	63	59	39.5	55	47	34	23	31	9	50	43	42	21	60	50	67	42	76	60
15	83	68	81	69	76	65	59	55	49	43	41	20	39	17	51	45	44	22	63	46	62	50	72	61
16	81	67	79	69.5	74	65	63.5	43.5	54	39	45	27	49	36	36	25	50	30	67	46	56	49	74	62
17	88	68	80	69	73.5	52	55	40.5	46	26	46	15	48	38	36	23	51	32	53	40	52	49	76	65
18	93.5	67	79	69	60	44	61.5	50	46	20	23	12	49	38	39	26	33	13	51	36	59	50	73	67
19	72	60	78.5	70	61	51	53.5	41.5	54.5	42	26	8	51	43	43	23	33	12	52	37	72	52	75	66
20	73.5	64	80	68	68	47.5	61	37	50	37	36	4	44	33	42	30	45	19	51	30	64	52	77	66
21	79.5	67	80	64	63	43.5	70	44	47	36	42	27	50	30	41	24	47	27	68	47	70	55	80	64
22	82	67	75	67.5	61	44	65	46.5	38	26	63.5	41	41	29	47	35	39	24	53	41	68	58	80	58
23	88	71.5	71	65.5	61	44	65	53.5	54	37	63	40	47	39	39	12	43	24	56	44	64	49	77	60
24	81	67.5	69	65	64	43	66	52	50	33	51	37	45	26	31	8	44	27	51	43	64	45	90	64
25	81	65	71	64.5	66	48.5	76	55.2	41	27	52	39	39	25	41	16	51	39	45	38	76	53	86	66
26	83	71	68.5	62.5	66	48.5	63	53	54	39	49	37	35	25	38	23	52	39	56	35	60	53	85	66
27	85.5	70	69.5	66	72	46	61	41	51	36	52	31	51	30	37	33	48	35	58	38	66	54	82	69
28	79	65	69	67	74	56	59	36	47	53.7	41	28	50	40	40	35	49	32	60	47	66	56	90	70
29	77.5	61	74	67	71	57	69	54	49	18	42	38	52	36	36	28	49	31	56	47	69	60	80	67
30	81.5	61.5	79	65	70	59	63	44	20	10	46	40	37	22	.....	.....	46	32	60	36	68	53	84	68
31	76.5	70	78.5	65	.....	.....	47	36	.....	.....	49	42	38	30	.....	.....	49	30	.....	.....	58	51	.....	.....
Range	34°.5		20°.5		47°		40°.5		45°		59°.5		47°		47°		40°		40°		43°		43°	
Monthly means	73°.0		72°.0		64°.1		54°.5		40°.7		35°.8		37°.2		31°.6		36°.5		46°.1		55°.5		68°.2	

Maximum, minimum, and mean temperatures—Continued.

STATION, AUGUSTA, GA.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	92	72	91	72	91	68	76	59	70	35	54	42	74	62	50	35	69	45	70	52	71	45	84	69
2	93	73	84	69	91	66	70	49	77	47	53	41	77	54	43	25	61	42	52	44	55	43	87	68
3	90	72	87	69	92	68	75	50	79	54	45	37	70	57	45	30	53	32	51	44	65	47	88	69
4	92	72	89	66	95	69	72	63	77	58	51	40	62	45	43	38	58	30	69	48	72	47	88	72
5	93	72	90	68	97	71	80	61	71	48	55	48	66	46	49	31	69	42	81	44	80	53	84	70
6	91	72	91	70	97	73	75	63	54	44	65	48	67	48	43	37	73	48	67	56	88	65	83	66
7	88	74	91	71	94	70	78	63	51	47	64	50	64	35	62	39	74	56	75	48	88	69	85	62
8	87	72	83	72	92	70	74	54	56	45	50	44	67	35	61	50	67	42	65	53	86	68	85	67
9	90	71	90	72	91	70	74	49	55	43	47	37	72	48	62	40	72	40	69	49	72	58	86	68
10	93	72	90	70	95	71	74	50	56	48	49	30	63	43	70	53	80	44	74	47	81	49	88	70
11	95	72	83	69	81	60	74	55	60	38	52	28	46	37	78	54	81	52	81	59	85	57	82	70
12	96	75	86	69	70	60	64	49	65	34	54	38	53	30	76	64	79	61	77	66	87	54	76	69
13	92	75	85	68	83	62	62	42	68	36	61	38	42	29	77	58	63	41	85	66	89	62	74	67
14	96	73	88	69	86	71	63	45	67	49	54	35	45	23	67	56	65	42	80	57	78	65	81	70
15	97	75	87	71	89	67	70	39	78	57	58	27	58	22	58	43	74	52	69	50	81	63	78	70
16	98	73	87	70	89	69	60	42	81	58	64	40	64	32	60	42	75	63	81	49	79	64	78	71
17	100	76	86	71	86	70	62	34	59	40	56	31	72	47	60	35	66	48	71	52	85	60	86	73
18	100	77	87	71	84	68	71	37	57	33	40	21	72	50	57	42	54	35	65	43	87	61	82	66
19	99	79	86	68	80	65	63	44	75	59	56	28	67	48	60	32	46	26	67	42	91	65	85	67
20	95	77	85	63	80	57	64	39	80	66	58	29	55	36	66	32	48	34	75	43	95	68	86	65
21	99	74	84	64	75	59	71	38	78	61	69	36	60	32	60	49	43	32	84	53	95	69	90	69
22	99	75	79	69	73	54	76	45	61	51	69	55	70	48	57	48	50	25	84	55	92	68	92	67
23	98	75	83	68	73	57	78	45	55	47	76	54	78	55	64	39	61	35	85	60	90	67	91	66
24	99	73	81	69	74	56	79	45	64	49	74	58	75	60	55	32	64	47	85	60	83	69	95	74
25	99	74	80	65	75	52	81	49	58	45	77	59	63	52	70	35	75	59	76	61	83	58	97	74
26	98	76	82	69	74	61	80	55	55	45	76	60	61	45	70	40	67	50	71	51	75	67	96	76
27	94	73	83	68	71	52	72	46	67	49	72	62	72	53	76	51	70	43	77	51	79	66	95	75
28	97	73	82	64	73	61	77	42	65	56	67	58	77	54	77	59	70	48	80	61	84	66	96.5	74
29	98	72	90	64	76	63	75	45	63	54	72	56	66	52	69	48	56	39	80	60	87	67	97.5	73
30	99	76	90	67	75	60	74	53	59	48	72	62	52	38	.....	.....	70	38	85	52	90	66	91	76
31	94	71	91	70	.....	.....	65	44	.....	.....	68	60	50	34	.....	.....	78	49	.....	.....	87	66	.....	.....
Range	29°		28°		45°		47°		48°		56°		56°		53°		56°		43°		52°		35°.5	
Monthly means	84°.6		76°.2		73°.4		60°.0		56°.6		52°.1		53°.6		52°.3		54°.8		63°.9		72°.1		78°.7	

Maximum, minimum, and mean temperatures—Continued.

STATION, BALTIMORE, MD.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	87	71.5	74	66	85	68	72	52	48	35.5	29	15.5	59	50	41	32	37	32	49	33	61	34	76	51
2	76	63	67	58.5	89	66	62	44.5	49	36	33	21	71	45	42	16	36	29	47	30	59	43	86	58
3	82	64	77	60	92	72	68	43.5	43	31.5	34	23	57	41	27	13	39	20	46	37	58	47	88	68
4	83	69	81.5	68	90	72	68	51	44	37	45	32	47	31	35	24	42	27	55	42	61	40	81	69
5	92	72	87	66.5	83	68	77	53	43	35.5	43	36	47	25	26	16	51	30	57	36	72	49	76	64
6	94	74.5	88	68.5	88	66	69	58.5	51	33.5	41	35.5	51	36	34	18	68	35	58	41	84	57	76	58
7	86	74	84	68	78	63	68	50.5	51	33.5	45	35	49	29.5	51	32	69	44	67	38	87	62	80	56
8	85	69	84	67.5	82	60	67	45.5	52	42	45	40	51	29	47	35	61	37	56	34	82	69	86	64
9	82	70	85	64.5	84	64.5	60	46.5	50	33.5	47	40	60	47	51	35	53	32	55	34	72	58	86	67
10	89	72.5	85	65	85	56	69.5	50	48	40	41	35.5	60	22	61	43	53	35	57	34	69	50	87	69
11	90	73	85	72	65	49	59.5	46.5	54	42	42	32.5	29	17	65	41	51	40	60	37	75	49	87	66
12	77	68	82	71	70	52	54	40.5	62	35.5	45	33	36	21	57	45	43	36	69	49	80	53	85	71
13	90	61.5	83	72	75	62	50.5	36	65.5	37.5	43	32	29	19	53	36	47	31	66	53	66	53	73	70
14	86.5	73.5	83	69	77	64	56	34.5	63	48.5	36	25	33	20	58	46	45	26	75	57	68	46	85	70
15	88	71	82	69	78	62.5	64	50	53	45	35	22	43	22.5	49	32	42	29	65	47	79	52	84	68
16	91	72	85	70.5	71	65	57	44	56	39	44	29	49	37	36	27	51	35	65	49	62	52	84	67
17	85	74.5	85	70.5	74	54	55	39.5	42	31	42	16	56	38	37	27	46	34	56	47	58	51	83	72
18	96.5	73.5	85	70.5	60	47.5	59	42	44	27	23	12.5	64	40	44	22	35	18	54	40	72	52	78	70
19	79	64	82	68.5	57	47	54	43	58	37	29	16.5	63	46	53	27	33	12	55	35	77	58	86	68
20	72	65.5	83	66.5	68	49	60.5	38	55	41	33	12	47	32	52	36	47	24	59	35	81	64	85	67
21	83	67.5	83	65.5	62	47	73	45	47.5	40	50	22	52	35	44	31	47	26	70	51	86	65	78	65
22	81.5	67.5	82	65.5	61	48	75	4 .5	43	31	63	45	42	30	45	36	39	25	62	43	85	66	81	62
23	88.5	72.5	71	63	61	47	69	49.5	44	33	67	42	48.5	33	42	13	42	29	68	45	69	52	83	64
24	84.5	71.5	65	62	65	43	75	51	49	35	57	39	49	34	35	12	44	30	56	45	76	47	90	68
25	85.5	65	75	60	69	47	77	51.5	41	30	54	40	38	31	36	22	51	34	49	40	81	56	90	71
26	94	72	76	58	66	54	75	51	47	32	45	39	38	31	48	29	50	39	61	38	76	62	94	73
27	89	75	76	59	71	46	60	44	48	36	55	35	50	31	40	32	54	36	66	44	82	59	95	77
28	78	69	73	64.5	75	51	60	40	46	34	39.5	30	69	42	41	32	48	35	74	53.5	79	59	93	72
29	85	66	75	65.5	71	54	71	47.5	48	23	43	36	64	35	41	34	45	34	68	50	88	63	89	72
30	86	66.5	86	68	76	57	66	47	26	16	49	40	40	24	.....	.....	44	31	63	36	75	57	89	73
31	77	73.5	87	69	.....	.....	51	38.5	.....	.....	52	43	37	22	.....	.....	47	33	.....	.....	73	54	.....	.....
Range	35°		30°		49°		42°.5		49°.5		55°		54°		53°		57°		44°		54°		44°	
Monthly means	78°.0		73°.4		65°.9		55°.5		42°.9		38°.3		41°.5		37°.8		39°.8		52°.1		64°.2		75°.9	

Maximum, minimum, and mean temperatures—Continued.

STATION, BARNEGAT, N. J.

Day of month.	1875.												1876.											
	July.		August.		September		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	87	67	72	66	74	68	71	47	44	32	21	12	54	43	43	30	35	28	44	33	55	34	61	48
2	72	63	68	58	74	63	60	41	43	31	29	14	53	42	44	17	32	25	40	29	55	37	70	50
3	79	54	80	64	82	61	63	43	46	27	33	20	53	37	32	10	32	18	45	32	46	40	81	61
4	80	61	82	67	90	71	69	55	44	34	41	30	37	26	32	21	35	21	47	40	53	40	84	61
5	80	68	82	71	80	63	70	56	40	31	42	29	42	23	28	12	43	27	45	37	59	40	68	59
6	79	68	85	67	87	64	65	62	45	32	42	36	48	33	45	22	47	37	53	37	63	50	70	57
7	83	65	80	67	77	62	66	48	51	31	43	35	40	27	49	31	53	40	57	37	63	51	72	56
8	73	64	76	68	79	59	59	45	48	41	43	36	45	30	40	29	50	35	52	35	64	53	72	61
9	78	65	80	65	80	62	55	46	46	36	44	37	57	41	44	28	41	27	48	31	60	49	70	59
10	82	68	87	66	85	55	62	46	56	41	39	30	55	21	53	37	38	31	55	30	60	49	74	59
11	86	68	82	70	60	54	61	47	48	37	40	29	29	17	52	38	38	36	50	38	64	46	75	55
12	73	66	81	70	68	58	52	41	61	34	44	30	34	15	52	38	40	35	60	39	66	50	70	57
13	80	63	81	71	72	65	48	36	55	37	44	29	26	15	53	34	47	30	52	44	64	48	72	57
14	81	69	83	69	71	62	58	41	54	45	33	26	30	10	49	40	38	23	60	46	63	46	74	58
15	84	66	81	70	72	65	58	55	48	43	36	20	39	20	50	37	42	22	62	46	63	50	72	59
16	84	67	79	70	69	62	62	44	53	40	47	30	48	33	37	26	47	25	64	45	51	48	73	60
17	86	67	78	70	73	51	53	41	40	28	44	18	46	36	36	24	47	33	55	43	52	48	75	61
18	91	68	80	70	61	46	61	42	40	24	22	14	49	38	38	26	33	15	51	37	60	48	71	64
19	70	59	82	69	58	51	53	45	55	39	24	9	50	43	42	20	31	13	50	37	67	50	76	62
20	75	59	83	68	66	50	58	40	46	38	32	5	44	31	44	30	42	19	58	36	67	50	75	60
21	76	64	83	66	61	46	67	44	47	37	44	21	46	30	39	24	46	31	67	46	70	55	82	59
22	78	66	78	65	57	43	64	48	37	26	58	39	39	28	41	32	38	23	52	41	70	57	81	59
23	85	71	71	66	59	41	62	47	52	33	63	37	44	38	37	13	42	26	56	42	62	46	79	58
24	77	68	69	65	62	44	64	47	48	35	49	38	41	27	28	8	44	28	51	43	62	47	87	63
25	78	65	69	65	67	47	75	52	40	28	51	39	37	26	37	17	50	38	43	37	80	48	87	64
26	82	68	69	64	63	49	62	53	53	39	51	37	32	25	36	25	54	40	50	37	62	52	86	62
27	87	71	71	65	71	45	61	42	50	38	51	35	47	28	36	32	46	35	61	37	72	59	82	66
28	77	64	72	66	72	52	57	38	48	36	40	35	49	40	38	34	48	32	58	46	67	57	89	65
29	75	62	73	65	71	54	65	48	47	18	41	38	53	37	34	28	47	33	54	46	73	62	89	68
30	80	63	76	63	72	54	62	44	18	11	43	41	37	22	.....	.....	46	32	60	37	66	52	82	69
31	77	68	75	66	.....	.....	48	35	.....	.....	47	42	37	28	.....	.....	46	30	.....	.....	66	50	.....	.....
Range	37°		29°		49°		40°		50°		58°		47°		45°		41°		38°		46°		41°	
Monthly means	72°.5		71°.6		64°.5		53°.9		40°.4		36°.4		36°.7		33°.9		36°.3		46°.0		56°.0		67°.3	

Maximum, minimum, and mean temperatures—Continued.

STATION, BENTON, MONT.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	(*)	62	78	54	71	42	82	40	46	29	55	24	47	10	3	—33	48	— 2	52	25	63	36	40	30
2	.....	52	86	56	76	56	63	44	48	29	52	37	23	— 2	4	—12	48	— 4	46	32	69	35	54	35
3	.....	48	88	61	71	45	62	40	52	26	58	46	18	— 4	9	—21	32	— 2	37	23	60	39	64	34
4	.....	48	88	66	77	48	50	35	54	25	50	30	33	8	41	— 6	30	2	39	12	57	35	75	40
5	.....	45	88	51	85	50	60	33	56	36	38	20	49	26	38	3	8	—12	54	30	54	42	78	50
6	.....	49	92	57	85	50	69	34	60	35	48	29	53	22	10	— 8	17	—22	56	32	55	40	75	57
7	.....	51	92	66	81	49	78	41	47	29	51	19	35	5	8	—12	17	— 3	64	32	68	52	74	53
8	.....	58	83	58	67	45	76	42	49	19	52	48	11	— 6	13	—10	9	—21	64	25	77	37	73	43
9	.....	56	84	54	64	40	87	44	62	29	60	34	11	—19	16	— 5	2	—33	52	35	82	44	67	55
10	.....	56	89	57	73	40	67	41	61	45	56	31	35	—11	10	— 7	1	—42	47	32	65	50	69	46
11	91	59	92	61	71	40	76	36	47	30	63	44	45	14	46	— 2	5	—37	42	27	68	37	72	48
12	92	61	90	59	75	36	80	38	47	15	57	33	50	12	41	21	5	—19	52	22	76	48	78	43
13	92	59	86	57	76	42	67	44	44	9	57	29	51	4	38	2	10	—12	58	35	76	46	81	43
14	94	60	80	64	81	45	72	33	12	— 8	59	35	53	33	49	— 4	5	—34	64	33	62	46	73	61
15	86	61	78	60	75	44	84	38	8	—12	37	21	56	34	50	35	12	— 5	56	37	62	46	80	52
16	79	56	80	56	67	41	72	46	13	—21	32	13	57	33	52	29	12	—12	61	28	66	34	80	53
17	86	52	82	56	84	40	73	36	16	— 9	54	17	37	24	54	29	7	—34	76	39	67	50	80	52
18	89	56	83	59	72	46	76	35	3	—11	58	26	37	18	54	21	11	—10	72	39	58	45	83	53
19	93	58	85	49	62	50	73	41	2	—20	55	41	22	1	45	26	16	—34	50	40	55	41	87	56
20	97	58	89	51	62	38	82	42	—10	—26	52	36	— 9	—15	25	0	45	12	57	30	60	47	90	62
21	93	66	88	57	77	33	74	37	— 6	—31	62	39	14	—27	50	—15	39	15	63	31	67	48	77	61
22	96	69	90	53	86	41	61	45	6	—14	62	28	5	—29	47	— 4	46	26	61	48	73	47	73	57
23	82	60	72	56	80	44	63	45	6	—20	51	20	— 3	—25	62	10	49	28	65	37	78	45	82	49
24	74	51	72	54	70	44	47	33	7	—15	25	11	— 2	-27	57	6	41	26	66	34	81	53	80	56
25	78	47	73	53	81	37	48	32	14	—14	28	17	35	—24	15	0	45	16	73	46	73	57	69	55
26	84	60	65	49	83	41	59	35	9	— 6	5	—18	35	13	15	— 4	35	10	71	48	77	46	71	48
27	93	56	59	47	88	36	58	37	— 4	—22	24	—19	19	—16	20	— 8	40	— 5	53	35	77	43	75	45
28	90	58	65	38	73	49	48	27	— 8	—24	47	8	18	—21	(†)	.....	50	35	70	35	81	37	75	44
29	83	56	54	47	82	46	41	29	46	— 5	47	9	43	16	20	0	60	34	70	32	69	51	75	56
30	72	57	66	39	70	53	50	28	51	29	31	11	38	—20	.....	.....	41	30	63	38	72	48	74	58
31	75	55	68	39	.....	.....	49	29	.....	.....	48	11	—14	—30	.....	.....	40	27	.....	.....	50	32	.....	.....
Range	.....		53°		55°		60°		93°		82°		87°		.....		102°		64°		50°		60°	
Monthly means	74°.5		68°.9		60°.6		51°.1		17°.1		36°.8		13°.9		16°.7		13°.3		47°.4		56°.8		63°.8	

* No maximum thermometer on station.

† No observation taken.

Maximum, minimum, and mean temperatures—Continued.

STATION, BISMARCK, DAK.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	78	57	73	61	74	46	63	30	34.5	29	26	10	32	9	− 6	−28	25	5	42	16	47.5	28.5	46	35
2	84	62	82.5	51	64	56	76	38	51	29	35	8	24	− 2	1	−11	38	4	46	29	56.5	32	49	33
3	74	52	89	60	77	54	52	36	41.5	26	34	1	2	−11	− 4	−17	36	11	40.5	24	49	23	60	37
4	70	48.5	89	55	73	52	48	32	48	19	35	20	12	− 2	6	−15	40	10	34	22	49	28	76	36
5	73	55	79	59	83	45	44	32	52.5	20	33	6	36	0	21	2	28	− 3	46	18	53.5	30	78	50
6	86	46	83	51	85	55	56	38	55	28	16	− 6	48	14	7	− 9	4	− 9	46.5	28	60	34	76	55
7	89	57	91	58	83	58	56	42	44.5	29	21	7	25	12	4	−15	22.5	− 8	43.5	27.5	60	35	66	56
8	84.5	58	86	63	74	54	54	34	44	19	23	12	18	5	12	− 2	17	5	60.5	30	72.5	34	68	52
9	86.5	57	79	57	57	44	48	34	58	22	38	12	5	− 6	21	9	12	2	48	32	66.5	41	72	48
10	85.5	60	81	53	67	39	37	26	56	31	26	5	20	−15	26	4	3	− 6	46.5	28	80.5	42	64	55
11	88.5	58	80	60	72	50	45	21	53	23	40	20	26	3	21	− 5	7	− 9	35.5	30	65.5	44	63	50
12	83	58	82	47	74	40	63	29	37	13	35	24	20	− 7	10	− 5	9.5	−22	45.5	22	71	33	75	46
13	92	59	84	51	73	54	65	39	41.5	25	38	19	42	4	13	− 3	14	1	55	30	72	50	84	50
14	95	57	74	51	78	57	52	32	33	7	51	21	48	3	12	2	10	− 4	55	27	65.5	48	84	57
15	84	55	71	47	63	51	70	38	15	0	37	18	47	17	15	1	12.5	3	49.5	26	54	46	65	51
16	83	59	73	54	51	43	73	40	13	− 2	18	− 5	47	27	23	8	10.5	7	49	29	60	45	62	43
17	74	53	74	48	67	40	59	30	29	− 2	24	− 6	47	27	45	3	8	− 8	60	24	72.5	41	62.5	39
18	85	54	76	48	57	40	70	31	20	0	19	3	28	8	40	8	13	−17	67.5	39	77	53	69	39
19	81	61	83.5	44	48	30	76	38	14	− 8	49	5	12	− 2	20.5	0	7	− 7	59.5	41	67	52	72	45
20	91.5	51	74	49	57	34	82	41	16	−16	44.5	20	1	−11	14	− 9	21	−17	57.5	32	66	49	83.5	46
21	88	58	77	39	65	29	82	39	4	−28	46	25	1	−10	6	−14	33	4	63	28	68	51	92	52
22	81.5	54	85	53	79	37	68	48	11	− 3	55	20	2	−10	0	−10	38	15	47.5	39	66	42	84.5	65
23	83	51	86	62	85	45	57	43	9	−15	26	10	− 2	−20	24	− 5	42	26	48.5	42	75	40	88	52
24	69	56	83	62	65	40	47	36	17	− 8	25	9	− 1	−30	48.5	10	37	22	62	40	78	44	93	52
25	73	48	73	60	69	36	39	27	8	2	26	7	20	−19	13	− 1	32	24	70.5	42	74.5	47	80	62
26	81	46	74	54	83	42	34	27	7	− 2	14	− 6	27	− 8	9	− 1	26	19	76	42	85	51	71	55
27	85	49	65	56	75	46	42	30	10	− 6	16	0	21	5	8	2	26.5	15.5	55	35	84.5	59	75	45
28	94	58	66	49	72	46	37	30	− 4	−25	24	3	6	−19	16	1	36	12	43	27	84.5	51	67	48
29	75	55	81	46	62	40	32	25	2	−23	39	13	26	−22	16	2	36	12	46	27	86.5	61	76	45
30	72	54	72	50	52	42	30	22	35	2	30	14	28	−17	.....	.....	35	10	43	31	74.5	48	71.5	54
31	81	52	69.5	48	.....	.....	43	25	.....	.....	28	8	−16	−25	.....	.....	39	19	.....	.....	67	45	.....	.....
Range	49°		52°		56°		61°		86°		57°		78°		76°.5		64°		60°		63°.5		58°	
Monthly means	69°.3		66°.2		56°.1		42°.7		17°.1		20°.1		7°.9		4°.8		13°.1		40°.3		56°.0		61°.4	

Maximum, minimum, and mean temperatures—Continued.

STATION, BOSTON, MASS.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	78	64	77	58	75	62	61	48	39	30	17	(*)	69.5	40	34.5	22	36	15	42	31	47	35	64	44
2	80	56	68	59	71	56	57	39	35	29	20	.....	64	37	39.5	4	30	22	45	28.5	60	42	59.5	46
3	79	58	63	57	78	64	64	40	45	27	33	.....	53.5	33.5	27	0	30	15.5	48	32.5	48	37	82	50
4	79	60	84	56	87	64	70	50	36	30	40	.....	35.5	13	30.5	15	43	14	38	30	51	33.5	74	49
5	87	69	82	67	78	62	74	47	46	26	35	.....	36	9	17	1	49	23	36	28.5	54	40	56	48.5
6	93	71	80	63	80	60	51	44	47	28	38	.....	44	20.5	44	4	63.5	38.5	49	32	61	42.5	64	55
7	78	65	87	68	74	56	65	49	54	32	37	25	26	14	49.5	36	68	44	57	34.5	80	46	73.5	55
8	80	62	83	70	80	54	63	40	44	32	36	29	42	24	49.5	33	58	41	43	28	52	45	69	54
9	86	64	84	66	87	61	54	41	45	26	35.5	28.5	55	36.5	35.5	30	42	30.5	42	24	56	47	86	64
10	83	63	86	64	78	50	57	42	49	33	37	25	51.5	17	37	23	34	28	49	30	61	45.5	86	62
11	83	67	85	66	65	42	56	45	51	34	40	22	22	11	52	29	35	25.5	58	34	58	48	70	55
12	81	60	87	72	63	43	48	35	56	31	41	29	28.5	13	49	37.5	36	29	66	36	56	44	59	55
13	86	60	86	74	65	54	52	30	60	39	42	25.5	18	8	56	37	38	25	61	40	62	42	74	55
14	81	65	86	70	67	54	53	31	46	33	31	16	25	5	38	31	29	17	76	45	60	43	78	61.5
15	88	64	85	69	73	57	52	47	35	28	28	11	36	20	46	33	33	12	61	46	59	45	89	61.5
16	72	62	74	66	67	58	60	48	47	30	40	23	45	30	37	28	37	17	59	40	54	40	84	64.5
17	84	62	67	64	67	49	55	40	38	22	38	18	39	33	33	22	34	26	55	37	63	42.5	80	64
18	71	57	75	63	58	43	64	43	40	19	18	8	55	33	34	16	32	7	52	33	60	48	81	67
19	76	54	84	69	49	44	54	44	50	34	12.5	—10	58	46	41	18	24	5	48	36.5	71	52	82	64
20	79	55	83	70	60	42	62	38.5	44	31	31	—11	47	29	38	22	30	11	57.5	33	64	50	83	64.5
21	84	59	84	66	63	44	66	49	43	27	55	30	32	19	40	16	53.5	27.5	55	39.5	69	53	78	65
22	83	63	83	63	54	39	67	45	35	20	56	43	25	13	39	25	39	25	62	35.5	83	55	76	57.5
23	69	64	68	60	59	35	62	43	39	18	58	45	37	22	30	— 3	39	23	50	39	59	40.5	81	56
24	84	61	69	57	68	42	50	45	44	30	47	27	35	13	10	— 6.5	45	26.5	46	37	64	42	88	64
25	86	60	70	58	71	46	73	43	33	21	38	27	32	9	26	3.5	42	30	44	35	77	52	87	66
26	88	64	70	54	59	44	51	43	53	26	42	31	30	16	29	13	56	30	46	34.5	62	44.5	87	66
27	88	69	71	54	69	43	60	41	53	31	54	23	41.5	15	32	12	47	33	60	39	85	49	87	63
28	84	68	76	54	65	49	52	39	40	22	32	18	39	34	27	21	52	29.5	58	37	85	59	90	70
29	85	62	86	58	56	46	45	40	44	85	34	26	51	31	31	19	61	34.5	61	36	86	61	75	66
30	85	62	78	63	71	54	51	42	10	— 2	41	32.5	33	12.5	.....	.....	46	29	56	40.5	61	47	87	68
31	79	62	78	64	.....	.....	51	35	.....	.....	57	32	30	10	.....	.....	48	30	.....	.....	64	42.5	.....	.....
Range	39°		33°		52°		44°		62°		.....		64°.5		61°.5		63°		52°		52°.5		46°	
Monthly means	71°.7		6 °.7		58°.8		49°.3		34°.4		29°.8		30°.5		27°.5		32°.9		43°.2		53°.9		67°.6	

* Minimum thermometer broken.

Maximum, minimum, and mean temperatures—Continued.

STATION, BRECKENRIDGE, MINN.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	81	54	73	49	73	58	52	27	40	22	25	5	26	5	−13	−28	16	− 2	34	5	43	35	72	48
2	76	55	83	57	67	57	75	35	42	24	35	24	18	− 3	2	−24	20	− 6	34	17	54	28	55	37
3	78	55	83	60	68	56	55	41	43	16	25	12	10	−12	− 4	−17	31	3	36	22	45	23	50	40
4	68	50	85	57	76	53	49	25	41	15	42	20	12	− 4	0	−20	37	8	32	25	55	35	72	34
5	71	49	76	62	78	42	47	30	56	27	39	20	12	2	29	0	35	− 2	35	12	59	33	78	44
6	74	48	79	50	83	46	57	26	57	24	20	8	36	0	6	−10	2	− 8	42	14	51	41	79	48
7	86	50	82	46	83	58	59	32	57	34	20	5	32	2	2	−10	13	−14	36	14	51	39	79	56
8	88	60	76	66	92	67	52	31	36	22	18	− 7	14	3	15	− 2	32	2	41	18	69	31	66	55
9	83	55	81	61	67	44	48	33	50	9	25	− 8	3	−10	26	12	30	14	43	35	65	34	75	47
10	73	55	78	55	64	33	41	29	62	25	24	5	5	−19	34	4	14	− 9	49	32	65	32	78	62
11	87	40	77	49	64	44	43	13	53	24	21	0	18	− 7	22	− 4	6	−14	36	32	60	44	75	52
12	77	49	76	55	73	37	62	19	34	14	40	15	0	−16	16	− 3	3	−23	39	28	69	33	73	51
13	85	45	78	48	62	49	73	31	43	10	32	10	26	− 5	15	− 4	21	−16	51	28	69	36	83	47
14	89	59	71	56	73	55	52	33	37	16	41	5	27	3	2	− 8	24	10	51	29	86	54	81	54
15	85	64	70	48	70	50	52	27	20	4	38	22	32	12	1	−17	21	12	44	32	59	45	76	55
16	75	54	66	51	56	45	77	30	20	1	22	−12	42	14	4	−16	24	12	49	30	56	43	64	46
17	75	54	73	49	58	35	45	32	30	− 4	8	−18	41	28	30	−12	15	−15	51	26	69	36	62	47
18	83	47	76	45	54	41	68	13	28	10	8	− 3	29	10	31	1	6	−31	59	32	75	47	52	43
19	85	60	79	42	52	36	71	32	10	−12	26	3	10	5	8	−10	7	−11	61	42	82	61	64	43
20	87	49	77	50	49	35	83	33	11	−11	40	21	7	−14	21	2	4	−27	61	34	77	45	82	45
21	89	60	68	35	61	36	84	38	5	−24	34	23	1	− 18	2	−15	17	−24	65	36	70	53	90	49
22	77	52	74	38	72	35	75	35	29	4	47	25	6	0	− 3	−18	29	− 1	60	32	66	40	96	69
23	76	46	81	52	79	39	64	42	11	−10	25	8	1	−14	9	−24	34	10	52	41	75	39	92	49
24	83	53	68	60	60	40	52	36	24	−12	30	8	− 4	−25	30	− 6	44	31	56	39	81	39	89	57
25	76	54	79	64	68	33	47	32	24	− 1	19	− 4	8	−23	18	4	34	19	61	41	80	40	92	67
26	83	43	76	57	80	30	37	27	9	−13	18	− 5	34	7	19	7	26	14	74	42	83	46	70	58
27	83	53	69	53	69	40	37	26	25	6	22	− 8	17	1	16	7	37	8	62	36	82	55	80	50
28	88	51	68	50	72	28	43	26	12	−16	28	−11	19	−15	16	2	29	− 1	49	27	87	53	69	52
29	67	56	78	45	61	41	34	27	− 8	−25	37	18	5	− 25	13	−12	24	− 3	45	25	87	54	75	43
30	73	47	72	54	54	41	30	24	20	−10	32	21	30	− 7	.....	.....	24	− 3	45	24	83	61	64	50
31	77	50	64	45	.....	.....	34	23	.....	.....	15	5	− 4	−23	.....	.....	39	2	.....	.....	79	65	.....	.....
Range	49°		50°		64°		71°		57°		63°		67°		62°		74°		89°		64°		62°	
Monthly means	67°.7		63°.8		55°.4		42°.0		16°.3		18°.0		6°.3		4°.3		10°.5		38°.3		56°.3		63°.1	

Maximum, minimum, and mean temperatures—Continued.

STATION, BROCKVILLE, CANADA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	ax	Min.	Max.	Min.
1	74	54	72	47	89	54	49	33	37	24	4	− 8	58	37	39	23	32.3	11.7	36.5	24.1	48	27.5	81.1	54.1
2	77	56	75	46	87	61	54	31	32	25	12	− 9	57.1	34.1	33.1	− 8.9	21.6	5.4	42.1	14.7	54.5	33.2	78.6	56.7
3	82	47	65	55	74	64	64	32	31	22	26	− 1	38.8	31.1	16.4	−20.7	25.7	− 2.2	38.8	22.9	48.5	39.1	69.6	57.2
4	76	63	67	59	76	62	62	43	35	22	27	17	35.7	3.4	23.5	− 0.7	33.2	− 5.2	42.1	32.4	51.6	39.2	73.6	53.9
5	82	62	74	58	72	56	45	38	37	20	27	20	23.8	4.9	7.1	−22.1	44.9	9.4	42.9	32.0	53.7	39	67.1	47.1
6	78	61	84	56	79	55	57	38	40	22	27	19	22	6.4	40.5	− 4.0	49.6	36.1	41.7	32.6	61.9	45	66.5	50.1
7	80	55	74	62	73	51	58	43	42	31	28	21	21.1	− 0.5	42.8	30.1	57.8	39.7	38.5	31.1	56.6	40.6	66.1	46.1
8	82	57	72	61	77	57	49	38	33	25	25	20	34.7	19	33.6	20.8	46.1	26.0	32.7	20.7	72.6	44.1	75.6	47.2
9	84	55	77	59	83	63	48	30	34	21	29	22	45.4	32.6	23.7	12.2	27.8	17.6	34.6	15.8	58.6	44.1	81.5	58.2
10	79	58	79	57	74	43	57	40	39	28	29	16	49.6	7.4	22.8	13.5	33.1	19.2	45.6	24	56.6	42.1	77.1	58.2
11	78	55	82	57	62	35	49	34	40	28	32	13	18	0.5	42.6	17.8	36.2	20.0	48.9	26.8	61.6	43.1	84.1	55.2
12	76	53	84	64	68	39	41	29	51	32	33	23	15.8	2.9	38.5	26.0	47	32.2	58.5	26.0	52.9	43.3	87.6	59.2
13	72	55	78	66	73	54	45	24	46	31	34	15	8	− 3.8	37.4	22.9	41.6	5.2	59.4	36.1	54.6	41.1	83.6	65.3
14	75	54	81	62	74	51	58	32	34	21	18	2	24.2	4.4	30.6	13.6	16.9	− 1.0	62.4	40.3	55.3	32.6	81.6	64.2
15	82	57	85	60	73	54	62	41	37	23	15	− 5	35.8	12.8	31.6	22.8	20.2	1.6	44.8	34.1	51.6	39.1	86.5	63.7
16	78	60	85	66	66	46	55	36	39	27	31	14	37.6	29.4	27	19.8	19.8	7.4	48.1	32.1	60.6	34.1	87.6	67.3
17	77	56	81	64	49	39	40	33	30	16	29	− 2	39.6	27.5	22.7	6.9	31.7	17.8	40.7	30.1	63.6	38.1	80.5	68.3
18	65	51	70	59	57	34	41	32	31	6	6	−11	49.3	35.1	24.2	0.8	21.8	− 3	39.6	30.1	68.5	50.1	75.8	61.2
19	76	43	80	57	55	36	44	28	44	29	8	−29	50.9	35.1	37.5	10.9	21.3	− 6.7	43.6	30.1	73.1	47.1	79.6	60.7
20	78	53	77	57	59	42	56	37	38	27	14	−31	37.2	21.8	24.9	3.2	23.4	− 3.9	49.6	29.1	75.1	44.3	77.6	58.2
21	79	61	77	61	49	40	60	44	38	20	41	13	27.3	4.6	25.9	− 8.8	31.8	16.7	43	33.7	73.6	54	69.6	55.2
22	83	51	69	52	51	33	55	35	34	9	45	32	13.9	3.3	35.6	17.7	30.7	20.8	49.6	32.8	65.6	38.1	75.1	51.6
23	78	63	67	39	59	28	65	38	36	18	48	25	26.3	11	22.2	−11.4	33.9	9.4	54	32.6	59.1	34.1	72.6	55.2
24	80	59	73	44	63	45	65	49	37	19	27	11	24.7	3.2	8.1	−14.1	36.6	4.3	55.4	31.1	63.4	41.1	79.6	61.2
25	83	55	77	45	68	47	58	32	29	11	43	5	22.2	− 0.3	14.9	−10.7	32.8	21.1	56.1	31.6	58.1	44.1	79.6	61.3
26	78	63	80	47	58	41	50	31	43	23	44	19	15.4	− 6.8	14.9	5	37.6	29	57.6	31.1	64.8	34.2	81.6	61.7
27	79	60	84	50	62	41	49	37	43	15	28	15	42.5	9	13.7	− 4.6	40.4	31.1	62.1	30.1	73.6	51.1	82.7	60.7
28	82	60	84	51	53	33	41	31	23	13	29	14	38.6	31.1	15.8	4.4	37.6	20.8	58.6	40.1	74.6	53.1	77.6	61.2
29	82	60	85	50	52	30	47	32	38	− 8	29	19	46.2	17.7	28.7	12.6	36.6	25	54.4	31.5	63.6	43.1	77.6	55.3
30	82	59	88	59	63	41	59	35	− 3	−15	46	27	20.7	− 1.7	.....	.....	32.7	21.9	44.7	29.7	62.6	33.6	78.6	53.1
31	72	51	86	55	.....	.....	45	26	.....	.....	60	39	37.6	12.5	.....	.....	43.6	21.9	.....	.....	78.6	37.1	.....	.....
Range	41°		49°		61°		41°		66°		91°		64°.8		64°.8		64°.5		48°.4		51°.1		41°.5	
Monthly means	.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....	

Maximum, minimum, and mean temperatures—Continued.

STATION, BUFFALO, N. Y.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	67.5	61.5	65	53	80	61	47	38	36	31	17	7	61	48.5	41	33	26.5	20	32	26	43	29	79	64
2	75	58	64	54	77	71	55	38	34	29	26	9	59.5	39	33	2	22	17.5	44	20	42	32	71	58
3	82	55	65	56	82	71	61	43	32	22.5	40	17.5	40	22	23	3.5	25.5	11	48.5	36	45	36	71.5	58
4	74	68	69.5	59	77	61	62	56	37.5	30	35	27.5	22	15	23	9	34.5	20	36	33	47	39	65	62.5
5	77.5	64	73.5	60	74	57.5	56	45.5	42.5	26.5	37	31.5	49	19	30	2	52	32	46	32	61.5	42	56	50.5
6	77	64	79	64.5	74	62	72.5	43.5	43	32	36	32.5	40	28	40.5	28.5	61	39.5	38.5	32	56	39.5	62	48
7	74	61	66.5	62	70	55	54	43	49	39	45	36	37	27	40	31	59	36	44.5	31	69	46	70	53.5
8	78	61	66	61	75	59	52	42	39	32	38	31	48	34	41	29.5	36	23	38	28	63.5	39	74	62
9	76	64	71	60	82	69	52	36	41.5	28.5	32	26	53	43	37	29	31	22.5	34.5	25	46	39	74	60
10	74.5	66	79	65	72	50	52	42	42	36	31	24	46	14	50	26.5	50	27	47	25	49	39	67	58.5
11	67	53	83	69	63	42	44	35	47	34	34.5	28	19	14	53	34	61.5	39	61	33	55	38.5	83.5	63
12	72	55	76	68	66	47.5	39	33	52	43	35	22	19	15	41	30.5	57.5	34.5	59	44.3	50	40.5	88	66
13	73	65.5	73	67	70	52.5	48	32.5	48	34.5	35	21	19	11	51.5	35	34.5	12	60.5	38	53	39.5	83.5	69
14	74	56	74.5	63	68	51.5	59.5	34.5	36	30	21	12.5	30	19	51	34.5	21	11	64	36.5	51	40.5	83	69
15	79	57	81	61.5	68	59	56.5	49	43	29.5	37	19	39	27	37	27.5	27	15	41	34.6	56	42	84	68
16	75	67	75	69	62.5	47	49.5	35	44	30	34	28.5	37	34	28.5	22	40.5	22	41	32.5	59	43	84	72
17	44	64	75	67	50	43	51	33	30	24	31	11.5	43	36	26	21.5	39	19	38	32	66	52	78	67.5
18	69	60	74.5	62	52	39.5	52	34	44	27	16	8	56	39	29.5	23	19.	3	35	30	58.5	46	76.5	63.5
19	73	53.5	71	63	55	41	41	33	47	37	12.5	— 6	49	30	36.5	27	20	6.5	39	28.5	70	45.5	71	55.5
20	74	56	70	63.5	55	44	55	41	41	32	43	— 6	31	25	30.5	22.5	25	11.5	56.5	29.3	76.5	56.5	67	59
21	74	65.5	76	64	50	39.5	54.5	52	41	23.5	48	40	27	20	45	18	25	18.5	48.5	35	72	52	63	57
22	79	64	66	54	50	41	60	46.5	31	20.5	47	35	35	18	32.5	12.5	29	20	50.5	38.8	61.5	44	68	59
23	73	64	69	48	56	39.5	60	56	42	28.5	45	32	44	32	12.5	3	32.5	22	42	34	46	34.5	71.5	62
24	72	60	74	51	61	46.5	60	56	39	27	45	27	32	25	15.5	7	42	22.5	52.5	34	53	44	70	63.5
25	81.5	59	77	53	65	49	60	46	40	23	51	34	33	22	25	14.5	45.5	32.5	45.5	36	66	48.5	74	66
26	75	70	79	55	60	45.5	62	43.5	47	37	55	31.5	31.5	20	23	17.5	35.5	31	46	33	63.5	46	78	65.5
27	76	67	81	60	64.5	56	49	39	37	30	40	21.5	44	31.5	22	17.5	32	26.5	65	41.5	62	54.8	74.5	68
28	74	63	78	62.5	57	43	50.5	35.5	41.5	28	33	22.5	49	34	29.5	19	31	25	55.5	38.5	63.5	54	73	66
29	77	61	76	63	66	43	53	41.5	38	4	46	30.5	50	16	24.5	18.5	33	23	42.5	36	64	52	73.5	63.5
30	73	61	75	66	61	43	66	39	8	2.5	53	15	26	13	.....	.....	28	21.5	38	27.5	62.5	41	71.5	66
31	72	51	77	56	.....	.....	39	32	.....	.....	62	49	40	26	.....	.....	34	28	.....	.....	87	47	.....	.....
Range	31°		35°		42°.5		40°.5		46°.5		68°		50°		51°		58°.5		45°		58°		40°	
Monthly means	68°.9		67°		58°.2		46°.8		33°.5		30°.6		31°.7		26°.2		28°.9		39°		50°.9		67°.7	

Maximum, minimum, and mean temperatures – Continued.

STATION, BURLINGTON, VT.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	71	60	72	52	87	62	55	39	35	28	3	– 8	49	43	35	22	35	17	34	25	41	30	83	60
2	75	49	71	48	83	64	53	38	32	26	10	– 4	59	39	35	– 4	26	18	43	20	51	38	88	58
3	81	51	65	54	72	61	61	38	32	26	23	1	43	34	15	–12	23	8	48	27	51	40	77	62
4	70	65	77	60	80	65	63	46	38	27	26	18	34	8	23	5	34	7	43	33	54	39	70	52
5	83	63	76	63	78	58	46	38	43	29	27	15	33	6	11	– 8	42	19	47	30	56	38	72	55
6	78	65	83	57	76	60	50	35	40	30	24	18	33	14	38	10	50	39	47	35	68	38	64	54
7	80	61	82	70	68	58	53	46	42	31	29	12	25	10	43	35	59	42	43	34	60	41	66	50
8	81	56	80	65	80	54	51	36	31	25	30	20	37	23	35	25	53	31	35	24	75	40	70	46
9	84	62	81	58	86	60	50	38	39	27	37	28	43	35	25	13	31	22	38	20	62	50	96	62
10	84	65	84	62	74	48	51	40	38	30	30	24	42	9	25	17	28	21	44	28	56	45	79	63
11	74	63	81	64	59	40	51	41	39	32	34	21	17	2	43	23	45	20	53	35	55	40	81	60
12	81	56	86	68	65	40	41	35	44	30	38	26	15	6	43	30	42	32	55	32	51	43	80	63
13	74	55	81	70	70	52	48	30	47	35	37	23	9	4	37	20	43	8	65	35	52	43	84	65
14	80	58	84	67	71	51	56	30	35	23	23	11	23	3	33	15	19	5	63	47	54	40	81	67
15	85	59	86	60	72	55	59	40	39	28	25	8	32	21	40	30	22	6	48	41	51	37	83	61
16	77	67	87	65	60	48	56	45	41	33	38	22	37	30	33	25	19	8	47	36	58	36	89	69
17	74	62	83	66	51	40	46	35	33	20	33	8	42	27	25	15	39	18	43	34	68	38	86	65
18	63	52	73	65	54	38	52	36	30	15	8	– 2	50	36	27	16	18	5	44	33	63	48	86	77
19	70	47	80	65	50	38	44	35	43	28	2	–18	58	40	36	17	18	1	45	33	67	49	84	64
20	79	53	80	64	58	36	55	35	41	23	21	–18	40	26	33	17	26	8	52	32	74	42	83	62
21	81	61	81	59	51	44	61	47	41	22	43	21	26	7	28	11	38	23	44	34	81	55	71	57
22	81	60	72	58	50	40	51	39	22	15	49	38	17	3	32	23	34	26	53	36	71	40	73	58
23	83	65	63	47	58	33	69	40	35	15	50	24	32	16	27	– 3	39	17	53	36	53	34	79	54
24	75	59	70	46	65	42	68	50	37	21	25	12	22	9	4	– 8	35	24	54	30	72	38	85	63
25	84	54	75	50	69	47	54	38	28	16	41	22	26	9	11	– 3	37	17	57	31	59	41	94	65
26	79	64	77	54	59	45	50	33	45	20	38	21	25	8	17	6	45	32	56	33	71	33	80	57
27	81	66	83	55	63	47	50	41	45	19	41	14	41	12	10	1	43	34	57	32	84	52	84	60
28	81	63	83	57	53	35	44	34	35	13	30	14	46	34	14	3	43	30	54	35	84	62	81	68
29	82	57	85	58	53	32	43	33	35	– 4	37	21	47	22	28	12	49	33	55	36	68	43	83	56
30	82	61	85	60	64	45	51	39	– 1	–10	43	34	22	0	.....	.....	41	28	49	32	59	34	86	60
31	73	56	82	59	.....	.....	42	32	.....	.....	50	38	32	15	.....	.....	42	27	.....	.....	77	41	.....	.....
Range	38°		41°		55°		39°		57°		68°		59°		55°		58°		45°		54°		50°	
Monthly means	69°.8		70°.6		57°.8		45°.6		29°.8		23°.8		25°.9		20°.0		29°.1		41°.5		54°.5		70°.9	

Maximum, minimum, and mean temperatures—Continued.

STATION, CAIRO, ILL.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	86	69	78	63	89	73	59	51	74	47	56	32	70	52	51	12	59	39	52	43	55	48	83	68
2	89	69	71	61	92	74	65	43	71	51	53	39	57	44	25	8	43	30	62	46	55	45	85	71
3	91	74	79	64	87	74	70	48	67	48	58	51	57	38	32	24	50	30	60	44	65	44	77	66
4	92	75	81	66	86	72	79	56	49	42	54	49	63	39	29	10	56	34	65	42	71	51	74	59
5	93	69	84	69	91	68	76	61	54	42	52	49	65	49	42	18	66	47	61	44	73	58	80	58
6	91	76	83	72	89	73	68	52	57	38	57	48	52	33	53	38	72	59	61	41	78	62	84	63
7	85	74	81	67	90	75	63	50	55	45	49	33	57	35	56	39	59	35	68	43	71	61	84	67
8	88	69	81	67	92	74	69	46	61	45	33	29	66	48	55	44	63	37	71	50	63	50	83	69
9	87	74	83	69	90	75	68	48	51	45	40	29	64	27	60	52	70	53	76	51	73	51	78	68
10	80	73	83	65	81	63	71	50	52	38	43	29	28	18	69	58	76	63	71	59	75	58	88	67
11	84	71	77	65	66	60	54	42	61	37	39	33	40	22	66	49	69	36	78	62	85	57	89	71
12	82	72	82	65	73	62	55	34	66	45	48	29	37	28	67	42	36	28	73	63	83	65	84	70
13	79	73	82	69	77	61	62	41	61	43	47	39	31	20	73	44	48	29	70	56	72	57	79	68
14	85	73	82	69	82	67	60	44	47	41	50	35	49	22	49	36	52	37	59	42	82	59	82	71
15	92	70	83	69	85	66	54	44	48	42	59	39	39	36	42	27	60	44	71	48	77	67	73	67
16	96	79	86	72	83	68	57	34	46	30	46	29	47	36	42	23	58	38	66	52	81	65	75	63
17	95	79	75	67	69	53	68	40	38	23	29	7	57	46	41	28	38	27	58	44	86	66	66	57
18	94	75	78	65	56	49	55	40	50	35	35	11	62	54	54	31	36	19	60	41	85	66	72	53
19	86	68	77	62	66	45	60	36	70	49	56	31	54	33	52	41	30	22	73	48	88	69	77	56
20	85	73	79	64	61	47	60	40	57	51	59	43	52	35	63	40	29	23	79	62	87	69	79	58
21	78	72	79	65	60	44	71	43	51	33	56	52	56	41	57	35	32	11	63	55	80	66	86	63
22	79	72	78	66	62	46	70	44	48	30	60	53	67	45	53	31	41	22	73	54	83	64	90	71
23	83	69	81	61	69	46	70	49	50	39	60	57	65	33	45	24	39	33	78	62	69	52	93	72
24	84	71	83	64	69	49	77	49	41	27	66	57	33	26	54	26	53	36	72	49	63	57	93	68
25	84	72	86	68	66	55	79	52	45	27	62	43	42	31	66	46	43	39	66	48	73	58	88	70
26	86	71	87	70	68	47	60	45	56	39	72	39	55	33	62	54	52	37	71	52	80	60	91	73
27	88	75	87	71	70	48	69	42	44	33	41	31	62	54	72	49	48	42	78	54	84	59	90	72
28	85	70	86	69	76	49	72	56	52	42	43	32	66	53	50	33	47	31	69	59	88	63	90	69
29	89	71	79	72	82	55	78	59	45	25	54	42	56	21	50	30	47	31	78	52	90	66	82	70
30	83	71	86	70	73	58	59	43	42	22	67	51	42	20	.....	.....	54	34	69	53	87	66	86	70
31	84	71	86	72	.....	.....	55	34	.....	.....	72	64	52	31	.....	.....	63	40	.....	.....	80	69	.....	.....
Range	28°		26°		48°		45°		52°		65°		52°		65°		65°		36°		46°		40°	
Monthly means	78°.9		73°.6		67°.5		55°.2		45°.9		45°.6		41°.1		43°.9		43°.2		59°.4		68°.2		74°.2	

Maximum, minimum, and mean temperatures—Continued.

STATION, CAPE HATTERAS, N. C.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	81	74	84	72	79	70	78	64	61	42	47	36	66	56	54	44	59	40	52	44	57	43	64	58
2	84	72	84	75	78	70	66	58	62	49	49	44	70	59	62	36	59	33	52	44	62	48	78	57
3	81	72	85	76	84	73	69	58	65	48	56	49	65	47	60	35	36	32	63	52	50	46	79	70
4	82	74	85	73	81	73	72	63	68	53	55	52	53	46	62	37	42	35	63	49	55	45	80	73
5	82	75	82	74	80	66	75	60	56	51	65	52	62	48	46	36	51	34	56	44	70	55	75	63
6	82	76	84	75	83	63	77	63	54	51	62	47	63	44	64	44	64	48	59	47	75	60	71	62
7	84	76	85	75	83	63	72	62	58	50	62	48	48	39	64	48	68	55	64	42	75	65	76	60
8	82	75	83	73	75	69	64	52	58	51	54	48	59	44	52	47	64	46	60	45	76	66	79	63
9	83	73	79	71	79	68	66	60	56	53	51	45	64	58	60	47	49	43	52	42	76	66	78	67
10	81	74	82	74	82	68	67	58	65	55	46	39	64	44	67	52	55	43	51	44	67	60	79	69
11	82	76	82	73	78	66	70	61	59	46	51	34	44	33	69	52	70	53	68	49	65	60	82	73
12	84	74	80	74	76	68	61	54	57	43	49	42	45	32	64	49	71	56	70	58	73	62	79	72
13	84	76	82	73	75	69	63	53	61	50	51	41	37	29	68	50	65	46	68	59	74	61	80	72
14	85	73	83	74	76	69	64	59	66	57	45	37	34	28	70	61	46	38	73	63	62	56	80	72
15	84	75	83	73	75	68	63	55	62	58	55	32	48	32	67	52	56	43	68	52	71	55	81	69
16	86	76	83	76	78	66	67	52	70	58	61	48	57	48	52	41	68	56	66	57	72	63	81	73
17	84	76	84	76	81	70	54	44	60	40	61	31	61	51	52	41	67	47	64	52	68	60	81	73
18	83	76	82	75	75	64	62	48	50	39	31	23	65	55	47	41	65	35	57	49	75	63	81	75
19	82	74	79	74	81	64	59	50	67	49	40	30	65	59	57	38	36	26	51	47	74	67	83	75
20	83	72	82	72	70	64	53	47	68	58	56	40	61	38	53	44	63	35	63	48	74	68	84	73
21	82	72	85	72	67	60	64	46	66	53	62	46	52	35	63	48	65	37	67	60	78	68	83	73
22	82	76	82	75	65	60	67	55	53	50	62	56	63	39	64	42	43	32	63	59	79	70	82	72
23	83	77	83	75	65	62	69	60	67	53	61	56	65	58	51	30	48	37	72	60	74	58	84	72
24	85	74	82	75	67	61	68	61	66	51	68	55	62	46	40	24	64	43	70	57	62	57	83	76
25	84	76	77	69	72	64	71	61	54	48	66	62	53	45	56	39	67	56	57	46	72	56	87	76
26	85	78	75	69	68	59	74	62	69	55	69	62	48	43	62	48	62	52	52	43	76	64	85	77
27	85	76	76	70	68	55	71	59	67	50	68	54	66	46	64	52	56	45	65	50	76	64	89	77
28	82	76	78	71	73	63	66	56	60	47	71	52	65	57	65	57	68	52	70	61	77	67	87	77
29	82	74	79	71	76	68	69	63	64	49	60	51	68	56	62	41	61	48	67	56	77	70	85	76
30	81	75	77	70	76	64	72	58	49	35	66	57	55	39	.....	.....	58	43	70	57	78	67	82	75
31	84	73	79	70	.....	.....	58	48	.....	.....	66	56	50	43	.....	.....	57	46	.....	.....	68	61	.....	.....
Range	14°		16°		29°		34°		35°		48°		42°		46°		45°		31°		36°		32°	
Monthly means	78°.9		77°.2		71°.1		62°.1		55°.4		52°		51°.3		50°.9		50°.8		57°.1		65°.8		76°.2	

Maximum, minimum, and mean temperatures—Continued.

STATION, CAPE HENRY, VA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	92	72	82	73	83	72	78	64	60	36	40.5	26	71	48	51	39	45	36	52	39	59	41	70	58
2	75	68	92	75	83	70	67	53	57	45	41	32	77.5	57	56	29	45	34	45	39	54	45	76	56
3	76	69	92	72	91	71	66	53	53.5	43	47	37.5	66	46.5	45	23	40	29	61	40	52	45	81	67
4	80	69.5	89	73	94	75	76	61	60	46	51	41	60	39	41	32	50	35	58	45	52	44	86	70
5	83	70	82	71	83	70.5	76	61	48	42	56.5	41	57	41	36	26	60	33	58	43	67	50	72	62
6	87	76.5	91.5	71	90	69	77	64	52	41	46.5	42	61	41	61	33	74	46	60	46	82	63	75	60
7	91	72	92	69	82	72	70	59	56	42	50	44	53	38	58	40	76	55	70	43	88	67	82	60
8	80	72	77	70	85	66	69	55	52	47	51	44	65	40	50	41	65	44	57	43	87	68	86	66
9	84	72	87	70	87	65	67	53	53	45	51	43	69	55	57	36	54	38	50	38	75	61	83	65
10	90	73	82	72	90.5	66	71	58	60	47	45	36.5	63	35	67	46	56	40	53	38	73	58	83	67
11	87	77	89	71.5	67	60	65	53	56	44	51	32	38	28	75.5	45	54	45	60	43	67	56	80	68
12	86	75	78	68	73	66	58	49	68	41	48.5	36	48	25	69	43	64	45	60	51	82	55	80	67
13	84	72	83	67	79	70	56.5	48	70.5	40	51.5	34	35.5	25	70	42.5	65	40	84	57	73	56	78	65
14	90	74	82	70	75	68	64	55.5	70	54	44	31	37	25	77	54	53	36	85	67	63	55	77	67
15	90	74	84	70	79	68	69	56	64	50	46	25	46	25	64	43	50	38	67	52	79	53	77	67
16	91	75	87	74	86	65	65.5	48	74	53	62	36	57	41.5	52	36	69	43	74	52	67	54	79	69
17	97	76	85	73	82	69	61	39	58	38	55	24	63	45	48	33	66	41	60	47	64	54	79	69
18	101	79	87	73	69	57	69	44	46	35	28.5	17	70	58.5	51	35	41	28	64	46	83	58	73	65
19	82	69	86	74	75	59	59	49	63	41	41	21	76	48	58	33	38	22	61	43	83	67	88	65
20	76	69	91	71	74	59	59	45	64	49	46	31	50	40	62.5	40	59	30	67	45	73	64	80	72
21	88	73	82	72	67	58	75	45	55	47	68	41	60	37	57	39	61	33	71	55	78	65	86	71
22	92	75	84	73	70	58	74	55	48	40	69	57	61	42	60	37	48	29	60	51	86	67	81	67
23	94	77	79	70	65	57	69	54	71	47	72.5	54	72.5	57	46	24	41	35	74	50	70	57	86	70
24	89	74	83	71	65	58	77	58	67.5	45.5	62	47.5	62	42	41	20	50	40	57	48	72	55	88	73
25	84	73	72	68	73.5	58	76	57	48	39	76	59	43	37	47	32	64	45.5	48	43	75	54	88	74
26	94	71	72	67	69.5	61	80	58	65	48	76	49	47	37	57	41	60	45	60	40	78	63	89	76
27	96	77	71	67	70	59	68	52	62	44	69	44	71.5	37	59	44	63	39	74	47	72	62	92	78
28	94	76	79	70	81	55	63	53	51	42	49	42	76	58	74	44	62	48	81	58	74	63	94	78
29	95	74	78	71	73	65	76	56	64	39	50	42	78	45	46	38	52	43	65	54	80	65	87	77
30	93	77	81	71	79.5	61	75	54	39	26	52	48	45	32	.....	.....	55	40	80	45	82	60	89	74
31	92	75	84	73	.....	.....	54	43	.....	.....	69	49	48	34	.....	.....	60	41	.....	.....	64	58	.....	.....
Range	33°		25°		39°		41°		48°		55°		53°		57°		54°		47°		47°		38°	
Monthly means	79°.9		75°.9		70°.4		60°.8		50°.8		46°.6		49°.3		45°.2		47°		54°.9		63°.4		74°.5	

Maximum, minimum, and mean temperatures—Continued.

STATION, CAPE LOOKOUT, N. C.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	68	43	71	60
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	66	49	78	66
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	53	48	79	73
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	60	47	83	74
5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	70	60	75	65
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	75	64	75	63
7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	76	66	78	66
8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	76	67	79	71
9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	73	65	79	72
10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	68	61	80	73
11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	68	61	80	74
12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	74	64	80	74
13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	76	62	80	73
14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	65	59	80	70
15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	71	62	81	74
16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*68	56	73	59	80	75
17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	62	53	68	62	80	76
18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	59	46	75	64	79	73
19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	56	44	76	68	82	75
20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	64	49	76	68	84	76
21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	67	60	78	70	84	77
22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	66	60	80	70	86	72
23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	70	60	72	62	84	77
24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	70	60	66	59	84	78
25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	60	49	72	56	85	78
26	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	57	44	73	67	86	79
27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	66	55	76	68	86	80
28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	71	62	76	68	87	80
29	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	66	61	78	68	87	80
30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	70	60	80	68	81	77
31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	72	63	.....	.....
Range	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	37°		27°	
Monthly means	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	66°.6		76°.9	

* Station opened April 16, 1876.

Maximum, minimum, and mean temperatures—Continued.

STATION, CAPE MAY, N. J.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	84	66	74	63	78	63	71	52	47	37	28	15	55	44	44	34	39	31	46	34	58	37	67	67
2	71	63	70	63	78	62	59	46	45	34	33	18	58	44	45	20	36	27	45	30	57	41	75	59
3	74	61	77	66	82	68	64	53	42	31	40	22	54	39	38	15	33	20	47	36	49	39	73	64
4	76	65	77	71	85	73	67	62	50	40	41	21	42	29	34	27	37	22	49	41	49	38	75	65
5	78	68	79	71	76	67	70	62	44	34	45	38	46	23	34	12	43	34	53	39	56	47	73	64
6	77	67	79	71	83	70	65	57	47	33	45	39	48	35	45	32	55	38	54	42	60	51	70	60
7	76	69	79	68	82	62	67	52	50	38	47	38	45	32	49	34	49	42	57	42	64	52	76	60
8	76	67	75	70	76	58	60	46	50	38	47	39	47	37	47	34	49	38	51	37	72	54	74	65
9	77	65	80	67	78	68	61	45	49	38	44	39	55	46	46	34	46	31	48	32	62	55	74	65
10	77	69	80	70	82	57	63	46	55	43	45	34	55	23	54	42	44	30	51	33	63	53	73	66
11	81	70	78	71	63	49	64	48	52	43	44	33	29	19	52	42	42	38	53	39	66	49	76	66
12	75	67	80	72	69	59	53	39	55	42	43	35	38	23	51	42	45	37	54	46	63	54	73	65
13	76	64	79	70	77	66	49	34	56	47	44	33	29	20	48	39	49	32	57	46	60	50	70	64
14	78	71	79	71	74	63	59	38	56	51	38	27	33	15	53	44	40	25	62	50	62	50	76	64
15	80	71	77	69	72	65	61	53	54	43	40	25	41	27	51	37	40	26	61	49	65	54	73	68
16	83	71	76	70	73	66	61	47	55	42	47	33	47	37	38	29	47	36	63	47	61	50	74	63
17	85	72	77	70	73	56	54	43	42	33	45	20	47	40	35	27	48	34	53	45	55	49	75	65
18	90	70	75	70	60	50	60	51	45	30	26	16	49	43	40	31	35	19	52	37	64	52	72	66
19	74	62	78	70	60	50	56	46	56	43	26	16	54	41	44	29	32	15	50	37	72	51	77	65
20	70	65	78	69	65	49	55	41	52	40	40	9	41	34	48	36	47	22	50	36	65	57	76	66
21	78	67	79	69	60	51	66	50	48	36	42	30	49	37	43	27	50	30	63	43	67	56	75	66
22	79	68	75	69	60	44	71	62	42	28	61	44	48	32	43	36	37	27	53	41	72	60	79	66
23	83	71	71	66	61	42	62	55	53	39	58	41	50	42	39	16	40	31	61	46	63	51	79	66
24	82	70	69	64	63	44	66	54	50	38	51	42	50	34	32	13	44	31	53	45	64	50	84	67
25	79	65	72	62	66	55	72	54	45	29	52	42	39	26	37	20	51	40	46	38	77	57	84	68
26	80	71	69	60	66	54	65	55	54	44	50	41	42	30	42	29	49	40	54	36	64	56	84	69
27	85	72	70	62	68	53	59	44	60	37	56	34	53	35	41	35	48	38	60	44	68	56	85	71
28	79	67	70	67	73	59	58	44	49	34	43	28	56	44	46	37	50	37	60	49	69	60	85	72
29	79	66	75	68	69	59	66	56	50	24	44	39	58	37	37	32	48	36	55	49	71	62	82	71
30	79	66	78	68	73	62	62	46	24	14	50	43	37	25	.....	.....	44	36	60	39	68	53	85	73
31	78	70	78	66	.....	.....	45	40	.....	.....	50	43	40	27	.....	.....	46	35	.....	.....	64	50	.....	.....
Range	29°		20°		43°		38°		42°		52°		43°		42°		40°		33°		40°		26°	
Monthly means	72°.8		71°.6		64°.7		55°.4		43°.2		38°.5		39°.7		37°.5		38°.3		47°.7		57°.3		70°.5	

Maximum, minimum, and mean temperatures—Continued.

STATION, CHARLESTON, S. C.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	89	77	91	76	86	74	81	68	64	44	53	45	72	61	58	42	67	49	75	55	71	51	80	70
2	89	77	89	78	85	73	73	61	74	53	53	45	76	61	58	31	66	44	61	49	64	47	85	72
3	87	75	88	79	90	71	74	57	74	60	47	40	74	60	53	36	52	34	67	58	60	49	88	75
4	89	76	87	77	92	73	78	67	75	60	52	42	60	48	50	41	55	39	71	50	65	53	86	77
5	87	78	89	75	90	76	78	66	74	49	65	50	67	49	49	34	64	48	71	52	77	60	84	76
6	89	77	89	75	91	79	74	69	55	46	63	53	68	55	53	45	67	55	68	58	82	66	81	68
7	88	77	86	76	86	76	78	67	63	52	62	55	60	44	61	45	71	59	66	55	82	69	82	66
8	87	78	82	78	86	76	72	59	58	49	55	46	66	48	56	50	69	50	62	52	82	70	82	72
9	88	78	87	76	85	69	72	56	60	48	52	40	64	52	61	44	66	48	64	52	77	64	81	71
10	90	78	88	75	88	77	71	57	72	52	51	34	63	49	73	52	71	53	68	56	78	54	82	71
11	95	78	86	74	82	65	73	63	60	49	55	40	54	42	73	56	74	58	78	60	75	63	78	72
12	94	81	86	74	77	62	66	52	60	44	54	45	53	33	71	59	76	61	81	65	81	62	76	72
13	95	79	85	76	82	70	58	49	65	48	62	42	46	33	69	57	66	49	80	66	84	67	76	69
14	96	76	85	77	80	70	57	49	72	60	53	39	44	22	71	59	58	45	77	63	72	65	75	70
15	97	79	89	78	81	70	68	50	75	63	55	36	51	32	62	48	68	55	69	56	75	66	80	73
16	96.5	81	89	77	87	72	68	51	79	63	62	46	60	42	63	44	69	62	76	55	78	63	82	75
17	96	80	89	76	88	72	60	44	70	42	58	39	68	51	62	43	67	54	70	57	76	63	81	75
18	98.5	82	87	77	85	69	68	49	58	38	42	25	70	53	56	48	57	40	64	48	78	67	88	74
19	95	81	87	75	81	69	63	48	72	54	53	33	69	59	57	41	44	28	64	46	85	69	89	72
20	91	78	85	73	79	67	60	44	76	64	57	40	59	43	60	44	64	43	68	53	88	71	86	74
21	91	80	85	73	76	61	64	46	77	60	62	47	59	42	66	55	53	36	76	58	87	73	90	72
22	94	81	85	76	71	59	67	52	60	52	73	55	69	49	66	52	50	30	75	62	85	74	92	73
23	94	80	85	73	72	59	74	61	69	50	74	57	71	55	65	46	56	38	83	65	87	70	91	72
24	94	81	85	72	73	57	77	59	68	55	72	55	76	57	49	32	63	50	81	65	75	67	93	76
25	93	80	82	70	74	58	79	59	59	48	72	57	61	52	66	41	71	61	71	63	76	64	97	79
26	91	80	77	69	68	62	80	62	67	55	69	60	61	54	68	49	70	53	63	52	76	68	94	80
27	91	79	79	68	68	60	71	54	67	55	72	60	70	50	68	54	65	49	72	60	79	66	94	80
28	92	79	82	67	75	65	71	52	63	57	64	57	76	54	78	62	70	55	77	63	83	71	97	81
29	94	80	86	69	79	68	75	58	64	53	72	58	72	62	66	52	58	42	76	65	81	73	94	81
30	91	80	90	72	81	65	72	58	61	48	71	59	63	40	.....	.....	69	44	82	63	83	69	91	81
31	92	79	86	74	.....	.....	65	48	.....	.....	71	62	47	37	.....	.....	71	54	.....	.....	81	72	.....	.....
Range	28°.5		24°		35°		37°		41°		49°		48°		47°		48°		37°		41°		31°	
Monthly means	84°.6		79°.9		75°.1		63°.3		59°.7		54°.1		55°.4		54°.6		56°.6		64°.3		71°.4		79°.9	

Maximum, minimum, and mean temperatures—Continued.

STATION, CHARLOTTETOWN, CANADA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	73.8	56.5	68.7	53.6	70	49	61.6	54.5	45.8	36	9.9	— 2.1	41	27	27.5	15	24.7	15.1	32.9	26.0	41	32.1	71.4	47
2	65	52.1	67.7	51	76.5	58.7	59.3	39.5	43	34	12.4	5	38.4	27.1	43.1	10	17.7	11.8	37.5	25.0	42.7	31.5	73.3	51.1
3	70.8	54.1	76.6	53.4	67.4	56	51.3	37.1	37.7	32	19.4	5.1	40.1	27.8	12.1	— 1	22.4	10.4	33.6	20	40	30	79.9	41
4	74.9	55.9	71.6	53.7	65	53.5	57.3	44.9	33.9	28	24	13.8	28.9	9	28.1	5	21.8	8.1	35	18.8	41.8	29.9	43	38.5
5	70.1	57.8	74.9	63.9	73.7	61	54	33.8	31.4	28	21.6	10.2	10.4	3.8	14	15	33.3	10.1	34.2	26.5	46.9	32	61.1	42.2
6	69	58.5	73.2	61.0	68.4	57.2	44.4	36	36.5	29.6	25.2	17.2	26.1	6.9	30	—16.5	40.1	22.8	34.4	26	46.7	34	61.2	52.2
7	68.2	55.9	75	61.2	63.6	55	52.8	37	35.4	30.4	30	23	24.2	9	41.1	—25.5	36.7	16.8	40.1	25.1	49.6	39.5	55.1	43
8	72.7	56.7	77	64	65	50	59.8	42	40.6	32	33.8	20.3	14	0	29	6	43	21	36.8	31	49.1	34	57.1	40.6
9	74.7	51.9	74.1	65.7	62.1	51.5	49.2	37	41.3	36	34.2	22.6	26.2	13.3	9.7	1.6	41.8	19.5	39.5	30.1	47.4	38.1	63.1	46
10	70	58.1	76.7	61.5	69	47	51.2	41	42.3	33	30.9	18	34.8	24.6	14.1	2.9	26.9	20.7	37.1	30	55.7	40	58.9	51.1
11	72	58.6	77.4	60.9	52.7	42.5	56.7	45	44.1	33	32.6	27	29.8	— 1.5	31.2	— 2	29.2	19	35.9	29.1	43.1	33.9	57.4	50
12	71.7	55.9	80.3	63	61.9	43.2	53.8	39.5	38.7	31.5	32.3	27.1	9.9	— 2	37.9	23.6	35.5	19.8	36.7	29.1	49.1	35	63.5	49.5
13	76.9	55.8	74	61.7	60.2	51.1	42.8	35.8	43.1	31	32.4	28	9.2	— 3.5	33.5	18.5	42	24	47.2	27.8	51	36.5	73.7	55.5
14	74	60.9	78.2	67.7	62	48	47	33.5	40.7	25	31.4	21.7	9.2	— 2.5	20.3	11	36.5	13.5	39.9	35	42.2	34	72.8	55.1
15	74.7	59.2	76.2	59	77.1	50	55	40	32.8	27.4	23.9	14	24.2	3.7	31	15.5	20.3	5.5	40	32.1	45	35.5	71.3	57
16	77.7	61.3	67.3	57.5	57.7	47.5	62.5	40.6	35.2	29	25	6	31.8	10.3	36	29.5	24.4	13.7	49	34.9	46.2	31.5	72.2	57.2
17	72.7	58	75.7	58	56.6	48.0	59.7	47	37.1	25	31	13.9	13.8	8	33.7	16.5	23.5	14	48.3	34.7	49.4	33.4	75.1	57.3
18	62.7	55.7	72.9	62.7	54.6	46	51.6	39.7	27.9	21	31.4	10.5	36.5	9.4	30.5	17	28.4	10.5	42.7	32.5	59	36.2	79	60
19	58.8	52.8	83.5	67	50.7	45.2	53.4	39.5	35.5	17.9	12.3	— 8	41.4	33.1	32.4	20.8	14	3	47.3	31.8	55.4	39	79.3	59.1
20	70.3	53.1	79.3	69	54.1	41.2	52.7	38.5	30	24	9.8	—11	40.7	21	32.2	19	20.4	5	47.3	29.8	48.9	34.9	81	62.6
21	69.6	57.6	77.5	68.6	58.5	46	48.7	34.5	34.7	25	31.7	— 8.2	22.5	2	25.1	16	30.1	6	46	33	60.1	32.7	72.1	62
22	70.3	58.3	77.9	64.5	56.2	46.1	36.7	31	35	12	40	22	6	— 4	27.5	8	37.5	26.4	41.6	30	56	41.5	74	57
23	71.3	60.1	67.4	54	50.7	40	42	28.5	24.2	8	37.8	22.9	23	— 1	27.3	0.5	33.1	25.9	44.7	28	49	32	67.7	53.1
24	65.4	58.9	71	51.4	60.2	39.8	48	35.5	33.7	23	26	6	23.7	1.5	2.6	—16.3	33.6	24	34.1	23.8	59.3	33	69.2	55
25	64.5	56.6	70.5	54.2	63.9	50.3	49.9	41	26.4	14	32.2	7.2	8.5	— 2	17.1	—16.3	33.9	23.5	39.9	23.5	61.1	36.8	69.2	57.4
26	67.4	56	76.9	56.1	59.7	51.8	43	32.6	31.9	14.5	35	16.5	10.9	— 2	21	9	34.7	26	39	25.8	56.3	37	71.5	56.1
27	66.9	58.1	77.5	60.2	56.4	41.0	47.9	32.1	39	23.2	42.3	13	25.1	— 5.5	25.1	7.5	35.7	30.5	36	28	68.1	44	73.6	54.8
28	71.8	60.5	80	62.9	52.7	38.5	44.5	35	25	11.9	16.5	4.5	25.5	10.5	23.6	1	43	32	37	30	71.7	47	75.3	59.1
29	78.4	56.9	69.7	53.2	48.2	34.3	36.7	31.6	35	11.4	24.3	14	37	14	25	13.7	42	32.5	40	30.2	56.4	39.5	75.7	58.8
30	73.5	61.1	75	52.5	56.2	39.3	39.8	35.5	12.6	3.2	35.1	16.6	36	0	.....	.....	41.7	30	50	30	46	35.6	67.3	54.1
31	69.5	53.5	67.9	53	.....	.....	47.4	36.9	.....	.....	39.2	30.7	17.1	— 1.2	.....	.....	39.9	28.5	.....	.....	62.7	35.3	.....	.....
Range	26°.5		32°.5.		42° 8		34°		42°.6		53°.3		46°.9		59°.6		40°		41°.2		41°.8		42°.5	
Monthly means	.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....	

Maximum, minimum, and mean temperatures—Continued.

STATION, CHATHAM, NEW BRUNSWICK.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	78.3	55.6	70.3	49.6	83.8	49.1	52.3	37.9	47.3	31.2	9.9	— 9.7	40.5	29.1	30.3	13.6	22.4	7	37.3	26.5	37.3	32.9	83.1	46.6
2	71.3	50.1	76.3	46.3	84.3	59.2	51.1	34.2	38.3	34.5	12.4	1.6	38.3	25.1	51.3	1	23.4	0.6	44.3	20.2	42.3	31.7	88.3	49.1
3	79.3	48.1	78.3	46.1	75.3	53.1	57.3	30.2	35.3	28.7	21.1	0.1	40.3	20.2	8.9	— 6.1	31.4	5.6	43.3	14.8	47.3	28.6	75.3	40.7
4	76.3	52.1	68.3	51.9	62.4	53.1	55.3	44.1	31.4	25.8	25.4	9.5	23.4	4.3	17.4	— 0.8	30.2	4.1	32.9	7.2	44.1	26.7	42.3	38.4
5	77.3	54.1	70.3	62	74.1	55.3	47.3	35.1	32.8	23.7	27.4	1.8	7.4	— 4.1	4.3	—16.8	40.3	4.4	33.4	20.9	58.8	31.4	54.3	38.4
6	69.3	51.9	78.1	59.5	68.3	52.1	44.3	29.7	36.3	23.5	26.4	8.6	18.4	5.3	29.6	—16.3	47.3	28.7	39.2	24.7	51.3	29.7	69.3	48.6
7	83.3	56.2	83.3	58.2	62.3	49.8	53.3	35.9	39.3	24.7	31.4	11.6	13.4	— 8.8	42.3	20.4	39.3	12	46.3	23.2	51.3	37.4	63.3	42.6
8	81.3	55.1	80.3	66.4	64.3	45.9	56.5	35.2	44.3	28.2	36.3	4.6	16.4	—18.5	27.9	3	24.2	10.1	34.2	29.5	50.3	35.4	68.3	36.1
9	84.3	49.1	83.3	64.2	64.1	48	55.8	31.2	40.3	27.6	38.3	29.7	19.2	10.8	15.4	—10	32.4	17.8	40.3	29.5	64.8	35.1	61.3	47.1
10	74.3	57.2	80.1	60.2	61.3	45	47.5	32.6	38.8	26.7	36.8	29.2	31.4	13.5	18.4	— 3.6	24.4	15.7	40.8	29.7	54.3	39.9	54.3	47.6
11	74.3	56.1	76.3	61.2	57.3	36.9	50.3	42.1	38.3	31.7	35.3	13.6	22	— 3.2	20.2	— 9	26.9	16.7	43.3	30.7	43.8	37.9	54.3	43.1
12	72.3	49.9	73.8	62	66.3	37.4	42.3	37.6	38.5	27.7	31.4	11.1	5.4	— 6.5	36.3	5.8	34.9	17.7	44.3	27.7	59.9	35.7	76.3	44.1
13	78.8	52.1	73.3	61.2	65.7	48.1	47.5	33.9	41.3	24.7	28.9	8.6	12.4	—12.3	31.4	10.6	37.3	21.7	52.3	22.2	58.1	33.9	78.3	52.1
14	83.3	58.1	81.3	61.7	71.1	43.1	55.3	27.7	37.3	17.1	31.4	20.2	13.4	—21.7	24.4	— 3.5	37.3	9	38.3	33.4	49.3	35.4	80.3	57.3
15	86.3	56.7	79.3	60	71.5	41.7	55.3	30.2	32.4	14.6	21.4	— 2.2	20.4	— 5.1	31.7	15.3	20.4	2.6	44.3	31.6	47.3	34.9	80.3	56.7
16	80.3	58.7	67.3	57.8	61.3	46.1	60.2	47.1	34.6	22.6	16.4	—12.7	19.4	— 1.8	39.8	29.1	29.4	9.6	51.3	31.7	47.8	30.7	79.3	50.1
17	66.3	58.6	79.3	57.2	52.3	43.1	57.3	39.6	36.3	24	27.1	1	10.5	— 6.4	32.4	20.2	20.4	12.6	51.3	35.4	64.3	27.3	87.1	53.6
18	73.3	53.6	74.3	57.2	54.3	42.1	53.3	33.7	28.4	16.3	28.6	0.5	32.6	10.5	35.3	20.7	18.4	6.3	51.8	32.2	60.8	36.4	86.1	54.1
19	67.3	51.6	84.3	66.2	57.1	37	57.3	30.6	23.6	13.6	2.4	—12.8	48.1	32.6	34.4	19.7	15.4	— 3.9	49.1	29.5	59.3	45.1	82.5	54.1
20	69.3	49.9	80.5	68.7	54.3	45.6	59.3	28.2	36.3	14.6	— 1.0	—18.8	38.5	13.8	31.9	14.3	32.4	0.6	51.3	28.2	63.3	37.9	84.3	57.2
21	76.3	57.4	84.3	63.5	59.3	40.5	48.2	30.6	33.6	4.6	26.7	— 4.2	13.8	— 3.6	35.3	10.5	27.3	4.6	53.3	27.7	76.3	32.9	79.3	50.9
22	76.3	57	82.3	62.8	54.3	38.4	42.3	23.7	35.3	4.6	38.3	13.1	7.4	— 6.6	27.4	2.6	43.8	27.3	46.3	30.6	61.3	46.7	75.3	47.1
23	74.3	58.2	68.3	49.1	55.2	35.9	49.3	24.4	14.3	— 2.1	30.4	13.5	12.4	—10.5	27.4	—10.3	37.3	22.2	46.3	27.7	60.3	35.1	71.5	39.9
24	65.3	58.1	77.3	46.1	65.3	30.7	50.3	35.9	34.9	14.3	13.5	— 9.5	12.4	— 6	— 8	—17.5	40.3	9.6	44.3	23.2	74.3	32.2	71.3	31.7
25	72.3	52.1	80.8	50.1	69.1	44.1	50.3	38.9	25.4	4.8	20.4	— 8.1	16.4	— 9.3	17.4	—16.3	40.3	5.1	48.3	18.5	52.1	37.2	73.3	42.1
26	80.1	50.1	84.3	52.1	60.8	46.5	44.3	27.7	25.7	— 4.5	26.4	13.3	17.4	—10.3	25.4	6.8	32.9	26.2	40.3	20.7	59.3	32.1	74.3	43.1
27	66.8	58.2	86.3	54.1	56.3	39.4	46.3	30.7	33.4	13.3	39.3	4.8	15.4	—11.3	36.3	— 3.5	35.3	30	36.3	29.7	73.3	44.1	80.3	44.1
28	78.3	57.2	84.3	56.2	52.1	34.6	44.3	31.6	17.4	0.6	14.4	— 6	22.4	—10.5	30.4	1.6	42.3	31.1	45.3	29.7	83.3	45.4	82.3	46.1
29	82.3	53.2	68.3	54.1	53.5	29.5	39.3	26.5	25.4	6.1	23.4	— 3.5	35.6	16.3	27.4	9.4	38.1	30.7	50.1	30.7	63.3	44.1	81.3	54.1
30	79.1	55.1	85.1	55.6	47.8	37.1	42.3	28.7	7.4	— 5.1	34.6	— 3.5	35.6	— 8.3	.....	.....	42.3	30.1	40.3	26.3	58.3	34.7	68.3	54.2
31	70.3	50.1	74.3	51.1	.....	.....	45.3	32.2	.....	.....	43.3	34.1	24.4	—14.5	.....	.....	40.3	20.7	.....	.....	73.3	30.7	.....	.....
Range	38°.2		40°.2		54°.8		36°.5		52°.4		12°.1		69°.8		68°.8		51°.2		46°.1		56°.6		56°.6	
Monthly means	.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....	

Maximum, minimum, and mean temperatures—Continued.

STATION, CHEYENNE, WYO.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min	Max.	Min.	Max.	Min.	Max.	Min.
1	86	55	83	58	77	42	66	36	60	36	49	34	37	9	38	0	42	18	33	11	45	33	58	35
2	82	50	88	53	75	55	76	41	54	34	42	31	32	16	43	17	54	17	37	4	69	30	59	28
3	76	49	87	53	82	42	66	44	39	32	42	27	39	12	30	13	56	22	52	27	58	39	64	32
4	58	49	89	53	86	48	73	38	34	19	45	32	45	22	49	23	60	28	41	15	53	30	77	34
5	69	46	82	58	82	52	63	38	39	16	37	18	40	24	46	23	30	21	40	13	38	31	84	39
6	75	52	80	51	83	59	66	31	44	19	38	14	52	23	40	15	41	19	30	19	39	30	81	47
7	71	50	85	51	81	59	71	37	39	27	36	23	54	26	47	11	57	27	57	25	51	31	62	46
8	77	53	86	55	87	52	65	43	40	29	44	25	48	21	51	23	56	23	60	29	64	32	79	39
9	71	57	85	54	63	43	73	34	47	24	46	33	31	6	51	31	21	1	42	27	73	38	75	49
10	68	54	83	51	65.5	44	75	35	55	35	43	29	35	11	42	28	20	−1	47	29	77	40	66	42
11	76	49	80	44	72.5	47.5	70	37	51	29	51	23	32	8	46	27	28	−3	47	19	69	41	62	41
12	75	51	77	50	67	50	70	40	30	22	53	33	37	8	38	21	43	7	27	16	71	40	71	36
13	80	54	72	54	75	51.5	69	39	39	15	48	32	43	11	29	14	52	23	34	14	70	40	81	38
14	86	51	74	48	75.5	46.5	58	30	38	15	54	33	44	15	43	16	32	2	47	26	74	47	86	40
15	86	56	71	46	68	59	71	40	23	−5	49	29	45	10	39	23	20	−1	57	41	54	37	72	52
16	74	58	62	48	57	50	69	42	27	−20	39	17	48	10	36	17	32	10	53	30	69	27	74	44
17	67	56	70	45	71	46	70	36	48	12	49	25	49	28	46	19	32	9	72	30	73	37	67	49
18	68	53	63	50	71	42	72	37	44	32	57	24	33	3	44	21	43	7	73	35	72	40	67	38
19	75	48	72	46	61	41	68	40	37	26	48	34	26	9	52	19	19	2	56	37	66	37	80	32
20	77	51	69	45	44	32	70	36	34	22	39	23	28	2	31	14	39	14	62	35	73	32	86	39
21	69	52	73	44	44.5	31	71	36	37	12	45	22	18	1	40	5	45	25	72	34	64	36	93	54
22	83	46	81	50	68	28	69	37	35	20	53	32	27	8	49	28	35	25	73	38	47	35	84	55
23	83	48	84	50	77	37	62	34	32	10	47	30	24	3	58	21	39	23	63	38	47	34	89	44
24	77	49	75	47	57	43	52	33	42	15	39	19	41	4	58	36	39	28	66	35	61	42	89	53
25	67	50	68	49	72	34	43	24	39	20	45	18	38	14	58	32	33	23	73	36	72	45	89	56
26	76	51	74	42	77	39	56	21	36	15	32	7	33	16	48	17	35	20	75	42	75	45	81	49
27	73	48	73	42	75	40	65	44	44	21	41	21	37	8	30	11	26	15	61	40	79	53	78	45
28	81	48	69	36	76	40	44	29	42	16	42	22	24	9	40	7	45	15	67	32	81	46	72	52
29	76	52	83	47	74	35	36	24	48	13	46	24	35	3	41	17	58	34	74	43	76	47	80	54
30	76	52	81	50	66	41	51	11	57	40	26	12	38	27	.....	.....	52	30	64	41	76	45	70	46
31	80	47	72	48	.....	.....	61	33	.....	.....	22	3	36	4	.....	.....	35	18	.....	.....	57	35	.....	.....
Range	40°		53°		59°		65°		80°		53°		53°		58°		63°		71°		51°		65°	
Monthly means	64°		63°.2		56°		47°.9		30°.3		33°.4		23°.8		30°.7		26°.8		42°.4		50°.6		60°.8	

Maximum, minimum, and mean temperatures—Continued.

STATION, CHICAGO, ILL.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	71	57	66	57	87	73	55	43	45	39	38	28	65	40	38	6	30	26	36	33	44	35	78	67
2	70	60	64	58	80	71	59	38	44	38	45	34	47	35	15	−3	33	26	38	32	47	40	74	65
3	85	60	71	55	83	68	67	46	43	39	45	38	44	30	25	15	38	22	41	38	57	42	69	57
4	92	66	71	62	71	62	60	49	46	39	49	31	43	30	16	0	53	33	58	38	51	40	63	54
5	77	57	79	69	81	62	56	49	43	32	(*)	42	53	33	39	10	52	45	47	38	58	40	69	55
6	66	56	71	52	74	64	52	47	53	35	.....	41	37	23	45	31	66	51	63	35	46	38	70	56
7	73	57	78	57	78	62	60	40	50	39	.....	38	48	29	37	30	60	30	47	38	67	44	82	55
8	72	61	81	68	78	68	52	42	48	43	.....	34	56	45	43	35	37	27	45	37	56	48	81	57
9	78	68	81	64	80	56	51	41	49	40	.....	30	55	11	53	36	52	37	53	37	65	44	84	64
10	79	65	76	58	64	54	50	38	45	36	.....	30	16	4	63	36	69	52	56	43	55	43	85	69
11	70	60	75	60	63	51	41	34	57	39	.....	28	32	9	60	36	64	34	53	43	68	50	88	72
12	84	57	75	60	64	56	47	34	53	42	.....	23	30	11	55	36	34	27	69	47	65	43	74	63
13	77	63	78	63	65	52	54	35	43	37	.....	28	28	10	55	37	28	20	62	38	53	46	66	89
14	75	64	80	64	72	62	56	43	46	37	33	19	41	20	37	20	42	28	52	41	65	46	66	58
15	88	68	79	67	75	63	46	39	46	35	46	34	45	25	26	16	37	34	50	41	80	59	72	58
16	78	63	78	61	70	50	44	33	36	25	36	5	42	36	31	14	40	27	49	39	82	57	75	63
17	71	63	71	60	55	43	57	41	34	19	12	−1	54	39	36	19	28	15	44	37	75	67	72	65
18	67	58	68	58	56	46	42	35	47	29	21	2	54	38	48	26	22	10	48	39	73	61	65	47
19	71	58	68	58	57	43	59	33	43	37	30	14	38	20	40	32	29	16	56	43	83	60	60	50
20	75	61	78	57	53	43	67	40	45	34	57	29	31	18	42	32	30	20	67	48	83	63	63	52
21	82	63	71	53	51	40	69	48	34	14	55	42	34	23	45	29	28	14	59	47	83	65	77	53
22	82	65	57	53	58	43	73	52	39	15	57	39	47	34	38	17	38	21	69	53	71	41	76	64
23	73	62	65	55	62	43	71	48	45	25	48	57	42	21	23	6	42	33	57	40	55	43	82	62
24	83	66	70	62	67	47	59	48	32	12	58	37	30	15	43	22	38	33	48	40	65	48	85	68
25	84	68	75	63	60	52	63	48	45	21	43	30	31	19	51	34	35	33	55	38	74	54	85	72
26	73	66	84	67	68	43	50	36	43	29	39	25	39	19	46	40	40	28	65	48	76	58	87	70
27	70	63	86	60	75	49	46	36	43	30	36	19	44	29	40	35	36	32	70	53	82	61	80	67
28	72	61	85	69	63	54	67	42	41	22	42	30	60	29	35	25	34	26	64	48	85	63	72	65
29	75	62	76	68	71	57	55	46	22	0	47	35	32	9	29	17	31	20	50	44	87	52	77	63
30	72	62	75	66	57	47	49	32	34	19	60	40	35	10	.....	.....	31	25	48	32	74	52	72	63
31	66	62	86	70	.....	.....	41	30	.....	.....	68	40	44	24	.....	.....	36	29	.....	.....	83	65	.....	.....
Range	36°		34°		47°		43°		57°		.....		61°		66°		59°		38°		52°		41°	
Monthly means	68°.6		68°.7		61°		48°		37°.3		37°		33°.2		31°.9		33°.9		46°.5		59°.4		67°.9	

* Maximum thermometer broken.

Maximum, minimum, and mean temperatures—Continued.

STATION, CINCINNATI, OHIO.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	83	67	85	66	89	70.5	60	45	60	35	46	31	69	58	45	17	38	32	47	33	56	36	79	72
2	78	69	66	62	91	70	60	41	53	36	49	39	58	44	19	8	34	20	50	36	56	44	82	69
3	87	68	69	62	89	72	69	43	53	42	51	38	49	39	32	17	42	26	56	44	63	41	82	69
4	92	74	79	62	81	70	73	55	47	38	56	49	52	34	28	16	55	29	55	40	72	50	80	61
5	88	70	82	61	86	62	72	53	48	37	56	50	58	44	35	10	53	38	51	44	65	60	73	56
6	89	72	83	69	87	67	67	52	51	34	57	51	52	36	48	29	68	52	58	38	83	57	82	56
7	84	71.5	81	63	80	60.5	57	48	51	37	52	44	51	32	47	36	61	35	62	42	80	65	85	63
8	86	66	83	61	89	63	64	49	54	42	44	40	61	41	51	35	50	32	58	41	71	55	87	69
9	87	66	83	60	88	70	64	46	52	39	41	35	63	31	59	46	67	40	60	42	61	50	83	68
10	83	69	86	64	81	55	59	40	48	42	41	34	31	19	66	56	73	57	70	43	64	53	85	68
11	83	71	77	68	71	49	47	38	56	37	39	33	31	15	66	47	73	59	75	53	76	46	94	68
12	85	69	78	65	69	62	47	34.5	63	42	34	30	31	22	59	39	60	32	74	60	74	61	93	71
13	87	71	81	65	74	61	57	37	59	44	39	31	27	17	65	45	38	28	72	63	70	53	84	72
14	87	74	86	65	77.5	64	64	37.5	49	42	34	27	40	20	57	41	48	32	66	48	80	51	87	70
15	84	71	85	65	80	61	58	44	48	43	51	32	44	34	41	24	53	42	65	46	79	62	88	72
16	93	72	83	65	79	67	44	37	43	27	42	25	42	39	29	21	62.5	39	59	47	83	65	88	72
17	96	76	77	65	68	49	64	34.5	37	26	25	10	56	42	36	24	39	22	51	42	85	66	85	64
18	85	73	76	65	66	47	53	41	54	33	24	5	61	55	44	28	26	18	56	39	83	71	82	58
19	85	69	75	60	62	44	51	37	55	49	33	16	55	34	47	36	31	16	63	39	87	67	77	57
20	82	71	78.5	58	59	44	62	36	56	46	54	29	48	33	49	30	31	26	77	50	90.	63	74	58
21	82	71	80	58	57.5	42	70	42.5	53	32	59	48	52	39	49	35	29	22	69	56	87	69	79	57
22	77	72	71.5	58	57.5	41	72	46	46	27	59	54	60	46	47	29	38	19	69	49	75	53	86	62
23	79	69	75	55	62	41	69	50	55	39	63	56	60	38	41	22	41	31	60	48	67.5	46	85	68
24	84	69	78	60	69.5	42	72	48	41	29	66	54	38	33	45	20	47	36	59	44	73	51	90	63
25	87	69	81	61	67.5	52	73	53	51	29	61	45	45	31	62	31	50	38	59	42	78	61	86	74
26	87	70	85	62	65	44	66	50	56	43	64	41	48	30	64	43	50	35	64	43	82	56	89	72
27	81	71	84	64	72.5	46	59	41	46	38	43	35	58	48	65	54	52	34	73	51	85	60	92	75
28	80	69	86	65	76	48	71	46	50	37	45	37	63	55	60	33	46	29	67	56	88	62	85	76
29	84	69	83	64.5	78	53	73	61	44	25	59	41	59	23	40	30	41	27	70	49	88	63	81	70
30	81	72	84	69	70	54	71	39	35	21	65	53	34	19	.....	.....	44	32	61	40	90	63	77	68
31	78	71	87	68	.....	.....	45	34	.....	.....	72	57	49	27	.....	.....	46	31	.....	.....	90	63	.....	.....
Range	30°		32°		50°		39°		39°		67°		54°		58°		57°		44°		54°		38°	
Monthly means	77°.2		71°.7		65°.6		53°.6		43°.8		44°		42°.4		40°		40°.6		54°.4		.....		75°.2	

Maximum, minimum, and mean temperatures—Continued.

STATION, CLEVELAND, OHIO.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	72.9	63	64	55	86	64	52	43	38	30	29	18	69	57	43	16	27	19	32	26.4	44.8	23.3	84	66.2
2	71	59	63.8	54.5	83	67.1	57.2	38	40	28	36.1	22.1	66	40.5	16	5	24.5	13.8	48	23.1	43	34	76	64
3	82.2	61	63.8	55.7	89	60.9	68	40	36.2	32	45	25.6	44	32.4	21	4.4	29.5	15.2	55	37.6	53	33.1	76	60
4	81.5	71.2	71.8	60.1	74.4	65	66	53	40.5	34.2	47.5	35	37	24.2	21	13.5	42.5	20.5	40	32.2	53.5	45.8	65	56.2
5	88	73	80	62.6	82.8	55.8	60.5	54	43	31	48	41	53.5	28.1	31	4.2	57	33.7	47	27.8	60.4	41.3	65	53
6	80.5	66.5	78	62	74	60	75	45	48	29.4	42.5	37	42	30	42.5	25.3	69	50.4	47	32	64	47.2	74.2	54
7	70	62.5	66	59	69.5	53.2	55.8	41.5	50	29.3	51	30	47.4	28.4	43.4	31	61.2	31.5	48.1	33	71	58.3	73	45
8	72	56	70.4	55.5	83	56	51.8	44	48	30.1	39	35	57.2	36.6	46	25	31.5	26.9	42.1	28	63.7	49.3	86	53.4
9	73	59	78.5	50	88	66	54	34.5	46.1	29.2	36	30	59.8	32	54	33	45	27.6	39	25	50.7	44	82	72.5
10	80	64.6	81.5	62.8	74.1	55	49.8	45	44.5	35.8	33	29.1	32.8	6.4	58	31.9	65	40.6	46	27.9	48	43.7	83	66.4
11	73.5	56	78	65.5	66	50.1	47	35	52	32.1	35.3	30.3	23	12	53	36	73	52	69.2	37.2	53	40.8	83	62.6
12	82	54	73	62.6	61.2	48.7	42	31	60	39.1	33.2	26.2	24.2	17	51	29.8	55	25	71	49	55.5	42	85	67.3
13	79	66.5	76	61.8	68.3	51	48	29	51.8	33.5	34	23	20.2	17.3	60.8	39.8	26	21	67	53	52	40.2	87.2	68.1
14	74.5	64.2	77	61.1	69.3	55	61	35	41.8	34.7	30	20.5	31.9	14.6	60	33.6	30.2	13.4	64	42	62	36.3	85.2	65.5
15	80	65	83	64	71	59.8	50	50	42.3	35.4	44	23.1	40.9	15	35	20.8	35.5	20.5	53.2	36.2	70	46.3	85.8	67
16	82.8	70.5	74.5	64	68.8	61.2	44	35	36	27	37	23	39.1	34.9	22.8	20	62	33	45.9	36.1	75.3	45.2	81	68.1
17	77	68	75.5	61.1	61.6	48.4	58.5	33.1	29.3	20	27.3	6.8	50	36	29.3	20.8	40.5	15.8	40	32.8	69	59	76.5	62
18	73.5	63	70	61.5	53.4	46	46	33	42.9	23.9	12	0.2	58.3	48.3	38	22	16.2	9	40	31.8	73	56	69.2	55
19	73.2	54	69	60.5	59.9	42.2	42	35.5	53	41	17	11.6	54	23	38.8	31.7	19	8.1	44	32.8	66	58	72.2	48.8
20	73	59	75	57.1	59.9	41.8	62	33.5	44	36	49	16	33.2	22.3	33	28	27	17.6	74	35.3	84	60	68.8	53.3
21	75	56	78.2	58.7	51.8	41.4	70	49	41	28	55	46.5	30.3	22.3	44.5	28	25	18	56	42	80	60	69.2	53
22	77.5	62	64.8	59.1	59	42.9	75.5	52	38	21.3	58	43.4	50	24.7	37.5	21	33	17	64.8	42.1	64	44	71	60.5
23	71	60.5	67.2	48.4	53	43	71	49.6	45	35.8	54	35	51	31.5	21	4.9	34	25	41.8	36.7	50	42	82.2	56.5
24	77	56	76.[illegible]	49.3	67	38	72.5	50	37	28.2	60	33	33.5	24	22.5	11.8	42	22.1	48	33.8	63	37.4	80.2	63.3
25	83.2	62	76	58.8	64	49	59	48.1	44.5	23.3	60	33	38	22.8	29	15.6	43.2	34.2	45.5	35.1	71	45	84.8	65
26	80.2	69.4	80.1	57	61.5	47	63	45.2	52	38.2	64	31.2	36	19.7	38.2	25	35	29.3	56	30.8	71	49.2	81	68
27	72.2	68	78	58.8	73.2	50	46.[illegible]	35	38	33	39	26	52.9	32.3	34	24	33	28.3	66	48.1	77	56.1	79	67
28	71	58	81	57.8	63.2	53	64.8	33.5	41	30.1	36	24.3	57	39.8	35	26	32.5	22.4	59	44.2	80	55	73	65.2
29	75	64.6	79.5	60.6	79	51	67	56	38	14	52	29.4	56.5	18.5	26.5	23.6	29	19.1	51	38.8	81.2	58	75	56.4
30	72	66	76	64.8	68.5	47	68	33	21	13.5	63	49.9	30	13.8	.....	.....	30	21	42	30.1	61	51.9	71.2	61
31	70	61.2	79	57.[illegible]	.....	.....	37	31	.....	.....	68	55.2	47	21.2	.....	.....	31	26.4	.....	.....	87	58.2	.....	.....
Range	34°		34°.6		51°		44°.5		39°.5		67°.8		57°		56°.4		64°.9		50°.9		58°.7		38°.4	
Monthly means	70°.4		67°.1		61°.1		49°.4		36°.5		36°		35°.0		30°.2		31°.6		43°.1		56°.5		69°.8	

Maximum, minimum, and mean temperatures—Continued.

STATION, COLORADO SPRINGS, COLO.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	85	60	84	51	80	49	64	34	74	38	67	35	46	5	31	— 1	51	32	28	18	55	39	72	38
2	84	55	88	55	84	46	78	38	73	43	57	35	42	11	60	12	64	13	48	7.5	65.5	26	65	39
3	80	58	85	54	80	44	71	41	46	32	56	25	54	14	33	8	65	29	57	19	75	37	57	41
4	67	52	93	60	88	46	80	36	33	26	58	20	50	21	57	8	63	34	52	21	58	39	75	38
5	67	50	84	64	87	55	62	39	47	17	34	18	45	17	58	26	55	32	42	13	47	31.5	84	45
6	69	48	82	54	87	55	62	42	54	17	44	3	60	14	40	17	51	5	54	21	44	31	86	54
7	69	52	87	54	86	56	72	39	49	34	41	22	62	30	56	17	64	27	60	20	54	32	64	52
8	81	56	93	52	86	50	69	41	45	24	53	14	54	37	58	28	60	39	63	29	63	33	80	42
9	71	56	81	60	67	51	78	36	49	15	53	25	37	8	58	21	49	22	50	29	72	37	81	41
10	70	55	82	50	63	44	82	42	61	26	37	20	43	2	54	29	27	8	53	32	79	40.5	66	45
11	73	52	82	50	87	39	56	32	65	31	55	26	43	5	57	26	28	10	52	31	64	49	73	39
12	76	52	78	55	70	49	75	32	45	23	59	30	39	8	52	29	44	5	32	19	63	43.5	70	41
13	83	55	77	49	76	52	76	38	48	20	60	23	44	11	44	20	55	13	36	18.5	72	42.5	77	37
14	86	52	84	48	78	51	64	34	57	32	63	20	48	11	48	19	45	8	56	20.5	73	42	86	40
15	90	55	75	49	73	55	76	36	32	17	62	31	47	19	50	27	28	3	71	43	72	48	76	50.5
16	85	61	75	48	66	51	77	38	18	15	41	12	54	12	47	10	46	7	58	34	66	35	77	52
17	67	54	70	49	66	47	72	38	59	12	53	15	57	20	52	12	39	15	70	22.5	76	39	71	52
18	67	53	65	52	76	47	74	36	67	45	60	24	39	8	48	21	49	14	74	36	72	43	72	42.5
19	74	51	72	50	66	41	76	40	57	31	63	24	39	8	57	12	38	8	70	49.5	71	35	79	37
20	74	55	72	47	59	31	75	41	56	27	48	28	43	14	48	20	48	4	60	35	73	39	84	45
21	74	51	68	42	41	27	76	41	42	22	50	11	24	7	44	2	59	17	73	34	73	40	90	48
22	76	51	79	45	59	31	74	41	58	26	64	23	46	10	55	14	42	32	78	41	57	36	93	52
23	77	48	81	50	73	34	66	43	36	16	52	24	32	5	62	21	50	28	69	42.5	53	36	85	55
24	81	52	76	51	65	41	68	38	59	9	53	27	55	7	64	31	48	20	64	38	61	41.5	86	51
25	73	50	80	52	70	40	50	29	58	28	56	20	43	9	64	34	46	26	75	36	76	46	91	52
26	76	53	80	47	76	36	59	22	49	25	37	12	45	18	56	33	59	24	78	40	74	48	85	54
27	78	55	80	55	77	45	71	35	52	22	48	14	43	10	44	17	39	21	75	47.5	77	46	78	53
28	81	50	72	47	[illegible]	41	55	33	58	12	53	14	32	6	50	20	51.5	7	73	36	84	48	70	57
29	78	53	81	53	76	45	42	29	62	12	55	35	44	— 3	50	13	63	25	75	38.5	77	55	72	56
30	76	54	85	53	76	46	54	18	69	28	35	20	52	22	.....	.....	54	27	79	50	79	46	71	51
31	80	47	81	54	.....	.....	77	32.5	.....	.....	32	9	48	17	.....	.....	41	16	.....	.....	71	48	.....	.....
Range	43°		51°		61°		64°		65°		64°		65°		65°		62°		71°.5		58°		56°	
Monthly means	64°.6		65°.3		57°.9		51°.3		37°.1		35°.4		28°.2		35°		35°.5		46°.5		54°.9		64°	

Maximum, minimum, and mean temperatures—Continued.

STATION, CORSICANA, TEX.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Máx.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	97	71	92	70	96	73	74	58	82	53	61	34	57	45	61	30	70	55	73	55	82.6	65	94	76
2	100	74	97	67	97	75	75	48	83	66	65	46	61	41	49	24	56	40	70	44	65	49	94	77
3	100	73	100	71	97	74	74	54	88	63	63	54	68	41	57	37	64	43	81	51	78	43	87	69
4	97	75	100	73	93	76	71	62	63	51	64	56	66	43	50	26	61	55	85	56	76.4	56	81	58
5	98	75	100	75	98	71	80	66	61	48	72	47	67	51	54	31	73	61	67	47	89	69	84	60
6	101	74	101	74	97	72	80	63	55	45	56	37	61	39	67	45	70	45	67	43	85	67	89	63
7	98	74	98	75	98	72	81	51	66	46	59	30	69	43	72	56	60	34	56	52	67	49	90	66
8	99	73	99	71	100	73	82	54	64	53	55	34	73	53	74	63	76	45	73	51	73	49	93	70
9	102	76	100	71	98	74	80	57	56	47	65	38	67	39	78	65	80	64	73	55	76	48	94	72
10	100	78	95	72	91	73	80	51	62	33	72	40	40	34	78	64	81	70	76	63	87	54	95	75
11	101	74	95	71	92	64	81	53	69	38	71	38	42	35	75	57	70	38	90	70	87	59	92	66
12	101	74	95	67	92	71	74	51	75	49	75	44	50	39	78	47	50	30	75	68	85	61	74	64
13	99	75	79	68	90	71	65	53	64	49	72	43	52	46	73	58	63	33	68	53	85	58	82	58
14	100	73	75	66	87	65	83	55	76	44	63	39	48	43	61	46	57	49	66	41	86	61	82	63
15	104	73	88	66	89	66	72	44	79	53	69	38	54	41	70	36	72	40	81	49	84	69	86	62
16	104	74	92	68	83	72	80	47	61	35	65	45	51	44	69	44	59	33	88	56	93	70	87	64
17	104	72	90	71	76	58	86	53	59	26	53	32	64	50	60	46	63	41	76	55	87.4	70	88	64
18	103	71	85	64	73	50	77	52	78	51	60	33	67	51	67	38	56	33	83	53	90	67	73	62
19	101	75	84	65	80	53	72	43	85	56	68	42	53	38	70	44	50	35	83	57	90.4	67	90	60
20	100	75	89	64	76	50	73	41	74	55	70	61	62	35	60	51	37	25	84	59	86	68	84	71
21	98	75	88	67	61	51	75	45	55	41	71	62	68	54	60	44	60	28	83	58	95	67	96	69
22	95	74	91	68	70	53	76	47	58	40	67	60	77	66	47	37	55	41	86	61	89	66	99	73
23	85	72	85	67	79	53	73	53	68	51	67	61.5	70	41	64	35	64	53	83	64	82	66	92	76
24	88	71	88	69	76	53	82	52	57	46	73	54	45	35	69	41	64	50	77	69	86	67	98	73
25	95	72	92	69	69	62	86	61	65	50	76	48	54	45	71	46	72	43	87	63	78	65	92	75
26	91	71	92	71	76	52	76	44	64	44	67	46	75	52	72	60	73	43	81	65	86	64	80	71
27	95	72	90	71	78	46	82	48	66	38	62	35	72	64	74	55	66	48	87	65	90	67	91	75
28	96	73	93	71	85	50	86	67	67	61	67	57	72	56	65	39	56	39	88	64	83	68	96	75
29	96	73	96	75	88	52	91	66	61	31	74	50	56	34	65	50	69	36	86	64	78	67	96	75
30	98	75	97	73	90	59	68	43	41	29	75	64	55	26	.....	.....	77	50	86.6	70	85	67	92	74
31	92	73	97	74	.....	.....	76	39	.....	.....	71	54	64	41	.....	.....	80	62	.....	.....	90	67	.....	.....
Range	33°		37°		54°		50°		62°		46°		51°		54°		56°		49°		52°		41°	
Monthly means	85°		80°.2		73°.5		63°.9		55°.6		54°.2		52°.2		55°.1		53°.9		67°		71°.8		77°.3	

Maximum, minimum, and mean temperatures—Continued.

STATION, DAVENPORT, IOWA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	73	63	73	56	88	74	57	41	50	34	42	22	58	36	34	— 2	30	18	42	30	50	33	82	68
2	78	67	73	54	85	72	63	42	47	33	45	29	40	28	15	— 5	30	12	40	32	55	39	80	62
3	83	70	78	54	81	66	73	53	43	40	44	34	40	24	25	5	39	18	41	35	63	41	64	54
4	86	71	78	65	79	60	66	56	45	30	51	40	45	25	15	— 4	49	30	55	33	50	42	66	50
5	83	70	82	68	83	64	60	49	46	29	52	47	45	23	42	10	56	46	46	33	52	41	77	55
6	75	64	75	60	82	67	50	43	51	28	47	44	37	21	48	30	63	41	59	35	48	41	80	63
7	80	63	81	59	75	62	55	43	56	37	45	34	48	33	40	26	41	22	55	40	55	44	80	64
8	82	65	82	63	86	71	54	42	54	37	34	25	56	43	42	31	45	26	59	38	58	44	78	68
9	79	70	80	65	82	64	55	45	45	36	33	25	54	8	52	40	63	40	64	39	68	45	85	64
10	84	68	77	64	64	52	50	38	49	29	37	25	13	2	62	38	70	41	69	50	64	44	88	70
11	84	68	77	57	61	46	45	35	55	40	25	22	29	9	56	33	47	22	72	51	78	52	80	71
12	86	64	79	60	68	48	48	34	50	39	43	19	25	12	53	33	29	17	69	54	65	48	78	64
13	87	73	81	63	74	53	58	37	44	34	37	29	22	6	50	31	36	15	55	47	70	50	74	65
14	86	72	80	62	73	59	54	44	45	35	37	21	41	20	31	15	46	32	54	37	79	51	75	65
15	88	69	80	68	76	66	46	36	40	26	42	33	40	35	20	11	41	36	58	45	77	64	78	68
16	92	74	79	62	68	52	49	30	28	20	33	— 2	40	35	27	10	36	24	51	39	82	64	74	65
17	78	72	75	60	53	43	57	38	31	13	5	— 6	50	37	35	14	24	11	49	37	78	62	65	46
18	75	63	72	59	57	42	49	31	48	30	21	3	47	33	51	26	20	7	55	36	75	66	54	43
19	79	60	73	57	54	46	57	36	47	31	30	15	33	21	38	23	27	14	65	45	81	68	58	47
20	81	66	79	59	53	40	67	46	45	26	51	28	29	19	48	29	24	10	66	53	78	68	65	50
21	84	67	70	58	52	37	70	47	26	7	52	40	30	20	46	24	27	7	68	46	76	66	79	55
22	84	70	67	49	60	37	73	52	33	18	55	38	43	30	40	14	37	21	69	51	68	56	85	67
23	82	63	72	48	65	46	72	50	35	17	49	37	32	17	22	4	38	30	61	46	65	44	80	71
24	85	69	78	57	66	48	64	47	35	11	53	35	27	9	46	19	36	32	59	43	71	52	85	68
25	85	70	83	65	62	48	60	44	41	20	38	26	29	23	57	31	38	32	64	48	75	55	85	72
26	82	69	84	71	69	47	44	38	39	26	37	18	37	20	56	42	41	25	66	53	78	57	87	72
27	75	66	86	70	75	52	48	35	37	24	30	13	40	30	50	37	35	30	72	58	80	61	80	71
28	70	63	81	71	71	53	64	48	39	10	38	29	55	13	37	23	35	23	59	43	82	64	78	66
29	80	66	80	64	64	52	56	40	10	— 3	45	31	15	0	29	17	35	23	63	49	87	68	78	66
30	83	67	84	68	58	48	40	32	26	4	60	43	37	14	.....	.....	38	24	52	38	85	65	79	63
31	67	58	86	71	.....	.....	42	29	.....	.....	60	41	43	28	.....	.....	42	30	.....	.....	77	71	.....	.....
Range	34°		38°		51°		44°		59°		56°		56°		67°		63°		42°		54°		55°	
Monthly means	74°.		69°. 9		61°. 7		48°. 8		33°. 5		29°. 8		29°. 8		29°. 9		32°. 2		51°. 2		62°. 4		69°. 4	

Maximum, minimum, and mean temperatures—Continued.

STATION, DENISON, TEX.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	.....	.....	.....	.....	.....	.....	74	53	79	55	60	32	56	42	67	17	64	50	70	51	84	56	88	72
2	.....	.....	.....	.....	.....	.....	76	49.5	83	62	56	46	58	38	44	22	50	31	65	41	61	48	87	71
3	.....	.....	.....	.....	.....	.....	80	54	76	55	61	53	63	38	64	32	61	39	70	45	68	44	77	56
4	.....	.....	.....	.....	.....	.....	76	58	51	46	59	49	65	39	55	23	59	49	83	52	70	58	78	53
5	.....	.....	.....	.....	.....	.....	80	67	54	41	65	51	63	49	59	33	71	58	59	41	77	57	84	58
6	.....	.....	.....	.....	.....	.....	71	56	57	43	54	34	61	37	65.5	42	68	36	66	36	76	64	84	63
7	.....	.....	.....	.....	.....	.....	73	49	59	43	54	30	67	44	73	50	63	31	64	47	64	51	83	64
8	.....	.....	.....	.....	.....	.....	79	56	58	53	54	30	71	55	70	59	74	48	72	48	73	46	85	70
9	.....	.....	.....	.....	.....	.....	73	57	55	40	57	39	65	32	79	64	76	62	75	55	78	50	89	70
10	.....	.....	.....	.....	.....	.....	77	52	57	33	59	37	36	28	73	65	82	57	80	64	81	57	90	70
11	.....	.....	.....	.....	.....	.....	66	51	67	43	64	33	45	28	71	51	57	32	86	68	81	59	79	62
12	.....	.....	.....	.....	.....	.....	62	45	71	50	70	44	54	34	75	48	43	25	80	69	78	62	76	63
13	.....	.....	.....	.....	.....	.....	73	45	54	44	62	43	56	39	69	54	62	33	71	49	80	60	75	57
14	.....	.....	.....	.....	.....	.....	71	53	69	39	59	37	53	41	60	45	52	48	73	39	81	61	77	61
15	.....	.....	.....	.....	.....	.....	67	42	70	49	67	43	49	40	68	45	70	36	79	55	78	66	74	59
16	.....	.....	.....	.....	*81	74	73	48	50	29	56	38	55	41	64	42	59	29	84	62	83	69	79	65
17	.....	.....	.....	.....	75	59	78	52	52	26	48	28	62	48	61	43	50	37	72	50	81	71	83	61
18	.....	.....	.....	.....	68	48	69	46	71	43	63	35	60	42	68	42	51	28	80	52	82	67	79	60
19	.....	.....	.....	.....	73	54	69	49	82	54	67	45	54	33	69	46	47	30	80	57	82	68	86	61
20	.....	.....	.....	.....	63	48.5	72	45	61	41	69	59	64	37	56	50	33	17	82	62	79	64	84	68
21	.....	.....	.....	.....	52	46	73	49	52	37	65	60	64	51	52	38	57	25	83	64	84	61	88	68
22	.....	.....	.....	.....	54	48	73	50	51	40	66	59	74	63	54	33	53	40	84	62	84	64	90	75
23	.....	.....	.....	.....	70	50	73	55	55	42	65	61	69	33	65	39	52	44	86	64	79	63	87	73
24	.....	.....	.....	.....	73	55	77	52	57	32	68	56	43	27	71	47	53	43	79	66	79	67	91	75
25	.....	.....	.....	.....	66	57	76	54	63	46	67	59	50	36	71	47	59	40	80	56	79	64	88	75
26	.....	.....	.....	.....	70	48	72	45	63	42	68	41	71.5	47	74.5	62	63	38	70	58	84	67	86	74
27	.....	.....	.....	.....	75	48	78	48	61	37	57	31	71	63	70	47	62	41	81	59	81	64	83	74
28	.....	.....	.....	.....	82	56	84	66	67	50	58	42	72	47	60	31	55	33	78	63	84	68	87	73
29	.....	.....	.....	.....	84	58	87	33	50	25	70	48	48	27	63	47	68	39	81	62	82	66	84	71
30	.....	.....	.....	.....	87	61	65	39	42	25	72	65	52	26	.....	.....	74	48	85	70	82	67	89	69
31	.....	.....	.....	.....	.....	.....	72	45	.....	.....	70	46	70	43	.....	.....	72	55	.....	.....	82	71	.....	.....
Range	.....	.....	.....	.....	.....	.....	54°		58°		44°		48°		62°		59°		50°		40°		38°	
Monthly means	.....	.....	.....	.....	.....	.....	.....		.....		.....		.....		.....		.....		.....		.....		.....	

* Station supplied with maximum and minimum thermometers September 16, 1875.

Maximum, minimum, and mean temperatures—Continued.

STATION, DENVER, COLO.

Date of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	94	59	87	58	88	56	71	40	75	38	62	35	42	2	33	7	53	30	31	20	58	43	69	41
2	94	64	96	57	87	60	81	47	65	36	51	33	25	10	56	29	55	18	48	4	75	32	60	40
3	77	59	96	63	91	50	74	46	45	33	55	32	31	5	36	16	70	21	55	24	69	41	66	38
4	66	53	95	64	90	57	81	43	35	30	50	29	48	9	56	26	66	30	42	25	66	37	81	45
5	73	53	82	62	92	58	66	43	45	26	42	22	45	22	57	28	47	32	40	16	49	35	86	49
6	73	54	86	60	90	64	72	39	57	26	40	12	49	18	45	21	49	21	55	22	41	32	83	59
7	74	54	91	61	86	62	78	42	50	38	44	29	59	29	57	20	67	26	63	30	57	34	70	53
8	84	61	93	62	88	56	74	46	47	32	50	26	56	37	57	28	66	36	68	30	68	39	84	46
9	78	62	92	61	75	52	74	43	55	25	55	38	40	18	65	32	50	14	53	34	80	44	85	50
10	78	60	88	62	75	51	84	48	64	33	53	23	36	14	52	39	20	9	58	34	82	48	70	54
11	78	57	87	56	82	55	73	40	62	32	58	32	35	14	55	29	32	3	47	25	65	49	76	47
12	79	57	80	60	76	57	77	42	45	27	59	35	34	13	52	31	50	12	35	20	71	47	70	44
13	87	57	75	57	80	56	77	46	47	20	54	29	43	14	38	24	61	18	41	21	73	50	80	45
14	95	60	78	52	79	57	67	42	43	32	66	28	49	19	50	23	43	10	55	31	77	52	89	49
15	94	61	82	53	71	57	77	38	19	8	61	34	46	20	48	34	28	7	70	44	74	47	78	53
16	85	62	76	55	70	57	76	44	17	5	41	23	49	23	46	26	45	15	60	37	73	40	82	56
17	71	56	70	53	76	53	73	38	60	9	52.5	21	54	29	60	24	43	21	77	36	78	44	76	56
18	74	57	72	55	79	50	79	39	53	40	61	29	46	13	46	34	42	20	78	47	79	46	75	50
19	76	56	78	52	67	49	77	44	49	32	55	32	32	9	57	24	30	9	67	47	70	39	80	46
20	72	58	77	53	57	32	75	42	47	34	46	29	23	9	37	27	43	13	70	35	77	42	90	50
21	74	57	80	50	50	34	77	41	31	25	57	23	12	8	50	12	52	27	74	41	65	46	92	56
22	80	53	89	56	69	36	73	42	54	25	66	28	33	9	57	23	38	30	82	46	58	37	92	60
23	82	54	86	58	80	42	72	43	39	25	57	28	28	8	63	26	50	29	67	45	65	37	86	60
24	81	59	82	61	67	47	64	46	48	19	45	29	34	12	66	36	52	30	77	42	63	41	95	55
25	83	54	83	55	75	44	49	36	51	29	50	18	37	13	64	27	46	29	79	43	75	50	97	57
26	84	54	84	51	83	43	60	31	52	33	43	19.5	42	20	52	31	51	26	81	41	75	49	86	58
27	78	56	70	57	82	46	70	41	44	24	47	25	46	15	45	23	40	23	70	59	82	54	81	57
28	90	53	81	52	84	46	57	34	36	23	57	24	30	14	41	16	57	17	73	46	85	51	67	57
29	80	57	89	50	76	46	48	32	56	21	55	33	49	11	45	20	68	30	78	46	76	56	77	57
30	81	60	90	57	74	45	63	27	62	35	35	20	50	30	.....	.....	60	31	79	52	83	51	70	50
31	94	54	84	54	.....	.....	76	36	.....	.....	22	−3	47	21	.....	.....	44	20	.....	.....	68	42	.....	.....
Range	42°		46°		60°		57°		70°		69°		57°		59°		67°		78°		53°		59°	
Monthly means	68°.1		69°		61°.7		54°.1		37°.3		37°.8		28°.3		37°.7		34°.4		49°.3		57°.1		65°.8	

Maximum, minimum, and mean temperatures—Continued.

STATION, DETROIT, MICH.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	71	60	64	58	86	61	53	40	37	30	31	20	65	41	39	11	26	17	35	22	50	39	79	67
2	73	60	63	55	88	70	57	36	41	26	34	25	62	38	12	6	29	12	37	22	52	35	76	63
3	78	62	65	55	84	71	65	45	37	33	39	22	42	28	18	10	35	14	42	34	56	38	68	58
4	85	69	73	54	75	62	59	50	45	32	38	33	30	13	18	11	40	22	45	34	57	44	62	53
5	85	64	77	62	78	57	52	47	45	30	39	35	46	26	27	9	45	35	42	34	55	42	62	50
6	79	63	73	58	77	62	63	42	49	32	38	35	40	29	42	27	62	41	51	33	55	43	73	50
7	77	57	67	56	76	53	57	38	49	30	43	36	44	28	38	31	56	32	46	39	72	49	73	50
8	79	58	73	52	83	63	52	41	42	36	37	32	52	36	38	26	32	23	48	32	65	49	83	64
9	76	60	82	58	79	71	52	37	42	34	32	28	54	27	47	29	40	28	41	26	56	45	78	64
10	83	60	79	63	72	45	48	35	41	33	33	28	27	10	54	32	51	32	47	31	55	41	86	67
11	72	52	79	65	62	43	42	33	52	32	35	30	22	13	54	33	59	43	61	36	57	40	86	71
12	83	61	77	61	67	54	44	26	59	41	36	22	22	12	48	27	44	24	69	47	56	43	87	68
13	83	64	76	61	73	50	49	27	47	34	36	24	22	15	53	34	27	15	63	49	59	42	83	66
14	81	55	79	61	71	56	59	38	35	29	24	17	30	16	41	33	30	16	56	42	62	39	80	70
15	83	67	80	65	72	62	53	37	41	32	40	22	41	25	33	23	28	22	46	38	61	49	82	68
16	76	67	79	64	69	53	37	30	38	26	35	18	40	33	24	20	46	27	44	36	56	47	79	70
17	79	63	73	62	53	42	59	30	32	21	18	5	46	35	31	23	34	13	43	32	79	54	72	67
18	72	52	74	57	55	37	41	31	42	26	14	3	51	40	39	21	14	7	47	32	66	57	67	50
19	75	53	68	57	55	46	47	24	43	37	20	9	46	26	40	30	22	7	50	30	67	59	65	53
20	80	54	75	58	52	41	64	37	44	32	48	20	27	23	39	26	24	18	67	40	84	57	62	52
21	80	61	73	57	50	35	72	46	38	19	51	44	25	17	41	26	28	17	63	43	82	64	70	52
22	80	66	65	49	52	40	75	48	37	12	54	37	40	23	33	11	32	14	60	44	64	43	73	63
23	75	58	68	45	59	42	69	48	42	32	52	31	40	31	15	1	40	26	50	38	58	40	77	62
24	81	61	72	53	66	44	70	48	33	26	48	31	31	25	26	10	39	28	53	34	70	46	87	65
25	82	65	77	53	61	49	50	47	42	24	48	31	33	21	34	16	40	32	55	40	77	52	88	66
26	80	68	79	59	64	37	50	37	46	34	46	30	33	16	35	25	35	30	61	39	78	49	86	68
27	76	58	81	65	75	48	39	34	34	28	34	20	50	33	29	23	34	28	63	52	81	58	77	67
28	76	58	82	66	62	50	60	36	36	30	36	24	50	35	34	26	32	20	59	45	81	57	73	65
29	80	60	82	65	78	50	61	49	34	7	48	28	50	13	28	22	27	18	45	38	83	56	76	60
30	77	60	81	63	61	43	61	35	20	7	53	40	28	9	.....	.....	32	21	41	28	65	50	74	57
31	71	52	84	63	.....	.....	35	31	.....	.....	65	46	40	24	.....	.....	35	28	.....	.....	85	55	.....	.....
Range	33°		39°		53°		51°		52°		62°		56°		53°		55°		47°		55°		38°	
Monthly means	70°.2		67°.1		60°.3		46°.7		34°.6		33°.4		32°.4		28°.6		29°.8		44°		57°.5		69°.3	

Maximum, minimum, and mean temperatures—Continued.

STATION, DODGE CITY, KANS.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	98	74	90	69	93	68	69	38	83	40	72	28	52	20	32	− 2	49	25	35	28	66	44	78	47
2	97	71	87	70	92	67	80	47	78	47	62	32	56	20	54	21	49	13	45	24	67	35	68	51
3	96	74	90	68	89	63	80	58	56	43	51	28	60	32	38	18	69	34	65	33	82	44	65	46
4	80	64	96	71	89	65	84	45	45	38	62	25	65	35	56	13	79	42	58	34	63	40	83	46
5	69	54	100	69	95	69	67	46	58	28	47	29	53	28	68	30	70	32	58	29	52	35	90	58
6	72	54	88	61	93	73	72	38	60	36	37	16	60	33	56	28	32	17	63	33	52	38	90	68
7	83	60	90	62	94	68	81	47	56	33	42	23	70	38	68	29	50	13	72	38	62	40	83	64
8	92	66	89	66	97	70	85	48	48	34	60	24	66	52	71	30	65	38	72	42	67	42	86	51
9	93	70	88	67	87	56	76	42	62	20	61	32	56	14	69	41	50	24	62	43	87	40	92	58
10	81	65	89	65	67	50	88	42	73	28	51	35	36	10	68	42	33	14	80	39	88	52	83	66
11	81	67	89	58	83	58	55	37	76	33	61	32	52	9	63	24	24	12	82	43	80	62	84	53
12	91	63	82	64	81	63	70	35	50	30	61	31	50	17	70	38	39	12	66	37	71	47	71	53
13	85	68	80	62	87	65	80	39	52	24	58	26	56	22	52	33	58	27	41	30	81	54	75	48
14	96	66	86	64	88	66	63	45	71	30	66	24	54	29	46	23	44	26	58	32	83	58	79	51
15	96	67	77	62	91	65	73	35	47	20	65	33	47	35	52	27	26	13	76	33	88	60	83	54
16	97	73	77	64	76	62	83	40	36	10	45	20	61	28	54	27	48	12	65	45	78	47	79	54
17	85	68	78	58	76	50	74	43	55	19	56	21	66	27	62	22	36	18	73	37	83	52	73	54
18	77	65	75	54	81	47	66	37	77	30	61	22	45	23	56	27	38	21	84	46	84	61	75	49
19	80	63	76	61	70	46	77	44	74	28	58	23	55	15	55	20	32	8	78	57	88	54	82	41
20	85	61	79	62	70	43	83	40	57	21	62	30	41	19	65	30	36	− 1	73	46	90	57	91	56
21	81	65	74	64	53	41	80	44	28	9	61	23	35	14	54	16	56	16	81	52	90	59	100	68
22	84	56	76	60	56	42	75	46	51	16	68	27	40	17	64	21	52	34	90	55	83	59	99	71
23	90	62	86	59	68	52	77	45	44	21	63	31	22	13	54	14	52	34	83	54	67	49	99	72
24	91	62	88	65	68	56	76	50	52	22	56	28	40	13	75	33	62	32	68	48	68	46	91	68
25	90	64	87	67	70	62	63	37	64	33	43	20	42	15	78	45	46	29	76	49	68	57	94	71
26	88	63	89	66	71	60	69	28	51	21	40	27	61	32	76	27	43	31	90	57	79	58	92	65
27	85	63	79	68	85	67	79	39	62	25	54	22	53	21	34	18	38	29	78	58	78	63	84	63
28	92	64	79	69	91	47	69	39	41	11	59	26	47	18	53	15	47	24	78	43	87	62	75	58
29	95	68	87	69	77	49	50	32	37	− 1	73	38	38	5	55	30	68	33	83	53	87	63	82	63
30	72	63	90	71	83	49	62	26	74	16	63	42	55	19	.....	.....	59	32	85	61	82	62	81	61
31	87	60	90	69	.....	.....	77	35	.....	.....	45	32	62	12	.....	.....	49	33	.....	.....	89	65	.....	.....
Range	44°		46°		56°		62°		84°		56°		65°		80°		80°		66°		55°		59°	
Monthly means	75°.5		74°.6		68°.7		56°.6		39°.9		40°.7		35°.3		41°.5		34°.7		56°.6		64°.5		71°.2	

Maximum, minimum, and mean temperatures—Continued.

STATION, DUBUQUE, IOWA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	69	59	76	56	87	70	55	36	50	29	43	23	49	34	34	– 3	30	18	41	28	50	32	79	68
2	78	61	77	50	80	69	65	34	47	29	46	29	38	24	16	– 8	37	8	39	30	56	35	82	55
3	84	70	82	53	79	65	71	49	46	35	44	33	33	18	25	3	41	19	40	34	60	36	65	51
4	82	70	82	66	80	57	64	52	52	24	48	38	43	17	14	– 8	51	30	51	30	52	35	65	48
5	75	65	84	62	82	57	63	44	45	24	50	44	45	20	45	11	53	42	45	32	50	41	80	47
6	78	62	77	58	84	57	53	40	52	24	48	41	36	15	46	28	60	34	58	32	47	40	82	62
7	81	56	83	56	75	64	55	39	57	34	47	33	47	28	36	19	36	23	57	36	55	45	81	59
8	85	59	84	60	90	67	55	40	56	35	37	25	55	40	40	27	40	21	60	32	61	41	80	66
9	84	68	81	63	78	58	51	35	47	38	33	25	42	3	45	36	63	36	62	36	67	42	90	59
10	85	65	77	63	64	47	47	36	48	27	35	26	12	– 3	60	35	69	41	66	45	67	42	91	65
11	80	61	77	55	62	42	44	34	57	38	31	19	26	3	46	27	42	20	62	45	75	51	79	62
12	89	67	77	59	72	44	49	27	51	37	46	13	24	10	52	32	28	15	65	49	69	46	77	61
13	87	66	83	56	73	49	60	33	42	29	38	28	22	1	47	28	40	12	49	42	72	44	79	65
14	91	67	81	58	70	59	53	41	43	33	39	17	39	19	30	14	42	30	50	31	82	50	78	67
15	91	65	80	57	72	63	48	32	40	25	41	30	42	31	21	9	37	32	56	40	78	64	80	66
16	92	71	77	57	80	49	50	26	36	20	35	– 2	40	29	28	8	34	25	51	35	79	61	77	59
17	83	68	75	54	60	38	51	38	35	12	7	–10	52	37	37	11	25	13	48	37	79	57	59	45
18	81	62	72	58	60	38	51	27	47	30	21	1	41	32	52	21	35	5	59	32	71	63	55	41
19	82	57	76	51	53	43	62	31	49	25	33	13	34	15	40	19	30	12	60	43	85	62	60	47
20	82	56	82	54	54	41	62	41	44	23	52	27	25	14	48	23	26	13	66	52	81	65	64	48
21	87	63	70	55	55	38	75	42	26	2	54	39	28	14	45	20	30	11	66	42	78	62	82	51
22	83	65	71	41	61	39	77	46	37	11	56	39	38	24	30	10	38	12	71	44	68	57	91	63
23	85	58	73	44	67	45	76	47	34	13	50	35	26	13	23	21	40	22	58	46	71	46	85	75
24	88	62	76	43	66	46	66	41	37	5	47	33	26	6	44	18	36	33	62	43	76	47	88	65
25	84	68	83	62	62	45	53	41	43	22	35	20	26	18	55	24	43	32	66	39	81	50	92	69
26	82	63	81	64	70	43	41	33	42	24	35	15	38	13	46	33	45	27	73	52	84	54	90	62
27	82	64	89	67	80	48	45	30	40	22	30	5	38	26	41	34	37	27	76	55	85	55	79	66
28	74	58	81	71	71	47	59	34	37	6	36	19	46	7	35	20	38	25	60	41	87	56	81	61
29	84	56	81	56	63	52	52	41	12	– 9	42	26	27	– 5	30	12	37	21	61	45	85	70	77	61
30	78	64	88	64	57	47	42	29	30	2	56	38	37	12	.....	.....	42	23	50	34	86	61	81	57
31	69	57	90	68	.....	.....	38	23	.....	.....	57	-37	41	26	.....	.....	41	22	.....	.....	79	68	.....	.....
Range	36°		49°		52°		51°		66°		67°		60°		63°		64°		48°		55°		51°	
Monthly means	72°.9		69°.5		61°		47°.2		34°		34°.2		29°.4		28°.3		31°.5		49°.3		61°.9		69°.4	

Maximum, minimum, and mean temperatures—Continued.

STATION, DU LUTH, MINN.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	66	51	67	51	80	60	49	36	36	26	29	14	33	10	— 3	—19	19	2	42	8	41	26	51	43
2	60	50	66	53	65	57	53	35	35	22	37	26	28	14	1	— 28	36	— 9	35	22	49	33	54	42
3	78	50	81	53	67	56	49	43	45	32	29	31	14	—10	5	— 9	33	5	40	29	40	31	46	36
4	74	60	76	61	68	51	44	36	38	21	43	37	21	—12	1	—23	34	17	41	32	50	36	59	37
5	61	50	66	61	76	56	43	34	47	25	42	36	20	5	30	— 4	36	24	44	29	47	32	67	36
6	81	46	79	57	73	54	47	35	45	34	45	36	21	— 5	31	17	24	12	51	29	50	31	56	42
7	85	61	77	62	81	55	56	37	46	40	37	23	34	15	21	2	15	4	53	30	49	38	44	38
8	85	64	83	59	73	58	50	31	46	37	25	15	38	26	15	4	16	5	39	25	65	37	45	38
9	84	63	72	61	67	49	45	33	46	27	26	15	26	— 3	27	13	27	12	40	25	57	43	70	43
10	75	58	72	56	61	41	41	30	41	33	28	22	7	—11	36	23	35	25	41	33	59	37	59	42
11	82	52	71	57	63	45	42	28	43	31	29	18	12	—10	28	7	34	4	41	29	45	36	76	41
12	78	62	71	58	74	51	46	29	42	24	40	13	17	— 3	21	9	18	— 4	48	29	66	41	70	54
13	83	56	78	57	64	50	57	39	40	17	31	14	27	— 8	19	10	18	—10	45	31	47	34	71	58
14	87	65	68	61	61	57	56	36	38	27	30	9	27	16	12	3	17	— 7	46	34	42	35	70	47
15	89	56	71	58	62	49	40	27	35	19	36	22	39	13	16	— 6	20	12	43	28	39	36	77	44
16	75	58	68	59	54	42	50	29	22	16	24	— 7	33	18	25	1	21	12	46	32	40	34	63	50
17	72	56	68	58	55	35	44	31	24	1	5	—14	45	30	33	1	18	3	51	32	64	36	51	44
18	73	54	71	54	49	45	53	26	33	22	4	— 3	35	14	43	16	18	—10	52	28	56	37	51	36
19	82	55	80	56	47	40	60	37	32	18	18	— 4	15	7	18	— 2	20	— 3	41	31	52	40	52	36
20	80	64	73	57	47	35	69	43	23	0	32	11	10	— 4	22	0	25	3	60	35	60	40	60	48
21	89	61	64	47	48	38	63	48	7	—12	38	26	13	—17	22	3	34	6	65	40	65	43	57	42
22	78	60	71	47	62	40	72	43	20	— 7	49	31	22	10	6	— 8	43	11	57	34	51	42	61	40
23	79	55	67	50	69	45	59	45	22	5	40	30	18	6	8	—19	41	17	45	34	77	34	87	48
24	73	57	62	52	59	45	50	38	20	— 8	33	22	13	—10	20	2	37	29	50	29	82	54	88	59
25	71	57	63	58	62	39	48	36	33	9	24	0	19	—10	28	14	41	26	47	31	69	47	76	57
26	75	53	79	62	70	46	36	28	31	7	22	2	34	9	18	6	38	17	53	35	83	40	76	50
27	79	61	72	63	62	49	35	27	25	3	23	—12	35	26	18	11	31	12	50	36	83	61	76	57
28	85	60	73	60	54	43	40	31	25	—16	28	2	34	5	17	11	38	9	48	34	87	48	75	55
29	76	64	76	52	49	44	39	33	— 2	—29	37	24	7	—15	27	— 1	34	15	46	30	48	41	75	53
30	71	54	77	61	51	41	35	28	16	— 8	40	35	34	2	.....	.....	36	16	36	25	48	37	62	44
31	67	52	70	63	.....	.....	34	25	.....	.....	38	15	30	— 6	.....	.....	33	14	.....	.....	56	40	.....	.....
Range	43°		36°		46°		47°		76°		63°		62°		71°		53°		57°		61°		52°	
Monthly means	67°.3		64°.4		54°.3		41°.4		23°.8		24°.7		15°.1		12°.2		20°.8		38°.4		48°.7		55°.1	

Maximum, minimum, and mean temperatures—Continued.

STATION, EASTPORT, ME.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	73	46	69	54	70	55	54	50	38	33	11	−11	47	39	34	20	26	16	38	30	44	34	61	41
2	72	51	70	52	64	55	52	41	37	29	15	− 2	47	37	43	2	26	17	45	26	46	33	63	45
3	73	50	65	49	75	55	54	37	37	33	23	4	44	31	15	− 5	28	14	44	31	43	33	67	46
4	67	48	60	50	60	54	57	48	35	31	30	18	31	10	36	10	33	13	37	29	44	34	48	42
5	67	50	63	53	72	55	54	39	39	30	25	11	29	3	10	−10	41	21	34	20	47	33	51	42
6	61	48	70	52	67	54	46	37	38	27	23	12	37	16	36	− 2	43	34	40	28	45	37	60	48
7	71	53	61	51	67	52	56	44	42	27	24	12	18	9	45	29	43	30	49	30	56	39	68	50
8	75	48	64	54	66	48	59	44	47	29	31	19	30	6	36	20	45	30	38	32	54	37	61	45
9	61	48	67	54	65	54	52	43	43	30	34	23	34	22	22	8	40	26	39	30	50	39	59	44
10	62	47	65	53	63	46	50	39	41	37	36	30	39	23	23	18	28	17	42	32	53	38	61	45
11	66	50	73	51	57	40	55	43	48	36	32	22	23	0	38	16	30	21	45	34	46	39	61	45
12	74	51	60	54	61	44	44	39	44	33	34	28	16	6	41	29	35	22	47	34	57	38	61	49
13	67	49	74	55	65	50	46	32	52	34	34	23	9	− 2	39	17	37	31	47	32	51	39	61	47
14	63	48	74	55	65	49	51	34	35	27	24	15	18	0	26	12	33	10	44	37	54	38	63	46
15	60	48	82	58	60	50	52	43	41	26	19	10	27	15	44	23	23	2	50	35	51	35	57	47
16	65	48	66	59	55	49	52	48	43	31	23	7	35	18	39	28	29	10	46	35	51	35	62	46
17	74	54	66	55	55	48	53	40	37	23	35	26	27	9	31	18	27	21	45	34	55	35	64	47
18	68	56	63	54	55	41	52	37	26	16	28	− 4	41	26	30	17	21	8	47	31	48	38	65	48
19	67	52	71	55	61	41	53	44	41	21	0	−12	45	37	31	21	21	0	45	33	56	41	66	48
20	75	51	70	57	55	41	52	38	34	26	11	−20	39	23	31	12	29	9	50	31	65	43	64	51
21	64	53	69	53	60	45	52	39	40	22	37	9	23	5	28	12	42	22	41	33	55	40	61	40
22	63	49	70	53	54	44	45	32	40	13	47	36	13	1	35	22	42	28	49	34	47	43	72	48
23	58	50	65	54	54	40	45	38	34	10	44	26	32	4	24	−10	35	23	44	34	56	37	72	51
24	78	51	70	52	62	42	50	44	40	26	26	9	25	6	−10	−20	38	22	43	31	62	39	69	46
25	76	56	69	53	60	46	53	40	28	15	37	17	12	− 3	24	−13	45	23	40	32	54	40	67	45
26	69	54	73	50	57	43	46	32	47	17	36	20	15	7	23	2	40	30	41	31	56	37	79	50
27	59	53	75	55	59	42	56	42	45	18	44	17	33	3	26	2	39	34	38	28	64	42.5	66	50
28	68	51	79	56	56	40	44	34	32	4	27	10	33	18	28	4	44	33	45	34	63	45	66	50
29	72	52	80	56	50	35	40	28	37	1	30	26	38	28	26	13	43	32	42	34	59	38	76	48
30	69	51.5	75	54	57	42	42	29	− 4	−13	38	29	35	1	.....	.....	40	33	40	32	58	41	62	50
31	74	53	75	60	.....	.....	49	37	.....	.....	42	33	29	4	.....	.....	40	26	.....	.....	62	38	.....	.....
Range	32°		33°		40°		31°		65°		67°		56°		65°		45°		30°		32°		39°	
Monthly means	58°.7		61°		53°.5		45°.1		31°		23°.1		22°.1		22°.3		28°.3		37°.5		45°.7		54°.6	

Maximum, minimum, and mean temperatures—Continued.

STATION, ERIE, PA.

Day of month	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	71	62	64	58	87	64	55	43	39	33	29	16	73	49	44	22	30	20	38	28	48	34	84	65
2	70	61	64	55	81	71	54	42	40	34	36	18	61	41	22	7	27	15	48	22	48	36	76	68
3	80	64	63	57	90	71	67	46	40	29	40	26	41	30	26	6	32	9	54	36	55	36	79	59
4	80	70	74	60	77	67	68	55	41	33	44	35	30	18	25	11	44	17	40	34	57	48	67	58
5	85	73	78	62	79	57	60	51	46	33	45	37	52	26	34	6	54	35	45	34	60	45	62	54
6	83	68	73	65	75	63	77	49	48	36	42	39	44	29	43	26	67	49	49	34	57	50	74	50
7	74	66	66	61	75	56	54	45	50	35	51	40	41	29	43	34	63	35	47	34	78	51	71	55
8	74	66	73	58	80	63	53	45	44	34	45	37	55	38	40	30	35	26	42	32	65	56	86	66
9	(*)	68	77	59	88	68	55	38	44	31	37	30	56	39	50	30	36	26	42	26	52	46	82	73
10	.....	67	80.5	62	74	55	51	46	45	38	35	27	39	12	56	32	44	28	42	29	52	45	82	67
11	.....	59	82	67	65	47	47	37	51	39	38	32	20	15	59.5	36	69	35	56	36	54	43	83	67
12	.....	54	77	66.5	62	51	44	37	59	43	37	27	23	17	50	31	53	33	65	41	53	42	86	69
13	.....	68	82	65	70	51	53	34	52	35	35	24	24	17	52	40	33	16	65	38	53	44	82	70
14	.....	63	81	63	68	54	63	37	40	35	27	21	30	16	54.5	37.5	28	9	68	41	57	39	86	68
15	.....	61	87	66	70	59	53	45	45	37	40	21	41	25	45	25	30	17	50	38	63	43	84	69
16	.....	67	77	66	67	55	48	37	43	31	37	29	42	36	28	23	47	23	47	36	60	44	84	71
17	.....	66	76	64	56	47	61	36	33	25	30	11	49	38	31.5	21.5	37	16	41	34	78	53	79	68
18	.....	63	73	62	54	46	50	36	46	27	19	6	60	48	36	23	19	5	39	33	68	56	75	61
19	.....	58	73	63	58	44	45	35	52	41	17	9	56	28	43	31	24	4	50	33	66	52	78	57
20	.....	59	74	61	55	44	59	37	45	39	48	12	32	25	33	26	29	16	65	34	82	61	70	60
21	78	60	77	61	51	45	61	40	42	28	52	48	32	22	47	25	30	19	55	43	81	65	67	56
22	82	60	69	56	49	43	66	49	37	25	55	41	42	23	35	16	32	18	59	40	65	46	74	61
23	74	63	69	51	61	44	69	55	45	35	54	38	47	33	12	4	38	27	47	38	57	39	83	56
24	78	57	73	58	65	43	69	55	43	31	52	33	33	27	22	6	48	24	45	35	66	43	81	66
25	85	66	73	59	67	53	61	48	48	26	56	34	37	25	32	14	49	35	48	36	68	44	84	69
26	80	70	75	60	59	49	66	46	53	38	62	32	37	22	29	22	39	32	59	36	74	50	84	68
27	76	68	78	60	73	51	48	36	40	33	43	29	49	35	32	22	34	28	68	48	79	59	78	69
28	77	62	78	62	65	54	60	39	46	34	37	25	57	38	36	26	35	25	59	45	82	60	75	65
29	79	66	83	63	75	51	63	49	41	11	50	29	57	18	29	23	35	23	51	39	76	54	79	61
30	76	66	81	63	69	49	65	36	21	11	59	44	32	16	.....	.....	32	22	40	29	60	49	74	62
31	70	57	81	60	.....	.....	40	35	.....	.....	68	54	45	24	.....	.....	40	29	.....	.....	84	48	.....	.....
Range	.....		36°		47°		43°		48°		62°		61°		55°.5		65°		46°		50°		36°	
Monthly means	70°.5		67°		66°.1		49°.6		37°.7		36°.2		35°.3		30°.5		31°.1		42°.8		56°.4		70°.5	

* Maximum thermometer broken.

Maximum, minimum, and mean temperatures—Continued.

STATION, ESCANABA, MICH.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	70	50	69	48	81	65	52	33	33	23	27	16	36	28	13	− 7	19	2	38	9	43	23	66	53
2	71	43	72	50	70	61	50	30	36	17	34	21	40	22	7	−12	25	5	37	14	46	29	72	58
3	67	61	72	47	75	58	60	43	39	33	38	33	23	0	13	− 2	30	4	39	31	42	31	59	46
4	81	57	74	58	69	55	44	35	40	29	39	34	26	− 1	4	−11	37	14	42	33	50	31	59	39
5	71	48	65	50	78	60	43	33	40	25	40	34	30	22	29	−11	37	24	42	33	42	36	61	47
6	73	50	61	55	73	54	46	36	42	35	36	32	27	17	34	21	40	16	51	29	48	36	60	45
7	74	51	67	56	74	53	55	34	46	36	34	31	34	17	27	9	15	5	43	27	43	39	57	39
8	77	57	72	56	72	61	46	31	45	39	35	26	36	31	21	12	22	4	37	22	50	38	66	33
9	76	62	72	51	70	52	45	35	44	34	29	25	34	6	29	18	53	9	39	23	45	35	74	55
10	68	55	64	53	54	41	36	31	42	28	31	25	10	2	35	24	36	29	43	32	54	35	71	54
11	69	42	58	51	59	35	35	27	45	37	28	18	14	− 3	39	25	41	21	46	31	50	36	69	56
12	73	52	64	53	65	46	43	25	43	29	32	14	17	6	39	14	22	4	53	34	61	37	69	56
13	72	52	66	56	66	44	51	34	37	22	32	10	20	11	25	15	14	2	42	33	54	37	76	59
14	76	56	69	57	66	57	48	38	40	27	24	8	23	13	33	13	22	3	38	32	49	37	76	57
15	84	58	74	60	63	55	39	30	41	27	32	21	35	17	21	6	28	12	45	30	45	38	72	54
16	74	56.5	69	55	55	39	40	29	32	18	25	− 1	34	15	22	4	21	15	44	33	45	40	66	45
17	65	54	66	57	45	39	43	34	32	17	12	− 3	37	33	31	10	17	5	42	30	54	42	47	40
18	72	50	62	53	54	36	40	31	35	29	8	− 2	39	33	36	5	14	− 3	43	23	62	42	54	41
19	76	59	69	47	50	43	52	35	35	29	23	− 1	33	15	38	10	24	−15	46	24	65	46	57	42
20	78	62	76	49	45	37	53	41	35	18	34	23	17	6	26	13	26	12	50	35	63	48	61	42
21	77	57	53	42	47	35	59	44	20	3	48	32	16	− 1	33	15	27	11	50	39	62	47	65	49
22	75	58	61	38	52	36	59	38	29	1	41	33	28	11	15	− 3	33	3	52	31	49	38	67	47
23	72	52	63	41	60	45	56	42	32	17	43	20	25	18	10	− 9	33	12	47	30	56	33	83	60
24	74	55	66	47	66	50	49	38	27	11	34	20	22	10	21	1	39	9	54	28	67	45	80	62
25	81	65	68	48	53	39	43	36	35	22	37	8	21	2	34	13	38	30	48	29	63	46	83	62
26	75	57	69	60	68	37	46	35	35	15	31	8	30	2	26	15	32	24	44	34	65	43	72	62
27	75	59	71	62	54	48	49	30	30	12	19	1	36	23	17	12	23	10	49	33	75	50	73	62
28	77	58	72	63	52	32	42	33	35	4	20	1	37	26	19	10	23	15	48	33	75	50	79	54
29	70	57	73	61	50	41	40	35	5	− 7	34	3	34	− 4	26	10	22	12	45	27	61	46	68	55
30	67	51	72	53	50	39	36	28	25	3	37	33	28	− 7	.....	.....	27	20	37	22	65	43	69	48
31	67	48	74	63	.....	.....	31	26	.....	.....	40	33	32	11	.....	.....	29	20	.....	.....	67	50	.....	.....
Range	42°		38°		49°		35°		53°		51°		47°		51°		56°		45°		52°		50°	
Monthly means	64°.6		61°.3		53°.3		39°.5		28°.4		21°.7		20°.1		16°.1		20°		35°.8		47°.8		59°	

Maximum, minimum, and mean temperatures—Continued.

STATION, EVANSTON, ILL.

Date of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	.....	.....	.....	.....	.....	.....	59	41	44	38	41	26	60	37	36	1	29	24	35	31	45	34	76	59
2	.....	.....	.....	.....	.....	.....	65	34	44	37	43	31	65	35	10	−10	34	24	36	29	49	37	71	57
3	.....	.....	.....	.....	.....	.....	71	45	43	37	42	35	45	24	22	9	39	18	40	34	57	38	69	52
4	.....	.....	.....	.....	.....	.....	62	50	50	36	43	38	45	24	11	− 6	51	28	48	31	46	35	63	47
5	.....	.....	.....	.....	.....	.....	67	48	48	35	45	39	47	29	34	2	50	41	48	34	55	38	69	51
6	.....	.....	.....	.....	.....	.....	54	47	53	31	49	38	39	20	45	27	67	48	61	32	45	36	65	52
7	.....	.....	.....	.....	.....	.....	60	39	53	38	40	36	48	29	39	26	53.5	25	46	35	70	40	86	52
8	.....	.....	.....	.....	.....	.....	55	44	53	42	45	33	55	42	39	31	34	24	42	32	55	45	84	62
9	.....	.....	.....	.....	.....	.....	52	38	53	40	35	31	54	6	47	33	47	35	46	34	67	45	86	62
10	.....	.....	.....	.....	.....	.....	53	38	53	34	42	30	14	− 1	60	32	65	38	46	38	56	44	81	65
11	.....	.....	.....	.....	.....	.....	43	34	56	35	32	27	29	6	58	32	61	29	54	37	63	40	89	60
12	.....	.....	.....	.....	.....	.....	56	33	52	40	39	17	23	7	53	30	29.5	23	69	41	58	41	68	57
13	.....	.....	.....	.....	(*)	.....	58	32	43	37	37	22	29	5	54	34	27	16	56	35	50	43	62	54
14	.....	.....	.....	.....	73	59	57	40	47	35	30	12	40	15	35	15	36	26	54	37	63	43	61	53
15	.....	.....	.....	.....	70	63	45	39	45	34	46	30	41	30	22	11	34	30	51	38	83	44	67	55
16	.....	.....	.....	.....	72	49	61	37	37	23	35	3	34	33	25	8	36	24	48	34	85	48	71	59
17	.....	.....	.....	.....	50	43	58	41	35	12	18	− 5	52	37	35	15	24	13	44	33	75	57	71	50
18	.....	.....	.....	.....	57	45	45	34	48	28	17	− 4	45	33	45	21	19	5	50	31	67	50	56	44
19	.....	.....	.....	.....	56	43	62	33	47	35	31	9	33	19	38	26	27	14	51	37	86	54	57	45
20	.....	.....	.....	.....	54	41	70	41	51	35	56	25	27	14	38	27	27	16	68	44	84	56	64	49
21	.....	.....	.....	.....	50	38	75	46	35	10	54	35	32	20	43	25	27	11	60	41	81	64	80	50
22	.....	.....	.....	.....	60	39	80	50	38	9	58	33	44	30	36	10	37	15	65	43	66	40	71	60
23	.....	.....	.....	.....	71	39	79	43	44	21	49	35	43	23	22	1	41	30	45	38	50	42	81	57
24	.....	.....	.....	.....	72	43	55	46	35	8	54	35	32	12	38	17	35	31	46	36	66	43	88	67
25	.....	.....	.....	.....	66	48	60	47	45	15	45	27	29	22	47	29	34	31	54	34	75	50	83	69
26	.....	.....	.....	.....	70	39	50	35	44	27	38	21	39	17	43	34	42	23	66	43	75	53	90	66
27	.....	.....	.....	.....	79	46	45	33	46	25	33	15	41	33	35	32	34	28	72	49	84	55	78	59
28	.....	.....	.....	.....	62	52	68	44	42	19	46	27	56	30	35	21	32	24	64	46	88	59	73	62
29	.....	.....	.....	.....	75	48	49	46	19	− 3	45	27	30	1	26	12	28	18	58	40	87	47	79	60
30	.....	.....	.....	.....	56	45	48	32	40	10	56	39	35	7	.....	.....	37	21	46	30	70	48	67	58
31	.....	.....	.....	.....	.....	.....	43	28	.....	.....	64	37	42	19	.....	.....	35	23	.....	.....	82	58	.....	.....
Range	.....	.....	.....	.....	.....	.....	52°		59°		69°		66°		70°		62°		40°		54°		46°	
Monthly means	.....	.....	.....	.....	60°.8		47°.5		36°.5		34°.8		30°.6		28°.1		30°.8		43°.4		55°.9		64°.3	

(*) Station opened September 14, 1875.

Maximum, minimum, and mean temperatures—Continued.

STATION, FORT GARRY, MANITOBA.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	87.4	50.1	75.8	57.1	71.5	52.7	47	23	22	10	10.4	— 8.3	16.3	— 8.5	—19.4	—41	23	—17.2	35.7	3.2	39.5	29.5	46.7	34
2	71.5	57.6	81.3	54.7	68	44	49	35	34.4	9	27	10.4	9	—15.3	—10.4	—36.3	23	— 5.3	39	10.3	37.5	28	48.5	36
3	80	51.1	86	48.6	77	53.4	43.5	28	24	9.5	17	0.2	—11.4	—23.5	—15.4	—32.3	27.4	— 8.5	38.4	23	47	27	59	30
4	71	45	89	50.1	76.3	54.4	42.6	25	26	— 2	33	13.1	—16	—25.5	— 9.4	—43	26	5.1	38.4	24	48	31	75	33
5	83	45.5	77	57.5	76	46	43.5	30.3	36.3	10	33	10	— 0.5	—21.6	4	—18.3	20	2	40	9.5	58.3	34	72.4	45.5
6	85	54.4	86	47.5	85	46	47	33	43	12	11	— 0.2	15	—12.5	— 4.2	—20.3	6.4	— 5.3	36.4	22	60	35	72.3	40
7	94	54.1	91.5	51.5	74.3	56.3	43	27	40.3	32.7	12.3	—13.6	4.5	—13.3	— 4.6	—28.3	12.6	—15.5	32.5	6.4	60.6	30.5	58	52.4
8	81.5	57.1	90.5	52.5	62	44	43.3	24	33.3	13.7	— 4.2	—21.3	3	—11.4	7	—24.5	24.4	3.2	45.4	20.5	68	33	63	52
9	83.5	51.5	83.3	54.1	58	38	38	30.3	31.7	12	17.4	— 5.8	— 6	—18.3	74	4.2	15	— 4.2	43.5	35.3	55	30	68	53.4
10	77.4	45	81.5	53.4	63.5	29.4	31	25	40	23	8	—13.3	— 3.2	—24.3	32	— 4.2	5	— 8.3	44	32	57.5	31.5	76.4	55.4
11	87.6	54.4	82.3	47.6	68.6	48	39	23	40.4	10	17	3	— 1.5	—18.3	8	—14.3	7.4	— 4.2	42.5	20.4	64	40	71	54
12	79	53.3	81	46.5	68.5	40	48	30	19.5	4	41.5	14	— 1.6	—26.3	— 5.4	—24.3	11	—16.3	42	21	64	29.3	78.4	44
13	89.5	53.4	84.5	47.4	77.6	43	56	30.5	25.5	13.3	16.3	— 3.2	26	— 5.5	6	—15	16	—21.3	45.5	22.2	65	30	83.5	54
14	86.5	56.1	70.5	56.5	72	54	38.5	27	21	10.1	26	5.1	18	— 6.5	6	— 8.3	16.5	—18.3	44.3	21.5	58	46	85	53.5
15	74	55.8	70	54.1	62	45	47.3	30	20	9.5	21.3	2	25	8.6	0.5	—19.3	17	—10.3	38	20	60.3	42	72	50
16	73	46	71	53.4	53	33	66	30	16	0.2	— 3.5	—20.3	34.3	9.1	7	—25.3	19	6.2	36.4	24	56.5	43.5	57.4	45
17	72.5	45.5	74.4	50.5	57.3	24	47	28	18	5.5	— 2.2	—24.5	36	18.2	18.4	—12.3	11.2	—12.3	52.3	19.4	69	42	63.4	34
18	87	48.5	80.5	45.5	54	39.5	69	27	20.3	3.2	— 2.2	—21.5	24.5	3.2	14.1	—16.3	14.5	—22.5	58	27.5	80	43.5	68	40
19	82.5	54.4	83.6	49	49.5	35.8	68.3	41	10	— 5.3	15.4	—10.3	8	— 3.2	8.2	—25	12.4	—10.3	57.6	39.4	79.5	55	72.4	35
20	94.3	54.3	62	45	49	36	77.2	38	1	—14.3	27.3	5	— 8.4	—24.3	8	—24.3	16.6	—18.5	54	34	72	49.5	85	47.4
21	81	57.4	71.5	31	62.3	31.5	83	39	— 7.4	—23.3	25	7.1	— 9.6	—35.6	0	—20.3	22.4	— 5.2	52.6	30.4	65	47	92	51.5
22	75	54.9	80	39	80	44	67	38.3	7	— 9.3	25.4	5.2	3.2	—16.3	— 7.8	—30.3	37.6	— 2.4	57.4	24	76	32	91.5	60
23	84.5	44	86.3	54.4	90	42	50	26.5	1.5	—17.7	9	—18.8	—10	—24.7	0	—31	32.4	4.6	61.3	26.5	82	42.3	80	55.5
24	68.5	59.1	71	56.1	57	36.3	45	27	3.3	—19.3	18	— 6.5	— 4.2	—34.8	11.4	— 5.3	38	24	62	28	89	45	90	51.6
25	72	50.3	73	57.6	70	28	43.5	27.5	2	—12.5	— 1.2	—17.5	2	—22.7	6	— 6.3	25	10.3	65.5	40.2	87.3	48.4	85	61.5
26	73.5	47	71.5	59	74	36	35	21.3	2	—17.3	— 4.2	—26.3	16	— 2.2	8.5	0.2	22.5	8.2	74.6	37.4	90	53.3	75	55
27	86.5	46	81	55.4	62	35	35.5	12	7	—12.5	4	—24.3	10	— 5.4	12	— 4.2	29.3	2.4	50	30	88.4	51	74	48.4
28	74	58.8	67	52.1	49	41	37	28.5	—12.8	—31.3	22	—21.5	— 5.2	—23.3	15.4	— 3.2	33.4	— 5.6	40	19.3	83.5	47	70.4	47
29	71.3	44	78	51.7	54.6	43	34.5	20	—12	—33.3	36	18	0	—34.3	16	—22.3	29.5	— 6.3	39.3	19	71.3	46	77	47
30	71.6	55.6	70.5	52.9	53	34	32	12	5	—12.3	25.4	1.2	10	—16.5	.....	.....	29.4	— 2.4	43	17.4	79	53.5	84.6	53.5
31	78	45.5	71	47	.....	.....	27	10	.....	.....	2	—13.6	— 8.4	—34.3	.....	.....	34.4	0.2	.....	.....	60	40	.....	.....
Range	50°.3		60°.5		66°		73°		76°.3		67°.8		71°.6		73°		60°.5		71°.4		63°		62°	
Monthly means	.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....	

Maximum, minimum, and mean temperatures—Continued.

STATION, FORT GIBSON, IND. T.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	93	71	81	61	92	73	67	44	77	53	60	27	63	39	59	10	56	38	63	52	76	46	88	70
2	93	72	85	63	92	71	74	38	81	55	62	40	53	34	40	12	48	27	58	44	62	42	85	66
3	94	73	86.5	67	87	68	84	54	72	51	63	51	59	28	40	24	57	30	60	38	69	38	73	60
4	95	70	90.5	73	89	67	82	55	52	43	65	52	63	42	42	14	55	47	82	45	63	54	77	49
5	97	72	93	73	92	66	77	60	56	30	64	50	59	45	52	30	70	49	50	36	73	51	82	54
6	87.5	71	83	70	92	69	70	49	57	34	54	32	58	28	54	38	69	33	62	31	80	67	85	57
7	89	71	82	62	93	71	70	39	64	33	45	28	66	40	66	43	56	27	67	41	67	46	84	67
8	92	72	86	60	96	73	78	44	59	52	44	27	66	53	72	54	73	46	73	40	72	37	85	62
9	95	72	81	68	95	75	71	55	54	41	51	27	66	29	76	61	71	60	78	55	76	41	89	62
10	96.5	65	87	67	81	66	77	49	55	30	56	33	36	21	72	63	83	42	80	59	84	53	88	72
11	83	69	80	65	96	64	62	47	68	42	56	24	42	29	71	46	42	28	80	69	86	60	80	62
12	86	73	84	56	74	66	61	37	70	52	70	28	53	21	72	39	36	20	81	62	84	60	73	64
13	90	74	74	65	84	70	67	36	52	41	59	32	49	28	63	44	58	25	67	44	83	57	67	51
14	92	77	77	60	83	63	60	49	61	34	56	28	53	32	49	33	50	44	62	35	83	59	75	58
15	96	75	84	65	85	64	65	36	57	37	62	39	52	36	50	26	54	37	79	45	78	65	75	57
16	97	77	87	68	84	64	68	35	37	26	45	32	48	40	47	29	45	26	74	51	78	68	73	59
17	97	75	78	64	72	56	74	47	47	22	51	19	55	44	56	26	38	27	64	40	82	70	76	55
18	93	71	78	59	66	41	65	(†)	70	39	58	20	59	40	64	39	47	23	77	46	83	69	76	45
19	88	73	79	54	69	45	67	.....	70	47	60	40	47	28	64	38	43	30	82	58	82	69	79	48
20	86	70	81	52	59	46	68	.....	58	42	64	54	58	35	62	50	30	10	76	65	79	60	86	62
21	82	71	79	63	(*)	(*)	73	.....	47	33	65	58	57	49	52	31	40	7	84	64	81	61	88	69
22	83.5	72	81	56	.....	.....	72	.....	48	36	64	56	69	54	54	32	45	35	84	59	88	69	91	73
23	87	68	84	63	.....	.....	75	.....	48	38	62	58	55	30	53	30	43	35	80	66	73	63	94	71
24	82	68	86	63	.....	.....	79	.....	53	24	65	49	41	22	69	37	49	10	74	58	71	61	94	71
25	76	67	87	67	.....	.....	70	43	56	40	62	34	45	35	67	51	49	37	75	48	78	63	92	73
26	87	70	87	70	.....	.....	68	29	54	32	63	37	64	41	72	57	57	33	71	59	79	63	92	74
27	88	71	87	71	.....	.....	78	37	60	35	50	23	70	53	68	38	58	39	82	58	82	60	90	68
28	86	75	79	72	.....	.....	84	65	60	39	56	36	64	39	52	26	47	32	77	57	88	64	88	74
29	83	71	84	68	85	54	83	45	40	22	71	44	40	18	61	36	64	27	83	55	86	64	82	71
30	83	71	85	68	82	55	60	36	43	25	76	58	48	20	.....	.....	73	45	85	68	84	63	81	66
31	79	69	89	70	.....	.....	72	30	.....	.....	70	47	59	38	.....	.....	60	54	.....	.....	87	68	.....	.....
Range	32°		41°		.....	.....	.....	.....	59°		57°		52°		66°		76°		54°		51°		49°	
Monthly means	80°.0		74°.6		.....	.....	57°.7		49°.4		48°.4		45°.4		47°.6		44°.4		63°.4		69°.6		73°.6	

* No observations taken.

† Minimum thermometer broken.

Maximum, minimum, and mean temperatures—Continued.

STATION, FORT SILL, IND. T.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	.....	.....	.....	.....	.....	.....	70	51	81	47	61	26	50	35	49	10	61	42	59	44	74	52	83	68
2	.....	.....	.....	.....	.....	.....	74	51	88	46	62	40	52	31	40	19	49	25	59	36	61	44	92	70
3	.....	.....	.....	.....	.....	.....	86	53	55	49	60	50	58	33	43	29	61	37	66	39	73	41	70	55
4	.....	.....	.....	.....	.....	.....	80	55	50	41	61	49	64	34	49	28	69	49	88	47	76	54	78	50
5	.....	.....	.....	.....	.....	.....	82	65	55	35	66	43	60	42	54	27	(*)	60	52	37	74	48	85	56
6	.....	.....	.....	.....	.....	.....	70	52	60	42	45	30	55	33	61	34	(†)	.....	58	31	81	56	84	58
7	.....	.....	.....	.....	.....	.....	72	46	61	40	52	30	66	37	68	38	59	31	62	45	66	45	86	65
8	.....	.....	.....	.....	.....	.....	81	50	55	47	55	36	71	48	72	53	71	45	72	42	75	42	85	66
9	.....	.....	.....	.....	.....	.....	62	55	55	36	59	37	64	31	75	55	76	53	78	51	79	45	90	66
10	.....	.....	.....	.....	.....	.....	80	47	61	28	62	38	35	25	72	53	(*)	37	83	48	88	52	90	72
11	.....	.....	.....	.....	.....	.....	62	40	70	35	65	30	46	31	64	42	.....	25	87	63	86	55	80	65
12	.....	.....	.....	.....	.....	.....	66	43	62	36	71	33	53	30	72	38	.....	21	77	53	85	60	74	61
13	.....	.....	.....	.....	.....	.....	73	45	51	37	60	35	57	38	60	43	.....	28	55	44	82	60	77	57
14	.....	.....	.....	.....	.....	.....	63	55	69	35	59	33	50	39	52	39	.....	43	65	35	81	61	78	63
15	.....	.....	.....	.....	.....	.....	70	44	59	36	62	30	47	39	65	32	.....	28	81	40	87	57	82	62
16	.....	.....	.....	.....	.....	.....	72	45	32	24	47	35	50	40	52	38	.....	25	78	50	89	64	82	66
17	.....	.....	.....	.....	.....	.....	82	48	48	25	42	22	58	41	60	32	.....	33	72	49	82	66	83	61
18	.....	.....	.....	.....	.....	.....	65	56	72	32	59	23	55	37	65	35	.....	25	80	48	82	66	80	60
19	.....	.....	.....	.....	.....	.....	70	41	70	41	63	32	51	28	60	38	.....	23	83	57	82	65	88	57
20	.....	.....	.....	.....	.....	.....	73	43	58	39	72	52	60	32	56	40	.....	12	83	60	80	65	91	64
21	.....	.....	.....	.....	.....	.....	71	48	37	25	64	57	59	45	54	35	.....	14	83	61	86	58	95	70
22	.....	.....	.....	.....	.....	.....	71	48	47	32	60	53	71	54	54	24	.....	40	85	58	84	65	95	75
23	.....	.....	.....	.....	.....	.....	73	48	50	38	62	56	54	26	61	30	.....	40	90	64	76	60	94	72
24	.....	.....	.....	.....	.....	.....	77	52	54	25	70	40	36	21	70	32	.....	37	79	61	74	63	95	72
25	.....	.....	.....	.....	.....	.....	64	48	55	42	53	33	51	34	74	41	.....	36	79	50	76	64	83	73
26	.....	.....	.....	.....	.....	.....	72	37	46	31	50	35	69	45	75	55	.....	35	77	60	83	65	77	69
27	.....	.....	.....	.....	.....	.....	85	40	55	28	50	24	64	46	61	33	54	37	86	62	81	63	78	70
28	.....	.....	.....	.....	.....	.....	89	60	56	39	61	36	60	39	56	25	51	31	76	55	87	69	78	68
29	.....	.....	.....	.....	‡84	66	78	50	23	14	73	35	38	21	60	37	70	33	80	57	84	63	78	69
30	.....	.....	.....	.....	85	57	64	34	45	26	75	57	51	22	.....	.....	75	41	87	64	83	65	86	63
31	.....	.....	.....	.....	.....	.....	71	36	.....	.....	52	40	65	34	.....	.....	69	54	.....	.....	88	69	.....	.....
Range	.....	.....	.....	.....	.....	.....	55°		74°		53°		50°		65°		.....		59°		48°		45°	
Monthly means	.....	.....	.....	.....	.....	.....	.....		.....		.....		.....		.....		.....		.....		.....		.....	

* Maximum thermometer broken. † Observer sick. ‡ Station supplied with maximum and minimum thermometers September 29, 1875.

Maximum, minimum, and mean temperatures—Continued.

STATION, FORT SULLY, DAK.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	68	57	92	67	83	50	65	32	46	26	36	27	34	16	— 5	—28	25	8	(†)	.....	61	30	59	42
2	90	61	99	62	86	61	81	38	57	28	45	20	37	8	7	—11	28	— 2	.....	.....	77	30	51	38
3	79	57	103	63	90	53	58	43	52	22	43	19	26	— 3	1	—10	30	6	.....	.....	55	27	62	38
4	69	55	100	60	86	55	57	32	48	16	41	20	19	4	14	—10	44	7	.....	.....	46	37	83	41
5	79	55	81	65	91	52	53	36	58	38	36	12	47	8	40	6	34	7	.....	.....	58	36	89	52
6	93	55	95	57	92	58	68	34	61	23	22	1	53	28	18	5	23	— 1	.....	.....	57	43	94	59
7	95	59	103	65	100	63	71	41	58	32	25	12	41	24	12	— 1	28	— 5	.....	.....	61	41	71	59
8	97	65	104	64	95	64	55	38	42	21	25	12	34	14	17	1	26	11	.....	.....	75	36	81	55
9	87	62	88	63	66	47	68	42	51	17	42	12	26	0	25	14	12	0	.....	.....	79	46	93	55
10	82	64	84	59	74	39	43	36	69	34	28	15	31	—12	33	13	4	— 4	.....	.....	91	47	75	56
11	91	63	89	59	76	48	47	26	56	32	48	24	36	13	47	5	5	—12	.....	.....	73	49	68	54
12	97	67	90	58	78	44	71	34	39	15	50	34	26	5	32	8	11	—16	.....	.....	72	38	82	51
13	96	63	89	58	85	61	73	43	55	22	47	26	43	7	21	1	27	5	.....	.....	71	56	90	53
14	100	62	80	57.5	83	57	58	37	43	14	58	28	43	11	17	2	18	10	.....	.....	89	55	94	59
15	102	66	82	54	82	58	72	45	15	2	49	25	50	18	22	7	14	5	.....	.....	70	52	77	58
16	83	63	80	56	59	43	80	45	18	6	30	0	55	25	34	13	19	0	.....	.....	76	49	78	48
17	80	60	81	51	75	48	61	40	50	5	27	1	47	30	52	9	11	— 5	.....	.....	83	49	71	45
18	95	51	84	49	62	48	74	33	42	12	27	6	32	17	42	18	16	—22	.....	.....	91	57	74	46
19	98	65	92	50	56	32	81	39	20	9	30	3	23	4	40	13	11	— 8	.....	.....	83	58	78	50
20	101	62	88	59	59	29	84	42	19	— 8	44	22	8	— 4	29	2	22	—18	.....	.....	78	49	96	48
21	95	62	86	49	72	32	88	39	7	—13	52	26	5	— 6	35	— 3	29	— 3	.....	.....	75	52	111	58
22	96	64	93	57	84	45	79	46	32	5	65	38	12	—10	16	3	36	20	.....	.....	77	46	96	69
23	96	62	93	62	93	42	68	42	15	— 7	38	22	1	—17	40	2	49	24	.....	.....	80	41	98	59
24	83	64	89	65	71	46	57	(*)	24	— 1	30	13	2	—24	65	16	39	22	.....	.....	80	48	105	60
25	84	53	82	62	78	35	45	31	20	10	32	6	17	—16	46	10	38	31	.....	.....	81	54	93	71
26	83	59	82	56	89	34	37	27	16	— 4	22	1	40	— 5	13	3	35	26	.....	.....	89	54	77	61
27	91	60	76	57	81	56	48	29	25	4	20	4	36	4	11	5	27	18	.....	.....	89	57	84	59
28	97	62	73	50	86	48	56	39	4	—15	31	4	31	— 6	21	0	32	7	.....	.....	96	56	83	55
29	92	62	90	50	75	44	40	29	15	—18	44	31	33	—16	15	4	34	15	.....	.....	94	64	85	51
30	90	56	81	56	60	43	41	27	41	8	41	30	42	1	.....	.....	35	15	.....	.....	91	57	72	56
31	87	62	83	54	.....	.....	49	25	.....	.....	30	10	2	—22	.....	.....	38	16	.....	.....	79	58	.....	.....
Range	51°		55°		71°		.....		87°		65°		79°		93°		71°		.....		69°		67°	
Monthly means	73°.9		71°.4		61°.3		48°.09		24°.4		27°.0		18°.7		14°.4		15°.9		.....		61°.7		68°.1	

* No observation taken.

† No observations taken during April, 1876.

Maximum, minimum, and mean temperatures—Continued.

STATION, GALVESTON, TEX.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	93	77	91	80	93	81	78	68	76	63	58	49	69	56	67	49	76	66	70	62	83	73	89	78
2	95	81	92	78	90	77	71	67	80	69	65	57	62	55	54	35	69	55	73	61	76	59	89	79
3	95	81	94	79	90	80	70	67	80	71	70	63	62	55	65	50	64	54	76	60	74	54	90	78
4	95	80	96	79	89	80	83	65	82	69	65	60	67	56	54	41	70	59	77	63	90	64	83	76
5	95	81	94	81	88	76	84	72	69	57	68	56	69	62	54	43	72	64	72	63	85	73	83	73
6	94	81	94	81	92	80	84	75	58	51	63	49	65	57	66	52	68	51	66	55	83	73	84	74
7	87	80	93	71	92	79	77	73	60	50	55	40	67	56	67	61	62	50	70	61	87	70	89	73
8	95	80	88	73	92	80	74	68	69	60	54	43	72	60	67	62	71	56	70	56	70	61	91	77
9	94	78	90	78	94	81	76	68	69	52	64	44	73	65	73	63	76	66	71	62	80	60	92	79
10	95	78	90	73	92	81	77	68	57	51	67	52	68	50	73	64	75	66	73	65	82	65	92	79
11	97	79	91	78	86	79	81	69	67	51	63	54	52	45	74	67	75	55	76	69	83	68	92	77
12	96	78	92	79	87	77	74	70	74	63	68	52	53	46	73	66	69	45	78	69	82	69	92	77
13	95	78	92	80	87	77	78	69	77	68	67	55	52	48	74	67	60	48	73	66	83	70	83	73
14	95	81	89	80	83	75	83	72	76	69	65	58	56	47	67	57	68	61	67	56	84	71	89	73
15	96	81	89	78	82	76	76	61	76	70	68	59	66	56	64	50	73	65	72	55	85	73	91	75
16	96	81	91	81	82	73	71	59	73	58	73	63	71	62	67	56	65	49	73	62	87	74	90	75
17	96	79	91	76	78	65	78	64	64	49	64	49	72	65	61	52	69	56	74	60	85	75	92	76
18	96	78	88	74	73	59	77	67	75	64	58	48	70	56	59	48	63	50	77	63	85	73	82	70
19	95	78	86	76	77	65	69	59	77	68	67	56	63	50	63	58	67	55	77	65	85	74	88	72
20	95	80	84	73	79	67	67	56	78	70	68	63	67	49	64	58	55	36	78	66	88	75	89	72
21	95	81	87	74	73	67	70	61	75	67	70	64	70	61	72	54	51	38	78	67	89	76	91	75
22	95	82	88	74	73	63	70	61	70	63	66	63	72	64	55	44	63	49	81	68	89	74	92	79
23	95	80	89	78	76	65	76	65	78	69	72	64	74	63	58	43	70	61	82	69	89	75	93	79
24	93	81	83	72	78	70	78	67	72	59	69	61	68	60	64	57	73	58	83	70	89	76	93	79
25	94	81	87	76	73	61	81	72	69	58	72	62	68	60	69	57	72	58	83	71	89	75	91	80
26	94	81	89	78	73	65	73	63	71	68	73	66	73	63	71	61	67	61	82	70	85	71	94	81
27	95	81	87	80	71	62	77	65	73	67	66	56	74	65	73	63	76	62	83	71	85	72	93	80
28	94	81	90	80	74	64	80	71	71	67	72	63	75	63	67	61	62	45	83	73	79	75	94	81
29	96	81	92	80	76	65	82	73	66	47	69	60	63	53	70	61	62	48	82	72	82	70	94	81
30	95	82	92	81	80	68	76	63	57	47	72	66	53	43	.....	.....	71	55	84	72	78	69	91	76
31	95	82	94	81	.....	.....	70	60	.....	.....	73	66	67	51	.....	.....	74	63	.....	.....	86	75	.....	.....
Range	20°		25°		35°		28°		35°		33°		32°		39°		40°		29°		35°		24°	
Monthly means	85°.6		82°.9		74°.7		70°.6		65°.7		61°.6		66°.9		60°.0		61°.0		69°.7		76°.1		82°.2	

Maximum, minimum, and mean temperatures—Continued.

STATION, GRAND HAVEN, MICH.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	69	58	69	58.5	79	69.5	53	36	43	34	32	18	54	41	38	11	28	20	42	22	46	30	78	70
2	70	58	75	51	78	68.5	57	44.5	38	26	35	23	46	34	17	4	30	12	38	24	50	38	70	57
3	70	64	69	55	75	69	65	52	36	30	40	29	39	22	27	9	35	26	42	35	53	36	64	53
4	72	61	68	54	69	61	62	53	45	31	45	37	30	12.5	19	9	45	22	44	36	47	38	58	49
5	75	66	75	61	73	59	53	45	45	31	43	39	43	23	38	8	48	42	43	38	52	40	62	48
6	73	62	73	54	69	60	49	42.5	52	29	42	36	37	26	43	34	63	48	48	36	50	38	66	51
7	73	53	64	54	73	50	56	46.5	52	29	41	36	44	36	40	31	62	28	44	34	66	48	79	56
8	73	53.5	70	47	75	67	51	40	48	36	41	33	49	40.5	41	25	31	22	43	32	50	42	83	63
9	74	57.5	74	59	72	55	51	33	44	35	35	22	50	20	42	33	47	30	56	29	53	39	70	58
10	73	64	70	60	62	48	49	37	49	36	40	31	20	9	57	34	64	37	53	38	50	38	80	61
11	72	54	66	57	65	42	40	31	53	44.5	37	30	28	12	51	35	63	32	62	36	53	39	84	66
12	73	55	68	58	64	50	46	31	52	42	41	29	22	14	45	34	34	20	66	51	54	43	76	61
13	67	62	68	61	67	46.5	51	38	42	33	39	28	28	18	54	37	23	15	58	47	55	39	80	65
14	76	54	74	59	68	56	56	39	45	33	34	17.5	35	26	42	26	28	17	50	39	67	40	78	66
15	78	62	71	62	71	60	48	35	43	34	40	32	41	24	28	21	28	21	47	38	62	52	81	66
16	78	63	71	61	65	47	48	31.5	38	28	37	16	39	34.5	30	17	34	24	46	39	69	48	79	67
17	75	63.5	66	57	50.5	41.5	48	41	35	25	16	10	43	38	31	24	31	15	41	36	66	54	73	61
18	72	59.5	65	55	53	34.5	41	34	46	31	18	12	49	37	43	18	21	7	45	35	70	55	61	50
19	70	54	63	55.5	53	44	51	33.5	46	34	20	11	37	26	40	29	26	8	60	32	74	61	59	49
20	72	56	71	49	52	43	56	48	43	30	47	17	27	21	40	24	25	17	57	44	75	58	60	52
21	75	60	67	48	49	40	59	50	39	20	48	41	25	14	45	29	28	13	55	39	73	55	66	54
22	74	60	58	42.5	56	40.5	63	53	37	18	47	40	44	19	32	14	34	25	54	47	57	47	72	59
23	71	57	65	43	62	51.5	61	52	42	30	46	32	40	29	15	5	37	30	53	38.5	57	41	78	63
24	76	53	70	46.5	64	51	57	48	34	24	49	30	30	23	32	11	38	25	52	38	63	42	75	62
25	75	67	74	51	61	51	55	46	44	20	43	28	31	21	43	20	37	31	54	37	63	50	75	65
26	71	60	82	58.5	64	40.5	52	42	42	31	38	26	36	15	38	27.5	37	29	57	47	69	47	78	63
27	71.5	54	81	67	64	54.5	42	36	32	22	29	19	40	33	28	21	36	26	70	51	70	55	70	60
28	76	55.5	80	64	62	47	55	35	42	26	40	25	49	31	31	32	28	21	51	42	75	56	69	62
29	73	58.5	77	63	63	49	57	47	26	2	47	26	38	10	30	21	26	19	47	37	65	57	69	61
30	73	61	74	50	53	45	58	37	24	4	59	43	33	15	.....	.....	33	24	45	29	76	50	73	57
31	72	54.5	80	59.5	.....	.....	37	33	.....	.....	59	45	48	31	.....	.....	37	23	.....	.....	84	59	.....	.....
Range	25°		39°.5		44°.5		34°		51°		49°		45°		53°		57°		48°		54°		36°	
Monthly means	67°.3		64°.6		58°.6		47°.1		35°.0		34°.4		31°.9		29°.6		30°.6		44°.7		55°.2		65°.7	

Maximum, minimum, and mean temperatures—Continued.

STATION, HALIFAX, N. S.

Day of month.	1875. July.		August.		September.		October.		November.		December.		1876. January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	72.6	52.0	76.8	49.4	72.9	49.0	62.5	53.9	51.2	29.9	9.1	− 1.0	47.6	30.0	33.3	22.3	31.7	19.5	37.0	26.4	44.3	32.7	63.8	36.2
2	77.0	49.9	75.9	49.1	76.3	48.4	59.3	37.5	40.8	31.1	19.0	6.3	39.8	30.0	45.0	14.9	31.4	12.0	47.0	27.0	48.3	32.2	75.0	37.8
3	73.7	46.7	71.1	48.8	73.1	60.3	57.8	32.7	41.4	32.6	22.4	4.3	45.5	28.9	17.2	2.2	27.3	12.0	46.5	22.8	51.3	30.0	64.8	48.7
4	72.8	45.3	80.0	56.1	68.8	57.4	60.0	40.8	37.5	30.2	28.8	19.8	32.1	9.0	40.3	12.3	31.7	5.1	36.5	19.6	38.9	32.6	71.9	50.0
5	70.0	55.0	74.9	60.2	80.2	59.2	69.0	53.0	35.3	29.0	30.7	8.7	14.2	3.0	22.8	− 5.6	37.9	13.8	33.6	28.0	48.0	32.3	65.0	46.4
6	63.4	52.0	80.6	60.7	71.7	53.0	56.0	42.1	45.7	21.1	29.8	13.1	33.7	11.0	32.4	− 8.2	40.8	30.3	35.4	27.0	40.3	35.1	60.2	52.4
7	68.0	65.0	77.8	58.2	73.2	51.7	54.2	42.0	43.5	28.0	34.0	15.6	31.7	6.7	46.2	30.5	50.1	31.3	51.8	26.3	66.0	37.8	61.0	52.2
8	74.0	49.8	73.6	60.9	72.5	44.4	68.0	40.0	45.3	25.0	33.2	19.3	26.8	− 3.9	32.5	18.8	50.3	30.3	37.6	31.0	53.8	37.3	71.0	46.1
9	77.9	47.1	76.0	59.3	71.1	54.5	61.6	38.0	46.1	34.1	35.6	28.0	35.0	19.0	23.8	8.8	45.0	25.0	42.3	30.6	45.0	35.1	68.9	46.2
10	62.3	49.8	82.1	61.0	77.8	49.3	56.2	45.0	45.0	33.2	37.9	28.0	37.2	24.8	22.9	4.0	29.0	21.5	43.9	31.1	55.6	37.8	73.7	47.3
11	72.6	51.8	81.0	60.0	60.0	40.1	56.1	49.8	50.2	37.8	35.9	27.0	30.4	6.0	35.0	− 3.2	32.8	23.4	43.2	31.3	53.2	39.4	61.7	51
12	76.9	51.9	79.8	58.5	67.2	36.9	54.1	39.0	40.0	32.2	36.7	29.6	22.3	6.0	48.0	31.0	40.2	23.1	44.5	30.0	61.4	39.2	63.7	49.3
13	75.2	51.2	84.0	62.8	70.2	44.4	56.7	32.5	56.9	31.3	35.2	31.4	14.9	− 0.8	43.1	20.8	40.1	29.0	51.1	27.0	54.4	39.4	71.5	51.9
14	74.8	52.2	80.0	63.3	73.3	47.1	53.2	29.3	40.0	29.7	32.8	24.9	17.8	4.9	27.8	15.9	44.8	17.3	42.2	36.5	58.3	39.3	67.2	52
15	73.8	50.8	85.0	63.5	72.5	43.8	56.9	35.8	36.4	28.0	26.3	17.2	32.6	6.0	42.0	17.2	20.0	7.4	46.0	32.4	56.6	32.8	76.9	54
16	70.3	52.0	75.1	58.0	71.5	48.9	61.3	49.0	39.8	26.8	33.1	11.2	33.9	11.3	42.1	30.1	33.3	15.2	56.6	32.8	54.2	32.7	76.9	57.3
17	72.1	54.1	74.8	59.8	70.0	50.3	60.2	41.3	45.3	28.4	34.9	21.7	21.3	10.6	40.2	21.0	28.5	14.0	52.4	35.1	62.0	29.9	78.1	55
18	74.2	57.1	73.9	61.0	60.0	46.2	59.2	40.1	31.6	23.2	34.1	12.0	35.1	15.7	35.4	17.6	32.1	16.0	48	30.5	57.2	30.7	80.8	59.6
19	69.2	50.4	84.5	63.0	60.2	42.2	63.8	41.9	43.0	20.8	15.8	− 3.1	42.8	33.8	37.5	24.0	23.1	7.1	50.2	27.9	57.2	42.0	74.9	61.4
20	78.1	48.3	76.3	63.4	69.5	40.0	56.4	41.0	42.5	25.1	7.2	− 9.7	45.1	26.0	36.5	20.3	27.4	9.5	52.8	33.1	64.6	42.1	79.2	59.6
21	73.3	51.5	74.0	62.1	66.5	41.8	53.6	36.0	46.0	19.1	36.1	5.8	26.0	9.2	31.4	11.2	32.3	14.0	53.6	32.7	63.3	35.4	68.1	59.5
22	72.2	54.1	75.0	61.0	60.0	38.3	48.7	29.0	36.8	12.8	45.9	30.0	17.1	2.1	31.1	12.0	39.0	28.5	52.2	30.0	47.3	36.5	72.8	55.2
23	69.3	53.3	74.8	54.0	60.1	36.1	52.2	28.0	36.3	10.0	44.4	31.8	30.1	− 1.2	33.5	10.0	39.0	24.9	53.3	26.8	48.2	35.4	72.7	49.9
24	70.0	57.7	73.5	52.3	65.8	36.5	50.0	39.3	45.0	30.0	31.8	7.0	30.3	4.4	11.2	−16.3	42.0	24.4	41.4	25.0	67.2	32.2	72	48.2
25	73.4	59.2	72.5	50.2	72.8	45.4	55.0	42.0	31.5	15.8	37.0	7.1	21.6	− 5.3	27.7	−16.9	41.6	23.0	46.0	22.6	64.9	37.7	78.8	53.8
26	75.1	54.9	77.0	52.3	60.3	49.0	47.7	29.3	39.3	12.0	37.8	30.0	26.9	1.2	27.2	11.2	36.3	30.0	36.0	22.3	62.8	39.0	83	51.9
27	62.3	54.3	84.8	51.9	67.0	42.1	52.8	28.0	46.7	29.2	47.5	24.0	29.8	− 8.8	34.2	5.0	37.0	27.6	39.5	31.0	63.2	42.2	80.6	55.2
28	72.7	56.3	84.9	53.9	63.9	36.1	50.2	37.9	29.6	11.8	24.0	9.1	35.1	19.8	34.0	4.9	51.0	27.0	41.3	31.2	70.0	44.0	68.9	54.3
29	81.0	57.1	81.0	57.2	57.6	32.0	38.5	31.0	40.8	13.3	32.8	18.4	39.1	24.1	27.2	14.6	38.1	27.0	44.8	32.0	60.2	46.2	84.8	54.5
30	72.8	55.9	76.9	56.0	64.0	40.1	45.8	31.0	13.3	4.3	38.0	18.0	38.3	2.1	.....	.....	44.9	31.2	44.7	29.2	54.7	37.0	69.8	52.4
31	75.2	52.6	79.8	56.2	.....	.....	48.5	35.3	.....	.....	44.8	34.1	26.2	− 3.8	.....	.....	46.8	25.8	.....	.....	63.2	33.0	.....	.....
Range	35°.7		36°.2		48°.2		41°.0		46°.9		57°.2		56°.4		64°.9		45°.9		37°.0		40°.1		48°.6	
Monthly means	.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....	

Maximum, minimum, and mean temperatures—Continued.

STATION, INDIANAPOLIS, IND.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	81	69	67	59	88	69	54	45	57	32	46	29	69	56	43	10	37	20	46	29	55	33	74	70
2	79	68.5	63	58.5	90	71	61	40	50	32	48	32	51	41	17	— 3	33	13	45	33	54	45	83	68
3	87	71	74	61	86	73	70	44	50	39	48	38	49	31	26	12	40	20	51	41	63	36	74	61
4	91	71	76	58	76	64	66	57	49	36	57	47	51	29	24	3	56	30	54	34	69	51	68	55
5	91	73	78	67	82	59	66	54	51	35	54	50	55	42	35	5	56	40	49	39	60	53	72	51
6	83	72	74	67	83	65	64	49	52	30	54	49	42	27	46	28	72	51	56	35	75	52	81	55
7	81	66	78	63	79	57	60	46	54	30	50	43	51	30	49	34	62	32	57	40	75	60	82	62
8	82	63	80	64	87	65	61	45	55	35	43	37	62	45	51	35	50	26	57	34	64	50	84	68
9	83	64.5	81	62	85	71	58	38	51	35	37	34	61	20	59	48	67	42	60	37	64	70	84	69
10	82	70.5	80	68	80	55	52	41	47	38	40	31	20	13	64	51	71	57	70	43	60	49	86	67
11	83	69	75	65.5	71	46	45	33	57	35	36	28	34	11	64	43	65	41	70	56	72	42	90	70
12	85	71	79	60	72	59	46	28	61	42	38	26	31	19	56	35	41	28	70	60	70	57	91	68
13	88	70.5	80	62	74	55	54	28	49	40	38	29	26	9	66	45	34	22	73	61	68	44	83	67
14	83	72	82	63	77	55	62	37	43	35	34	22	42	17	53	32	46	27	62	43	75	49	80	69
15	83	71.5	84	67	78	59	53	41	47	39	48	30	43	34	35	21	50	38	65	42	81	63	83	69
16	91	67	82	69	77	61	44	36	40	(*)	39	16	41	36	26	18	56	34	53	42	81	64	81	68
17	92	74.5	72	63	61	48	67	35	35	.....	16	— 1	50	39	34	19	34	17	48	37	84	67	70	54
18	80	71	75	60	58	42	49	37	50	.....	24	0	57	49	44	22	25	12	52	38	79	64	63	51
19	74	67	71	58	59	40	53	28	55	.....	34	14	51	32	44	35	28	14	62	36	85	67	68	51
20	80	70	76	56	53	40	62	35	55	.....	56	31	43	26	48	26	28	21	77	52	86	69	69	53
21	82	66.5	77	61	55	35	72	45	48	.....	54	51	48	30	48	31	27	11	67	51	81	68	76	55
22	77	71	70	57	57	43	75	49	43	.....	59	51	54	41	47	25	37	15	68	52	68	52	85	60
23	81	68	74	51.5	62	36	69	45	44.5	.....	59	52	56	33	31	14	39	29	60	46	65	45	90	67
24	84	64	78	55	69	40	74	52	34	.....	64	51	33	25	44	18	48	34	57	43	91	47	85	67
25	80	68.5	81	56	63	52	73	49	47	.....	57	38	36	23	61	35	52	35	60	40	75	55	85	73
26	81	70	83	59	67	41	66	44	52	38	67	34	44	24	59	45	48	32	66	41	80	52	87	72
27	81	70	84	64	72	47	55	37	43	31	38	28	53	44	64	51	49	30	73	52	83	57	88	68
28	77	68	85	62	77	52	70	47	45	33	42	28	57	46	55	30	41	28	61	53	85	59	76	65
29	82	68	80	67	79	54	71	62	36	14	53	35	54	18	37	25	37	19	71	45	85	62	79	66
30	80	70	84	66	62	51	62	35	34	15	64	50	35	16	.....	.....	39	27	50	46	86	62	73	65
31	73	66	86	65	.....	.....	42	31	.....	.....	68	50	47	23	.....	.....	47	27	.....	.....	83	70	.....	.....
Range	29°		34°.5		55°		47°				69°		60°		69°		61°		48°		58°		40°	
Monthly means	75°.9		70°.3		63°.4		51°.4		40°.5		41°.5		39°.1		37°.3		37°.7		53°.0		66°.0		72.1	

* Minimum thermometer broken.

Maximum, minimum, and mean temperatures—Continued.

STATION, INDIANOLA, TEX.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	92	77	97	77	92	79	80	64	79	62	55	47	60	51	67	45	80	65	75	62	84	72	89	77
2	93	78	95	78	91	79	73	65	82	68	70	54	63	50	55	33	70	57	77	59	76	61	88	76
3	93	78	91	77	90	77	70	65	82	71	71	60	64	56	65	47	65	58	83	58	72	58	88	77
4	90	77	94	77	87	79	78	68	83	65	63	58	66	58	52	38	73	63	78	64	82	67	86	76
5	94	77	93	78	92	78	85	72	67	54	69	52	72	60	55	43	76	65	69	52	83	72	82	72
6	88	78	94	77	91	79	89	74	60	52	64	41	66	55	61	51	72	49	64	51	83	74	83	72
7	87	78	95	79	92	77	84	73	62	49	59	40	67	58	75	57	65	51	74	60	82	65	88	72
8	93	74	94	79	95	78	77	71	72	62	56	44	74	60	72	58	76	57	71	56	72	59	90	72
9	89	77	93	77	93	79	78	65	71	52	64	44	76	66	76	64	77	66	70	60	81	64	87	77
10	91	77	95	77	89	78	79	66	60	(†)	70	48	67	45	77	64	75	67	77	66	84	64	89	77
11	92	76	96	77	88	77	87	65	69	46	67	51	53	42	73	66	79	54	80	69	83	64	90	76
12	91	75	96	77	86	78	81	63	78	60	72	48	55	47	77	65	60	42	78	70	80	66	86	71
13	93	77	93	78	85	75	85	68	78	66	71	52	56	48	78	65	60	46	75	65	79	67	86	70
14	92	78	92	80	84	75	83	71	78	67	68	55	55	45	68	55	70	58	69	54	82	71	94	70
15	92	78	93	79	86	74	77	56	78	69	71	49	70	51	67	51	78	65	76	57	82	72	93	72
16	92	78	94	79	75	(*)	78	57	70	52	69	61	73	57	67	57	67	48	79	60	85	73	94	74
17	92	77	95	80	.....	.....	80	64	59	42	61	47	74	65	62	44	76	57	72	60	84	73	94	78
18	93	76	86	71	74	62	79	62	69	50	61	50	72	57	59	46	65	52	75	61	83	72	86	71
19	96	77	81	75	77	63	70	59	79	63	66	60	64	48	64	54	72	55	80	65	84	72	90	79
20	95	77	81	71	80	65	70	57	80	70	74	61	69	51	63	61	61	(†)	78	67	86	74	93	72
21	94	79	84	74	76	69	72	60	72	64	75	62	75	61	68	51	54	41	74	67	81	74	90	79
22	95	79	87	73	75	65	75	65	71	57	67	63	77	65	52	42	69	53	80	67	84	72	91	78
23	94	79	90	76	76	67	81	67	80	67	75	66	78	66	61	43	73	60	80	69	85	74	91	78
24	93	79	81	72	76	69	82	67	70	61	74	65	67	53	62	49	78	57	83	70	84	72	92	78
25	91	79	89	74	74	(†)	83	72	74	60	75	67	69	58	73	56	80	60	79	70	83	74	90	78
26	91	71	87	77	75	65	75	62	72	66	76	64	76	65	75	62	69	62	82	69	87	72	90	80
27	90	78	91	78	75	63	80	66	74	64	65	49	77	66	79	64	80	63	81	70	82	73	90	80
28	93	76	90	78	75	61	83	68	72	66	77	65	77	69	67	61	63	46	83	71	77	71	90	79
29	93	78	92	78	76	65	84	73	67	40	76	61	70	48	73	64	66	48	85	70	81	71	94	76
30	93	79	93	78	79	66	74	60	54	41	77	69	57	43	.....	.....	73	53	83	72	86	73	84	76
31	95	78	93	78	.....	.....	72	61	.....	.....	76	58	68	55	.....	.....	79	67	.....	.....	85	73	.....	.....
Range	25°		26°		.....		33°		.....		37°		36°		46°		.....		34°		29°		24°	
Monthly means	84°.0		83°.2		76°.6		71°.8		65°.0		62°.0		61°.5		60°.0		62°.9		69°.4		75°.5		82°.5	

* No observation taken.

† Thermometer incorrect.

Maximum, minimum, and mean temperatures—Continued.

STATION, JACKSONVILLE, FLA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	90	71	95	72	87	71	84	70	69	43	64	54	78	60	68	47	78	46	79	55	90	66	86	71
2	90	70	86	73	87	68	78	65	76	48	61	52	80	60	66	36	74	51	71	61	88	64	93	72
3	93	71	92	72	90	68	83	71	77	48	60	49	80	57	72	39	54	42	68	60	72	59	83	73
4	93	71	91	72	94	72	82	70	80	57	54	42	67	59	76	47	64	38	76	53	75	54	90	72
5	90	74	93	69	95	72	82	70	72	66	68	49	75	53	55	44	72	52	80	51	82	63	93	72
6	91	72	90	72	98	73	84	71	71	55	70	61	73	57	75	43	76	56	79	53	88	64	86	71
7	90	71	91	72	94	77	86	67	71	55	72	56	67	48	67	44	77	57	81	61	89	72	84	67
8	90	74	90	73	90	73	80	63	67	54	64	45	72	45	65	53	76	54	71	62	91	71	84	66
9	90	72	92	74	87	72	74	57	69	48	55	39	71	48	71	52	75	41	62	59	79	61	85	66
10	95	72	92	74	92	70	78	58	77	57	60	34	74	54	76	52	80	44	74	56	79	55	82	73
11	98	76	91	72	94	73	71	64	63	47	59	39	57	38	78	57	82	54	80	62	81	58	86	73
12	97	76	92	72	81	69	68	58	67	46	62	46	57	35	79	52	82	60	83	66	82	59	87	73
13	99	77	91	71	85	68	68	51	72	46	68	39	52	35	77	62	69	52	84	67	87	59	92	74
14	99	77	93	72	85	72	74	53	80	61	60	40	50	30	77	61	72	46	84	65	85	60	88	71
15	99	74	94	73	88	75	78	50	82	67	62	32	63	32	67	49	76	46	71	54	78	68	84	72
16	99	76	93	74	92	71	68	50	83	67	70	46	71	38	66	40	78	62	80	51	81	61	86	75
17	98	73	94	73	93	74	69	44	74	52	65	45	73	45	66	44	72	55	78	59	82	65	88	76
18	99	75	87	76	92	75	74	43	70	46	49	28	76	55	61	46	61	46	72	48	84	64	88	73
19	100	76	89	74	81	75	66	53	79	56	58	28	77	59	66	42	61	33	72	47	89	66	93	70
20	101	77	88	71	76	65	67	50	84	65	65	37	62	45	68	56	67	54	76	59	92	70	90	75
21	100	77	88	71	80	60	71	51	82	66	73	48	70	44	83	61	59	39	77	53	93	70	92	74
22	99	77	90	72	80	62	71	58	70	62	77	54	74	46	74	60	57	31	84	57	95	71	93	72
23	99	77	88	69	79	63	78	61	72	56	76	55	76	46	67	53	65	40	86	63	93	69	93	73
24	97	77	85	70	79	60	81	60	72	56	76	55	78	53	59	41	72	42	85	64	81	65	97	74
25	101	76	84	72	80	59	81	55	73	56	76	56	76	58	69	38	80	62	86	64	82	71	99	79
26	97	71	82	69	75	67	80	55	72	56	78	55	64	55	74	43	78	55	71	62	86	65	97	77
27	96	71	83	66	80	64	73	54	68	62	81	59	76	48	81	49	74	51	78	57	87	65	96	75
28	99	75	86	66	89	72	77	44	73	60	79	60	79	56	81	61	76	60	85	63	91	73	99	79
29	100	77	89	68	88	72	78	44	66	61	80	62	80	56	79	53	61	45	84	64	84	72	99	80
30	99	78	93	69	87	64	82	61	64	59	80	57	55	48	.....	.....	70	42	88	60	86	71	95	77
31	97	73	95	73	.....	.....	67	46	.....	.....	78	60	52	42	.....	.....	76	47	.....	.....	87	70	.....	.....
Range	31°		29°		39°		43°		41°		53°		50°		47°		51°		41°		41°		33°	
Monthly means	85°		79°.5		78°.1		66°.5		64°.4		58°		59°		60°.2		60°.9		68°.8		76°		81°.4	

Maximum, minimum, and mean temperatures—Continued.

STATION, KEOKUK, IOWA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	77	66	74	57	92	74	57	41	53	35	46	25	55	39	34	1	34	35	41	29	53	33	83	66
2	86	69	74	56	90	69	75	44	51	33	55	30	44	29	25	0	34	15	42	30	54	37	84	62
3	85	70	79	59	84	68	77	54	47	39	52	41	43	25	29	8	42	21	44	36	67	43	69	51
4	90	69	86	65	82	60	66	54	46	31	55	47	53	29	21	0	56	31	63	34	49	42	70	48
5	85	67	84	66	87	62	57	52	47	29	57	48	51	27	45	13	62	47	49	33	54	43	81	57
6	77	67	78	62	85	68	55	46	54	28	51	33	43	23	50	33	66	36	60	36	56	44	87	67
7	82	65	83	59	84	64	62	43	58	33	36	27	53	38	45	28	39	21	63	39	56	48	82	68
8	81	65	85	64	91	73	60	45	55	39	29	20	62	49	52	36	58	28	63	38	55	40	80	68
9	80	67	83	65	86	67	65	44	54	35	34	22	58	13	63	46	69	46	69	41	73	45	89	64
10	84	70	79	67	68	53	57	41	51	27	38	25	21	11	68	40	75	41	74	50	64	47	90	68
11	86	69	80	58	62	46	50	34	60	39	31	23	36	18	62	34	45	23	78	56	80	49	83	69
12	88	69	81	63	70	51	49	31	55	39	50	25	30	15	56	37	30	18	72	55	70	48	75	65
13	92	73	81	64	76	54	61	36	44	32	40	29	20	7	51	30	42	17	61	40	70	46	74	64
14	84	72	84	63	78	60	56	45	42	35	42	23	49	25	31	19	53	34	57	36	81	55	78	66
15	90	67	84	68	75	66	50	33	41	27	48	28	46	38	22	10	47	40	61	44	78	64	77	66
16	97	78	84	63	70	56	55	32	30	19	35	6	44	38	29	13	47	24	53	40	84	65	68	59
17	92	73	77	64	56	48	66	41	33	19	9	— 5	56	41	38	16	24	15	49	48	81	67	61	47
18	78	68	70	60	61	40	49	31	53	32	23	7	53	32	58	30	26	10	57	34	82	68	57	46
19	70	60	76	57	58	46	61	35	47	33	36	14	34	24	42	25	28	16	72	44	85	68	58	46
20	83	67	81	57	56	39	72	49	51	26	58	32	33	21	58	27	25	11	68	53	82	68	69	50
21	85	66	83	57	54	42	74	49	33	9	55	42	38	23	51	27	34	9	69	47	77	67	81	58
22	88	71	69	49	63	42	77	52	36	18	62	38	53	33	49	21	40	23	72	53	69	55	86	71
23	86	65	73	47	67	45	74	48	43	23	53	45	33	18	26	9	39	29	62	48	66	45	87	70
24	87	70	80	60	68	48	66	46	41	17	56	40	30	11	58	20	36	31	60	42	72	50	87	68
25	86	71	85	60	64	46	62	43	46	21	40	28	35	23	65	37	41	32	68	43	77	54	81	71
26	90	69	86	69	70	44	46	37	46	24	37	23	46	22	61	47	45	28	67	50	79	60	89	72
27	85	69	87	68	78	54	57	36	39	22	30	18	46	35	68	34	41	26	72	56	83	58	80	71
28	75	68	80	68	78	58	76	49	39	13	45	28	58	17	35	23	36	25	63	43	88	63	73	61
29	81	67	80	69	72	57	70	37	13	3	51	32	24	4	38	20	41	24	75	50	90	67	78	63
30	85	67	86	68	61	50	40	30	30	8	68	44	41	20	.....	.....	43	26	58	41	86	68	77	62
31	74	59	88	68	.....	.....	47	26	.....	.....	64	39	50	25	.....	.....	46	29	.....	.....	79	69	.....	.....
Range	38°		41°		53°		51°		57°		73°		58°.		68°		66°		49°		57°		44°	
Monthly means	76°. 3		71°. 6		64°. 3		51°. 1		35°. 3		36°. 5		34°. 1		35°		34°. 9		53°. 0		63°. 9		70°. 1	

Maximum, minimum, and mean temperatures—Continued.

STATION, KEY WEST, FLA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	86	76.2	87.5	80	89.8	80.3	91.2	78.1	77.5	69.2	82.2	74.2	79	71.4	80.8	70	82	72.3	82.7	74	87	73.8	92.2	79.1
2	84.2	77.7	87.8	79.2	93.2	78.7	89.8	79.3	79.8	71.4	83.4	74.8	80.3	72.5	77.8	70	80.2	72	82.6	74.4	88.8	74.5	86.2	79.7
3	88	78.3	85	76.2	86.9	78.7	87.3	80.8	80.2	72.7	84	74.4	68.3	72.4	80.8	69.9	74.2	65.1	83.8	74.6	86.2	73.6	85.2	78.5
4	86.3	78.3	87	74.5	88.4	79.2	88	79.8	85.3	74	82	73.2	76.5	71.3	81.8	73.2	74.1	65.3	79	69.5	82.5	70.2	86.8	78.7
5	81.4	75.3	87.4	79.3	90.3	81.3	89.8	79.8	84.8	77.1	83.1	75.1	78.8	71.2	79	72	75.2	66.1	80	71	86	76.5	88.4	78.7
6	85	75	87.8	80	87.1	79.9	89.8	78.4	87	76	83	76.7	74.9	70.6	81	72.7	78	68.8	81.8	71.3	86	78.8	87.8	79.3
7	86.2	76.8	87.9	79.2	87.8	79	89.8	80.2	84.8	78.1	80.7	74	75.6	69.7	79.3	71	79.3	71.2	80.8	71	86	78.2	86.1	73
8	86.3	77.8	88	79.5	87.2	79.2	88.9	73.6	85.9	77.3	76.2	69.3	75.3	67.7	81.7	72.3	79.8	71.2	84	72.2	84.9	77.5	82.2	73.6
9	86.3	77.8	90.3	76.8	86	77	89	75.2	84.4	75.8	74	67.4	78	69.8	80.3	70.7	84.1	69.3	83	75.5	88.2	75	86	74.8
10	86.3	78.7	89	77.8	89	78.1	87.1	75.6	84	76	69.1	60.9	75.2	69.6	81.5	71.2	80	69.8	87.6	75	78.2	72.3	85	77.4
11	87.8	78.8	86.9	79.8	90.2	79.8	85	73.1	76	69.3	74.5	59.2	75	68.6	81.5	71.3	79.3	70	84.2	74	80.2	73.1	86.2	79.9
12	86.9	79.2	90.2	79.4	87.3	80.1	85.1	75.8	72.3	67.5	76.3	67.8	71.8	65.9	80	70.4	81.1	72	83	74.8	86	72.8	86	79.3
13	90.8	79.7	87.8	78.9	83.8	73.9	84.5	75.3	80	69	71	63.7	69.2	62.5	75.2	69.2	80.2	70.9	82.1	73.5	85	74.3	89.2	79.3
14	92.1	79	89.3	78.8	85.2	73.3	82.8	75.4	33.5	73	76.5	63.7	65.1	58.6	81.5	72.8	81.6	71	82.8	75.1	84.2	71.5	90.2	80.3
15	90	75.4	88.3	89	86.3	79	89	74.9	84.7	75.4	68	61.2	70.6	63	75.4	67.8	81	73	86.8	73.6	83.8	74.3	89.3	80.4
16	89.2	78.8	90	80	87	78.7	85	76.3	85.5	74.8	71.5	61.1	75.8	64.8	69.5	64.3	85.7	73.7	79.2	70	85	74.4	92	80.8
17	88.7	78.9	88	73.2	87.1	79.7	82.7	72.8	82.9	75.2	77.1	67.4	77	67.2	74	62.5	85.5	74.4	79.7	71.2	84.1	75.5	90	81.8
18	86.9	79.2	90.3	77.9	87	80.3	84.9	74.5	81.3	74.7	71.2	58.5	78.5	67.8	76	66.3	76	68.2	75.6	70.3	84	76	90.1	81.2
19	87	79	88.2	80.5	84.2	77	81.2	74.4	83.6	76.7	67.8	58.5	83	72.6	79.8	68.8	79	62.5	77.2	68.7	84.8	76.1	90.3	76
20	86.8	79.8	88.1	80.5	82.3	74.3	78.2	74.8	83	74.7	74.8	63.8	79.5	72.3	81.8	72.8	82.6	72	78.5	69.2	85.8	75.3	88.4	75.8
21	87.2	79.5	88.3	80.9	81.4	75	75.8	71	82.8	73.4	77.7	68.5	78.5	71	81.2	73.8	76	63.8	79.3	69.9	85.6	75.6	88.5	78.3
22	87	80	88.3	79.4	85.5	77	81	71.7	82.8	73.8	77	69.3	78.8	70.8	84.8	73.2	68.2	59.2	80	70.2	85.5	76.6	86.8	79.7
23	86.3	79.7	87.8	78.7	86.1	74.9	85.6	74.7	82.2	74.4	76.8	68.3	79.2	71.6	80.8	71.8	74.8	63.3	82.2	72.5	87	76	91.2	79.8
24	86.7	81.1	90.5	80.8	85.3	77.3	81	74.9	79.8	74.3	80	69.9	80	69.3	76	66	79.2	67.2	83.5	73.8	86.2	77.7	88.7	79
25	87.8	79.9	86.8	79.9	85.4	77	82.8	76	77	71.6	81	72.6	78.5	70.3	73	68.8	83	72.4	87.6	73.8	85.3	77.6	88.2	79.7
26	87.7	79.2	83.9	77.8	90.4	79.8	87	76	83	73.6	81.4	73.2	79	69.4	78.3	68	85.2	74.6	84.9	74.5	84.8	77.9	90.5	79.5
27	87.4	80	83.2	72.8	89	79.5	83.6	75	81	73.2	81	73.8	79	69.7	81	71.8	83.2	72.6	84.6	72.8	80.2	72	80	81.9
28	86.8	79	87.2	74.5	90.3	79.5	85	77.8	82.1	74.3	80.8	72.8	80	73.1	83.2	73.4	82	73	83.2	72.4	84.1	74.7	87.2	81.5
29	88	80.2	89.2	79.4	88.7	80.3	85.5	72.5	83	75	80.3	72.8	82	73	79.2	71.5	74	66.2	87.1	74.9	85.8	75.9	88.3	81.3
30	87.3	80.5	88	80.3	87.4	79.7	88.1	77.6	85	74	79.8	73	82.8	70.8	.....	.....	69.3	64.5	85.6	75	87.5	77.6	87.3	81.4
31	88	80.3	86.9	79.9	.....	.....	79.8	72.8	.....	.....	80	72.9	74.5	70	.....	.....	78.7	64.5	.....	.....	91	78.2	.....	.....
Range	17°.1		17°.7		19°.9		20°.2		18°		25°.5		24°.4		22°.3		26°.5		18°.9		23°.8		19°.2	
Monthly means	82°.1		82°.6		81°.9		79°.4		76°.9		72°		72°.1		73°.6		73°.1		76°.6		79°.4		79°.4	

Maximum, minimum, and mean temperatures—Continued.

STATION, KINGSTON, CANADA.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	74.5	56.9	71.5	51.9	82.1	61.5	57.4	34.2	44.4	24.6	5.4	− 5.7	51.4	37.2	40.1	20.7	28.5	14.7	38.1	24.0	55.8	27.3	76.5	55.3
2	72.0	52.4	75.9	53.9	83.1	70.1	54.4	31.7	36.0	24.6	12.6	− 3.2	52.4	34.2	33.0	−11.9	24.7	11.5	40.9	20.2	51.8	34.7	69	54.3
3	79.5	53.9	64.3	57.9	77.6	67.0	60.7	37.0	34.5	23.4	39.3	3.6	43.7	17.2	25.7	−17.9	32.0	5.6	44.8	27.6	52.6	39.7	68	54.3
4	72.5	62.0	70.0	61.0	74.1	58.9	58.1	43.8	40.0	24.8	29.7	18.7	20.7	6.3	20.5	− 3.0	35.5	7.4	42.4	31.5	52.8	37.1	66	51.9
5	77.5	62.3	73.5	55.9	72.5	52.9	54.2	39.5	41.8	23.1	41.4	20.9	42.9	9.7	19.5	−18.2	42.4	20.2	46.9	32.6	52.9	36.7	63.1	48.9
6	73.7	63.0	82.8	62.0	74.7	59.2	57.4	36.7	43.1	28.4	35.5	19.7	35.8	8.3	46.0	12.7	48.2	35.5	46.6	31.4	60.5	45.8	63.5	48.8
7	76.3	57.2	69.2	63.5	71.3	50.6	59.4	41.6	46.4	31.7	34.0	20.9	25.3	5.8	48.9	29.6	51.6	38.5	45.2	28.1	64.5	43.0	68.8	48.2
8	77.7	60.2	70.7	62.7	77.5	60.7	53.4	37.7	36.0	27.9	32.1	21.3	39.0	20.6	44.4	21.4	49.4	22.3	46.6	21.6	60.9	41.0	70.9	54.1
9	77.7	58.9	73.5	59.9	81.5	65.2	51.9	35.7	42.6	26.6	30.0	22.4	46.2	34.3	41.4	14.7	34.1	18.7	42.9	13.2	63.5	39.2	72	59.1
10	76.0	61.5	78.0	58.9	74.0	44.3	56.2	41.5	42.6	28.6	27.5	13.2	44.9	7.7	29.7	15.7	35.5	20.6	47.4	21.7	55.7	40.5	72.1	55.5
11	73.5	54.1	80.0	66.3	61.4	39.5	48.4	35.4	44.6	30.1	35.0	15.2	27.5	1.6	47.9	23.8	42.2	22.4	46.9	29.1	63.0	42.8	84.6	56.9
12	71.5	55.1	78.0	68.5	66.5	40.3	47.4	23.6	51.6	32.7	36.0	23.4	21.0	5.7	43.1	26.2	46.2	34.7	51.4	28.8	55.7	41.6	83.1	64.5
13	71.7	58.9	75.5	67.5	69.5	55.2	50.4	25.4	47.6	30.7	43.1	17.2	8.7	− 4.4	37.3	24.1	47.1	5.3	53.2	33.6	58.4	40.4	83.6	64.8
14	71.5	55.4	77.4	64.0	70.3	56.0	56.6	38.7	39.3	22.1	22.0	2.7	39.5	7.3	37.1	19.1	32.1	1.8	56.9	36.9	49.4	34.5	78.5	64.7
15	78.8	59.4	83.0	66.0	72.5	57.2	58.4	42.8	42.4	22.8	35.0	− 5.3	36.0	14.9	40.0	23.4	21.5	4.0	46.6	34.6	51.4	41.8	86.6	66.8
16	76.0	64.8	79.3	67.6	57.4	44.8	54.6	35.1	48.7	26.1	38.1	23.7	38.0	31.5	29.6	19.3	27.7	11.2	47.9	33.2	61.5	39	81.8	69.2
17	77.5	61.0	78.0	67.5	48.6	37.9	47.0	31.9	39.6	17.0	35.3	− 7.7	39.1	33.1	30.0	10.7	39.3	16.2	50	30.9	57.7	45.8	77.5	69
18	67.5	57.4	74.2	63.5	57.8	32.0	50.5	33.9	38.5	13.2	12.6	−15.2	48.2	36.5	26.7	10.2	27.8	− 0.3	41.4	30.2	65.3	44.2	72.5	62.5
19	69.5	48.8	70.3	61.0	56.4	43.0	54.6	29.1	48.2	28.7	2.7	−21.1	46.7	33.7	40.3	16.7	19.6	− 2.7	41.6	31.7	65.7	48.6	73.5	52.6
20	75.1	56.4	74.7	59.1	59.0	40.8	54.6	38.2	36.1	29.1	31.7	−26.3	26.3	23.8	39.7	10.5	24.1	1.8	44.6	30.1	65.7	48.5	69.5	59.1
21	77.0	62.0	78.5	64.7	58.9	38.7	60.2	44.6	47.2	19.2	44.4	31.7	27.5	9.9	40.8	0.7	31.0	19.2	47.2	34.9	75.3	51	64.5	57.6
22	75.5	56.9	71.5	55.9	53.4	36.0	58.6	39.9	28.5	12.2	41.5	31.4	19.6	7.1	47.4	9.3	39.3	16.2	47.1	33.4	57.8	36.7	70.7	50.3
23	74.5	64.5	68.6	48.8	58.6	32.9	61.0	50.1	58.6	22.9	46.4	23.1	34.3	17.0	12.2	− 6.2	35.1	8.2	52.9	35.7	48.9	34.7	72.5	58.4
24	73.5	54.4	73.7	51.2	62.3	51.1	59.6	49.1	52.7	20.5	37.0	11.7	28.1	10.0	9.9	−11.4	36.5	8.3	60.4	35.5	63.2	42.1	80.3	58.1
25	78.5	59.4	76.9	54.1	63.0	51.3	59.0	34.7	33.3	15.2	42.9	27.1	29.3	9.9	15.4	− 4.2	41.0	13.9	49.2	36.7	63.3	46.6	79.5	58.1
26	76.5	66.5	79.7	57.0	65.5	40.3	51.9	33.3	56.6	27.9	59.9	22.2	20.6	1.8	15.0	2.0	37.3	29.1	56.4	33.6	63	41.8	82	63.2
27	77.7	61.5	80.3	59.8	64.0	44.8	46.4	37.3	40.4	16.6	46.2	16.7	42.4	17.0	18.6	0.3	43.0	27.6	58.9	35.7	67.5	43.3	77	64.8
28	76.2	59.6	79.7	62.5	53.6	38.4	48.6	28.8	38.7	14.7	57.2	17.6	38.3	31.5	21.9	7.3	35.3	25.1	64.7	37.7	70.3	49.8	72	61.5
29	81.3	61.7	28.3	57.2	57.0	34.9	49.2	34.1	30.4	− 6.3	38.3	21.4	51.7	14.7	29.3	13.2	43.4	22.7	48.4	33.3	64.1	42.2	73.3	56.4
30	82.0	58.9	82.2	61.7	63.5	39.2	57.7	35.4	− 0.1	−14.2	47.9	37.5	20.7	2.3	.....	.....	34.5	22.4	44.6	36.2	60.5	37.5	75.5	56.7
31	71.1	50.1	81.5	63.3	.....	.....	50.6	28.6	.....	.....	49.2	38.1	33	14.3	.....	.....	40.4	22.1	.....	.....	76.1	44.6	.....	.....
Range	33°.2		34°.2		51°.1		37°.4		72°.8		86°.2		56°.8		67°.1		52°.1		51°.5		48°.8		38°.4	
Monthly means	.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....	

Maximum, minimum, and mean temperatures—Continued.

STATION, KINGSTON, JAMAICA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	86	78	86	79	85	76	85	76	87	75	84	72	83	72	85	71	82	72	83	74	81	75	85	78
2	85	77	87	77	86	75	86	77	88	77	85	73	85	74	84	72	85	73	83	73	84	76	86	78
3	85	77	87	77	86	76	87	76	87	77	85	74	86	75	85	72	83	73	85	75	84	77	84	77
4	(*)	(*)	87	78	86	77	88	76	86	76	85	74	85	74	82	72	82	73	84	73	85	78	.....	.....
5	85	77	87	80	88	76	87	75	86	76	85	73	83	75	84	72	84	72	83	74	84	77	.....	.....
6	84	76	88	78	88	76	86	75	86	75	85	74	82	73	84	72	86	73	83	73	85	78	.....	.....
7	86	75	86	77	80	73	86	75	.....	.....	85	76	84	73	85	74	85	71	81	73	86	77	.....	.....
8	84	77	87	77	87	76	85	75	88	76	85	75	84	74	83	71	84	69	81	74	86	77	.....	.....
9	76	.....	83	77	86	77	86	76	88	75	85	75	84	73	83	69	82	69	84	73	85	75	.....	.....
10	84	77	85	77	81	75	85	75	86	76	83	75	84	72	84	70	82	71	83	74	84	76	.....	.....
11	84	76	85	76	87	77	81	77	86	74	79	74	84	70	84	71	83	69	84	74	85	76	.....	.....
12	83	76	86	77	88	78	87	78	86	75	80	75	83	73	83	71	83	70	80	75	85	76	.....	.....
13	85	77	86	78	84	76	87	77	87	75	84	73	84	74	82	71	81	71	76	75	84	76	.....	.....
14	85	78	86	76	82	76	87	77	87	74	80	73	83	71	82	69	83	70	86	75	84	77	.....	.....
15	86	75	85	77	84	76	86	76	86	76	85	74	83	70	81	69	84	72	86	74	84	76	.....	.....
16	86	77	87	79	85	76	86	76	87	76	84	72	83	71	80	69	79	70	85	75	85	77	.....	.....
17	(*)	.....	85	78	85	75	86	77	88	75	84	74	83	71	84	69	81	70	84	75	86	77	.....	.....
18	.....	.....	87	77	86	77	88	78	84	73	86	76	83	71	84	71	83	72	84	75	84	76	.....	.....
19	.....	.....	82	78	86	78	87	77	86	73	83	75	86	72	83	71	82	71	83	74	85	76	.....	.....
20	.....	.....	87	77	87	78	86	75	86	74	85	76	85	72	83	71	86	71	83	75	84	75	.....	.....
21	86	78	87.5	77.5	87	77	85	75	85	74	88	73	84	70	83	71	82	74	82	72	84	75	.....	.....
22	(*)	.....	89	78	85	76	86	76	86	74	88	76	83	72	84	73	82	73	83	73	84	74	.....	.....
23	.....	.....	87	79	86	75	80	76	86	75	87	76	85	74	82	73	83	75	82	74	84	76	.....	.....
24	86	78	90	79	86	76	84	77	87	75	84	74	86	73	82	72	84	73	83	74	85	75	.....	.....
25	84	76	85	77	87	76	86	79	85	75	88	74	83	72	82	72	81	73	83	75	85	76	.....	.....
26	83	78	86	78	87	75	88	76	86	74	84	73	82	71	81	72	82	71	83	74	85	76	.....	.....
27	86	78	86	78	86	77	88	79	86	73	84	76	84	71	82	72	83	74	82	71	84	75	.....	.....
28	86	77	87	77	86	76	88	77	85	74	(*)	.....	86	73	82	73	83	73	85	76	83	78	.....	.....
29	85	78	88	77	87	77	87	77	86	75	84	71	82	73	82	73	83	74	83	76	84	80	.....	.....
30	85	77	87	77	89	76	87	76	86	73	84	72	85	72	.....	.....	83	74	85	76	84	80	.....	.....
31	87	76	.....	.....	.....	.....	78	74	.....	.....	84	74	86	73	.....	.....	83	74	.....	.....	85	80	.....	.....
Range	.....	.....	.....	.....	16°		14°		.....	.....	.....	.....	16°		16°		17°		11°		12°		.....	.....
Monthly means	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* No observation.

Maximum, minimum, and mean temperatures—Continued.

STATION, KITTY HAWK, N. C.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	94	73	86	72	75	68	82	66	58	37	46	28	67	52	52	42	52	38	49	42	56	42	65	58
2	79	66	90	73	77	68	66	53	53	48	46	40	73	58	47	32	52	34	46	41	53	45	82	58
3	76	67	90	72	91	72	69	58	57	40	53	46	64	48	53	31	38	31	64	45	49	45	90	69
4	85	69	82	70	93	74	75	64	68	49	52	46	48	45	53	36	47	31	60	43	57	44	83	72
5	92	71	87	69	81	68	83	62	51	48	59	48	55	43	43	33	54	33	57	40	66	50	75	61
6	92	75	88	72	91	70	76	65	52	48	57	42	56	43	59	42	69	43	58	43	80	62	75	60
7	91	70	90	70	77	72	70	59	53	44	52	45	60	35	59	41	74	52	70	43	85	65	84	60
8	84	70	75	68	83	69	69	58	54	50	53	46	62	41	47	44	60	44	57	42	85	66	85	68
9	82	70	80	66	84	63	65	60	54	50	48	40	64	41	56	43	46	38	49	37	77	64	82	68
10	92	75	83	67	90	70	71	61	67	47	45	34	60	39	60	48	59	38	56	39	75	55	84	69
11	88	76	87	68	70	64	64	57	53	41	54	33	40	29	72	47	56	46	68	46	67	52	85	66
12	90	70	81	70	73	63	57	50	62	42	47	38	45	28	62	46	65	45	70	53	77	54	84	65
13	85	73	80	69	74	61	59	53	67	46	53	38	33	24	62	45	64	44	79	52	70	55	79	66
14	94	75	83	68	74	69	63	57	66	50	52	32	33	22	71	51	45	38	81	66	66	49	83	66
15	86	74	81	62	73	69	66	55	59	53	47	28	46	28	62	46	52	38	70	49	76	53	83	66
16	90	76	88	72	84	64	63	48	73	53	59	40	54	40	53	37	68	46	75	53	75	52	80	68
17	93	78	87	75	83	69	57	41	54	39	54	24	61	44	52	33	63	45	63	48	62	56	78	66
18	98	80	87	69	73	62	69	44	50	33	30	18	67	50	46	37	45	29	54	46	80	57	75	66
19	76	70	84	68	78	59	57	48	64	44	37	28	72	57	56	33	32	20	52	42	79	56	81	70
20	87	71	88	72	70	61	57	41	69	53	52	36	61	40	52	41	61	32	69	46	77	64	87	72
21	87	73	85	68	66	61	69	46	60	57	66	37	62	36	54	41	59	34	71	54	81	64	87	71
22	90	71	81	72	65	56	66	53	62	43	64	52	60	38	59	37	44	29	57	52	85	71	85	67
23	93	78	85	70	64	60	69	54	67	48	63	50	73	54	49	25	50	32	72	51	74	54	87	66
24	89	77	79	70	66	59	75	59	67	49	62	51	61	44	41	18	50	39	58	50	68	55	93	75
25	86	77	78	66	75	62	75	58	52	45	71	53	48	40	55	34	63	47	57	44	71	52	92	75
26	98	78	76	65	67	55	77	58	68	50	73	56	46	36	63	39	60	47	57	43	75	62	89	75
27	96	77	72	65	74	56	69	55	63	48	68	47	71	42	70	43	65	40	72	49	74	59	97	78
28	94	72	84	69	75	59	65	52	57	46	53	45	71	52	69	47	65	48	78	58	75	63	92	79
29	94	74	76	70	76	66	73	56	65	45	56	44	72	49	49	39	56	46	68	51	85	67	95	76
30	94	71	77	69	82	64	73	54	45	30	64	49	49	34	.....	.....	58	43	82	48	80	62	92	76
31	95	70	78	69	.....	.....	57	41	.....	.....	66	48	44	34	.....	.....	54	43	.....	.....	65	58	.....	.....
Range	32°		25°		38°		42°		43°		55°		51°		54°		54°		45°		43°		39°	
Monthly means	79°.7		75°.9		70°.5		60°.7		52°.1		47°.3		48°.5		46°.6		46°.8		54°.6		63°.4		75°.3	

Maximum, minimum, and mean temperatures—Continued.

STATION, KNOXVILLE, TENN.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	91	66	88	69	88	66	69	49	65	30	56	42	70	47	42	19	51	34	55	43	58	44	75	67
2	86	71	76	66	90	67	64	41	70	50	49	40	62	50	26	12	50	25	64	48	50	45	88	66
3	85	68	74	64	89	66	66	40	70	51	52	46	54	44	33	22	47	21	60	46	66	40	83	65
4	89	68	83	64	89	71	76	53	67	45	57	48	54	34	33	19	53	26	67	42	74	40	81	62
5	94	66	84	60	90	63	79	56	60	44	57	49	59	31	35	10	61	30	74	40	71	50	78	58
6	91	72	83	63	84	64	72	57	59	44	59	50	54	39	38	21	67	38	62	40	87	53	79	56
7	89	70	83	66	89	63	60	49	51	41	51	44	55	28	47	35	65	42	68	34	74	60	86	54
8	88	68	83	60	89	63	68	40	53	46	45	34	61	32	62	38	57	32	67	43	72	57	85	60
9	84	73	86	61	90	65	70	43	51	44	36	31	67	51	59	41	69	35	72	39	65	49	85	61
10	83	68	83	63	84	69	71	45	53	41	39	31	53	25	69	55	77	48	71	42	76	48	91	65
11	82	67	83	63	71	63	70	42	55	31	47	31	33	20	73	57	74	51	76	47	80	45	89	66
12	79	68	78	61	65	57	50	34	61	31	39	31	39	25	66	46	71	36	80	54	84	52	79	70
13	80	70	85	63	79	61	59	33	65	35	44	30	30	19	68	47	50	33	74	63	72	59	85	68
14	84	69	76	64	84	66.5	62	34	62	49	43	28	37	15	63	44	57	31	65	48	80	49	87	65
15	88	69	75	63	86	64	56	41	68	45	51	25	42	22	45	36	56	43	65	40	81	57	76	62
16	84	67.5	81	66	86	64	48	36	59	34	52	37	44	35	43	26	64	50	60	47	85	63	88	66
17	94	69	80	65.5	69	57	59	29	37	24	41	13	60	41	44	27	51	29	55	42	84	60	76	66
18	93	73	77	65	59	52	54	44	53	29	26	7	67	53	45	24	31	20	55	37	77	64	78	58
19	89	69	75	57	66	52	54	40	50	43	46	22	64	36	55	24	39	18	67	32	87	61	76	53
20	85	66	79	58	64	48	62	33	74	48	50	24	58	27	59	30	39	25	76	41	89	64	80	56
21	81	70	81	57	61	43	69	34	69	46	56	29	50	27	47	41	30	21	73	54	88	64	82	61
22	84	68	77	62	65	44	70	38	57	42	62	53	48	37	50	34	38	13	70	56	83	63	79	63
23	82	71	81	63	63	44	68	48	54	46	64	49	67	47	41	27	45	27	79	52	75	60	84	59
24	85	69	82	63	68	53	71	45	53	40	69	59	57	37	49	20	52	38	74	52	81	54	89	67
25	86	68	85	62	66	56	75	43	50	34	68	54	47	33	65	39	55	41	62	45	69	63	84	64
26	90	68	84	62	63	46	65	51	50	45	71	51	51	36	65	35	54	38	71	40	82	61	87	65
27	89	68	82	62	73	42	67	43	57	46	59	42	65	46	63	45	46	33	79	45	75	61	86	68
28	86	68	82	61	65	46	72	37	59	38	53	47	74	62	62	46	50	33	70	56	85	61	88	70
29	90	70	83	62	72	51	67	43	58	39	67	52	64	28	55	32	44	28	75	45	85	61	86	67
30	88	69	84	64	77	55	68	45	50	33	65	48	41	22	.....	.....	58	31	74	50	88	62	90	68
31	88	69	86	64	.....	.....	53	36	.....	.....	70	45	45	23	.....	.....	68	32	.....	.....	88	64	.....	.....
Range	28°		31°		48°		50°		50°		64°		59°		63°		64°		48°		49°		38°	
Monthly means	65°.3		64°.7		57°.3		44°.7		31°.7		31°.9		25°.9		24°.9		27°.5		41°.9		65°.9		71°.9	

Maximum, minimum, and mean temperatures—Continued.

STATION, LA CROSSE, WIS.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	72	65	75	56	80	68	51	36	46	33	36	22	36	31	15	− 7	31	15	44	28	48	38	78	70
2	72	62	76	54	75	65	65	38	45	32	44	30	34	21	17	−13	35	0	37	35	47	42	72	58
3	83	69	83	56	75	66	64	54	45	31	44	39	21	1	16	− 2	42	7	40	33	49	39	59	48
4	78	70	80	63	76	59	54	48	46	28	50	42	38	0	12	−10	49	29	51	31	52	35	59	49
5	70	63	81	65	76	66	54	39	48	26	50	45	38	17	47	9	51	42	41	31	50	39	76	50
6	75	59	75	61	77	57	51	38	52	34	47	38	36	11	40	27	50	25	54	36	46	42	80	57
7	82	59	80	60	76	66	51	44	57	38	38	31	43	29	27	13	29	15	48	33	50	45	79	60
8	83	63	81	60	85	70	50	36	49	41	31	22	48	37	35	14	36	17	58	30	59	41	76	67
9	86	68	74	60	75	58	50	38	44	36	30	24	40	1	37	29	44	28	60	40	62	47	87	67
10	80	67	72	59	62	48	43	35	52	27	37	27	5	− 7	47	34	43	34	55	45	64	42	87	63
11	79	56	72	57	65	46	42	34	56	39	28	22	24	1	41	18	43	11	57	43	60	48	85	71
12	88	63	73	58	71	50	52	23	53	32	44	15	18	5	50	35	17	7	52	42	64	42	77	65
13	82	65	78	58	73	53	61	38	44	20	33	22	24	− 4	45	23	31	8	42	33	72	46	78	61
14	88	64	79	58	67	61	55	44	43	26	39	16	36	20	23	11	35	27	46	33	77	49	81	62
15	90	71	75	59	70	62	46	34	40	26	39	30	45	29	16	3	32	21	53	38	72	51	85	62
16	84	69	69	62	65	48	48	28	27	19	30	− 3	42	26	24	6	27	20	47	34	75	48	85	65
17	80	69	71	57	53	37	50	38	36	14	− 5	−13	46	37	33	11	20	7	44	34	74	57	76	54
18	78	56	73	57	56	43	50	29	50	34	13	5	39	29	47	27	18	0	57	32	78	60	54	43
19	80	58	76	49	53	46	63	35	38	22	31	8	29	15	32	17	30	6	57	45	83	65	56	47
20	85	62	80	53	50	42	66	41	31	14	48	28	20	10	49	28	22	11	60	49	78	62	64	50
21	85	62	65	54	49	42	76	46	14	− 7	49	41	16	3	45	15	28	7	61	44	74	60	80	56
22	79	66	70	44	62	42	78	49	35	32	57	41	28	13	23	6	35	20	62	42	67	52	87	64
23	81	59	75	47	67	52	76	54	32	10	50	37	23	10	20	− 5	44	17	59	46	69	49	85	72
24	86	60	73	56	67	52	55	42	36	3	41	31	21	2	41	20	36	32	58	44	76	53	87	65
25	79	69	82	66	60	45	53	40	42	26	31	17	19	10	58	28	42	30	64	42	80	55	87	74
26	79	60	82	67	67	47	40	34	37	20	30	19	38	8	41	30	41	29	74	52	81	60	82	71
27	77	66	87	67	76	55	40	33	35	12	30	4	38	22	32	22	39	25	65	52	83	60	73	62
28	78	58	77	64	68	48	49	36	31	0	34	15	36	7	23	16	35	23	55	40	85	68	80	65
29	82	63	78	57	57	49	41	34	0	− 24	44	29	9	−10	22	− 2	31	22	52	43	87	66	72	60
30	74	65	88	64	50	44	34	31	26	− 2	55	41	40	8	.....	.....	37	22	52	35	87	64	77	57
31	72	57	83	65	.....	.....	38	28	.....	.....	54	35	36	15	.....	.....	41	25	.....	.....	80	70	.....	.....
Range	34°		44°		48°		50°		81°		70°		58°		71°		51°		46°		52°		44°	
Monthly means	22°.8		68°.4		60°.3		45°.5		31°		32°.1		22°.9		24°.2		21°.7		47°		60°.6		67°.6	

Maximum, minimum, and mean temperatures—Continued.

STATION, LEAVENWORTH, KANS.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	94	72	78	59	93	75	59	44	66	43	56	30	36	32	16	−3	43	28	43	34	55	38	81	68
2	96	78	78	64	92	74	72	42	63	42	62	31	37	28	36	5	44	27	43	36	56	37	71	55
3	96	71	82	62	83	70	83	55	53	42	58	47	44	24	30	14	57	30	57	33	66	42	66	49
4	93	72	87	67	85	61	74	45	47	35	59	50	59	35	37	6	63	37	70	37	57	47	75	46
5	80	69	84	70	89	63	67	50	55	35	55	39	54	35	49	29	65	49	52	31	54	43	90	52
6	80	65	81	63	92	72	58	44	60	37	39	25	51	29	54	35	59	20	61	33	61	48	88	60
7	83	64	80	60	92	72	70	45	59	36	34	22	61	37	53	27	50	17	68	36	56	43	82	68
8	86	66	83	60	94	73	66	48	53	41	35	18	65	51	64	40	65	43	72	39	65	41	78	64
9	87	69	81	61	93	62	64	48	45	34	42	17	58	17	63	40	68	34	65	52	80	45	90	61
10	81	71	82	68	68	57	56	45	56	29	41	24	28	14	73	39	39	21	70	45	74	55	83	66
11	86	70	82	60	70	56	52	38	64	37	45	24	50	23	55	28	27	13	81	61	85	59	81	64
12	87	68	84	61	76	61	55	35	52	40	59	28	37	20	67	42	31	9	72	44	71	53	70	60
13	86	71	84	65	79	58	67	39	42	32	41	33	35	17	48	34	55	20	45	34	73	56	68	59
14	89	70	83	63	86	65	59	44	50	36	52	25	54	30	37	28	54	39	60	34	80	60	78	66
15	92	72	82	64	86	68	53	36	46	22	52	36	50	41	31	12	47	42	69	45	80	62	76	66
16	98	79	83	64	75	59	68	35	29	11	41	15	51	40	35	25	44	22	58	49	85	65	69	59
17	95	75	76	60	62	50	66	49	41	18	15	0	63	43	51	20	27	15	55	39	84	63	64	53
18	80	71	76	56	66	43	58	37	59	30	37	13	51	30	64	33	32	10	65	38	82	66	68	47
19	82	68	79	56	62	45	68	37	52	37	51	20	49	23	51	28	32	23	78	54	79	67	70	53
20	85	67	81	56	60	40	71	47	49	27	66	44	44	29	64	37	26	2	71	49	80	63	81	51
21	79	70	83	56	59	41	78	47	27	11	61	42	38	28	54	18	32	12	73	52	83	66	82	60
22	87	69	74	62	65	45	76	47	45	23	65	37	38	28	57	28	35	7	71	55	73	65	91	73
23	88	63	81	58	65	43	76	49	40	25	60	54	28	17	35	14	40	33	73	56	67	56	95	75
24	90	67	85	67	67	50	75	49	47	15	59	34	36	14	70	26	39	33	62	49	72	55	92	72
25	88	67	86	69	66	45	63	45	49	31	42	29	40	25	65	45	42	34	69	45	76	57	92	74
26	83	67	80	65	75	45	53	38	37	24	42	26	53	36	70	48	49	30	77	55	79	56	91	73
27	83	69	85	70	83	51	71	36	40	24	35	20	48	33	63	22	46	29	74	56	84	56	74	66
28	87	71	77	68	82	56	78	56	37	12	50	27	50	13	36	16	46	26	70	47	87	61	78	66
29	86	68	83	70	73	57	56	35	20	3	64	39	28	5	45	21	42	30	85	56	85	68	79	63
30	80	70	87	69	64	53	44	30	43	14	72	51	44	20	.....	.....	48	27	64	54	84	65	79	63
31	73	66	90	71	.....	.....	60	28	.....	.....	59	35	51	16	.....	.....	48	33	.....	.....	85	68	.....	.....
Range	35°		34°		54°		55°		63°		72°		60°		76°		66°		54°		50°		49°	
Monthly means	77°.6		73°.1		66°.6		53°.6		37°.3		39°.9		35°.4		38°.3		35°.2		55°.2		65°.5		71°.2	

Maximum, minimum, and mean temperatures—Continued.

STATION, LEXINGTON, KY.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	83	68	82	69	88	70	56	44	64	33	50	29	68	56	46	13	45	28	47	33	55	30	75	67
2	83	70	70	63	90	70	59	39	55	35	52	34	50	44	15	4	33	21	64	34	52	42	78	64
3	85	69	70	61	89	69	67	43	64	47	54	43	47	36	31	9	40	21	59	43	61	39	78	67
4	91	70	77	60	84	68	74	54	53	38	55	49	54	34	26	11	53	26	55	37	72	45	69	57
5	91	71	80	60	85	64	76	53	45	36	54	49	57	38	33	8	58	36	56	40	63	59	69	55
6	88	70	82	66	87	63	67	52	50	32	58	48	51	33	44	32	68	49	56	33	83	58	79	53
7	78	69	76	64	83	62	54	46	52	41	49	39	49	29	47	38	62	34	63	35	75	63	83	62
8	81	63	80	63	87	65	65	41	53	40	42	35	59	38	58	38	52	29	57	38	65	52	84	65
9	85	73	81	60	89	69	66	45	49	39	35	29	63	36	67	47	68	40	62	36	57	48	79	68
10	80	70	83	68	75	57	63	40	46	35	35	29	36	19	58	36	74	56	71	40	65	48	84	65
11	73	68	77	65	64	47	45	35	53	31	39	29	30	12	65	48	75	57	77	54	75	48	88	68
12	80	67	75	62	65	60	46	29	60	39	33	26	31	19	59	37	58	33	77	57	81	60	88	69
13	83	67	80	65	75	62	64	32	61	43	39	30	26	11	65	48	40	26	71	61	67	54	80	67
14	80	71	82	62	78	59	62	40	54	43	37	25	37	14	59	37	50	27	64	43	76	45	81	66
15	85	71	80	67	82	64	51	41	51	41	51	25	43	26	37	18	53	43	61	39	82	60	79	68
16	87	69	83	69	79	64	44	35	46	26	44	31	45	34	32	16	60	43	56	44	82	64	82	68
17	92	76	77	64	67	48	63	30	33	19	31	5	55	45	34	20	43	20	50	38	85	64	73	58
18	89	75	75	60	49	45	52	40	55	26	22	2	61	52	41	21	24	13	51	34	84	63	68	51
19	81	67	72	56	60	44	46	31	58	48	42	18	52	32	47	31	31	13	62	36	83	64	75	53
20	81	66	76	55	57	42	61	34	56	48	55	34	45	28	54	32	32	20	76	48	86	68	72	55
21	75	66	78	62	56	40	69	43	48	30	60	44	49	32	53	33	28	16	66	52	86	65	77	53
22	80	70	76	62	57	39	72	47	45	24	57	51	59	46	48	24	33	12	58	48	77	64	82	63
23	82	67	73	58	63	38	67	53	53	42	62	52	61	42	36	20	38	26	55	45	64	43	83	66
24	81	69	76	57	68	47	71	52	43	27	65	55	42	30	46	16	46	33	56	43	69	45	86	66
25	84	70	80	62	67	53	73	51	51	25	63	44	44	28	63	38	45	39	55	38	65	55	83	68
26	81	71	83	64	63	43	66	45	53	45	64	41	50	26	61	46	50	33	60	44	73	55	86	67
27	85	70	83	66	70	46	60	37	46	38	42	31	60	50	63	52	50	34	77	48	78	61	88	71
28	81	70	85	66	73	49	73	47	55	37	43	37	68	55	58	32	49	29	66	53	81	59	83	71
29	79	70	84	69	75	53	73	57	48	24	63	41	55	20	36	28	41	24	71	46	84	65	78	69
30	80	68	85	67	65	53	66	36	35	17	67	50	31	14	.....	.....	46	31	63	40	86	66	77	69
31	80	70	86	70	.....	.....	45	31	.....	.....	71	56	47	26	.....	.....	49	29	.....	.....	85	70	.....	.....
Range	29°		31°		52°		48°		47°		69°		57°		63°		63°		44°		56°		37°	
Monthly means	75°.9		71°.2		63°.4		51°.3		42°.8		42°.6		40°.6		38°.5		39°.5		52°.9		65°.1		71°.3	

Maximum, minimum, and mean temperatures—Continued.

STATION, LONG BRANCH, N. J.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	84	68	71	65	75	68	72	48	44	35	30	19	57	43	43	32	36	29	56	34	58	35	64	49
2	72	62	67	59	79	67	60	42	44	33	42	19	68	42	52	16	42	25	47	33	58	39	69	53
3	79	60	73	56	83	67	63	46	45	30	34	22	60	38	38	12	42	22	43	33	58	43	72	60
4	74	64	75	68	88	72	73	53	45	35	40	32	43	30	43	23	43	23	47	39	50	42	74	61
5	78	67	76	69	80	64	65	56	43	32	44	33	49	23	41	12	45	31	49	39	54	43	72	59
6	76	67	75	66	85	67	61	57	49	33	40	34	50	36	48	18	55	37	51	38	63	46	72	56
7	83	69	75	66	77	61	65	48	51	32	43	36	46	29	48	34	69	40	60	38	71	49	72	55
8	78	66	75	66	80	60	59	42	47	40	41	34	53	31	46	34	51	37	58	35	83	48	78	59
9	73	66	80	66	83	63	54	45	44	36	43	38	57	45	48	34	49	30	54	31	63	50	82	60
10	75	67	80	66	86	58	61	47	52	39	44	30	59	21	52	38	47	31	59	32	63	51	82	54
11	87	70	73	68	61	51	58	47	48	38	43	28	28	18	55	36	39	33	52	37	64	46	80	55
12	85	65	75	66	67	59	53	45	58	34	49	34	36	18	52	41	40	34	58	41	64	51	70	55
13	82	62	76	68	70	64	48	37	60	41	44	31	35	14	52	36	48	32	52	44	64	48	69	61
14	83	69	80	67	71	64	55	41	54	43	34	23	36	14	42	37	40	22	63	45	64	46	70	59
15	79	68	80	70	74	64	57	53	49	38	43	19	45	22	49	36	48	27	63	48	59	48	69	60
16	76	67	77	71	67	63	62	44	58	39	47	31	48	36	42	27	47	28	63	46	53	47	69	60
17	87	65	76	71	70	52	52	40	42	30	44	18	51	35	36	24	48	31	56	41	52	48	70	62
18	82	67	78	71	60	46	61	43	50	28	22	13	61	35	44	29	37	18	55	40	60	49	69	65
19	75	61	79	70	56	49	55	49	56	42	26	13	65	43	52	29	38	12	62	38	70	55	71	63
20	74	59	81	69	65	51	59	44	53	39	42	7	51	32	46	33	47	20	60	34	70	53	72	64
21	75	64	82	67	61	46	67	48	48	39	56	28	43	32	45	29	49	28	65	45	73	54	79	63
22	75	68	76	67	57	45	65	49	52	29	56	43	45	27	45	32	40	24	65	43	81	58	79	58
23	85	70	72	63	60	47	67	49	56	34	59	43	47	34	37	12	45	28	63	42	65	48	82	61
24	79	69	69	63	66	46	62	52	50	40	54	36	50	32	35	9	46	30	64	43	64	48	88	64
25	78	69	71	59	68	47	73	52	49	32	44	37	45	29	37	16	50	30	47	40	79	52	91	69
26	79	68	70	63	61	50	63	50	58	37	45	37	42	25	34	27	50	39	65	38	66	54	90	71
27	86	71	71	62	69	46	60	43	55	38	61	32	49	30	31	28	50	38	67	38	76	49	89	70
28	78	69	70	64	73	52	54	39	54	36	45	31	45	38	36	29	48	33	58	48	73	55	91	74
29	72	65	80	67	68	59	64	48	53	22	41	33	62	37	42	26	48	30	56	46	80	59	88	71
30	82	63	80	67	73	55	60	47	34	11	45	37	47	25	.....	.....	48	30	58	37	80	52	88	70
31	76	68	75	68	.....	.....	56	38	.....	.....	48	40	36	26	.....	.....	49	32	.....	.....	62	50	.....	.....
Range	28°		26°		43°		36°		49°		54°		54°		44°		57°		36°		48°		42°	
Monthly means	72°.8		71°.2		64°.1		54°.1		41°.3		36°.6		38°.3		34°.9		37°.7		45°.5		56°.5		68°.4	

Maximum, minimum, and mean temperatures—Continued.

STATION, LOUISVILLE, KY.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	85	72	83	70	91	70	60	49	68	35	53	34	71	55	49	14	49	34	49	35	67	36	77	69
2	86	73	70	62	93	76	63	42	58	40	56	38	57	46	26	8	36	25	59	38	57	45	84	67
3	88	73	72	62	90	77	72	45	66	48	56	46	50	37	34	19	44	28	60	44	67	45	81	67
4	94	77	79	65	84	71	75	57	51	40	60	49	57	34	31	13	59	30	61	38	75	50	74	60
5	95	79	84	68	84	66	79	54	51	39	56	50	60	44	40	11	63	41	67	43	66	59	72	56
6	93	76	84	73	87	69	70	55	53	34	60	41	54	34	49	30	73	54	59	36	84	56	83	57
7	82	74	79	66	83	65	63	49	52	36	53	39	53	31	52	33	65	34	65	39	79	62	87	66
8	83	66	84	66	88	69	67	45	57	40	42	36	64	43	62	38	57	33	61	40	68	53	88	68
9	88	68	82	63	89	75	66	44	52	39	38	31	63	28	61	50	73	42	65	40	64	49	83	69
10	84	75	85	67	83	60	65	42	48	39	40	33	32	19	69	58	75	59	73	45	66	54	80	67
11	80	72	78	69	67	52	50	39	57	35	42	31	34	18	66	47	72	50	79	58	80	47	90	69
12	87	71	79	67	68	61	52	33	63	43	37	29	34	21	63	39	52	32	76	61	82	64	88	69
13	88	74	84	63	74	63	57	36	62	51	43	34	32	15	67	44	43	27	73	63	71	52	84	69
14	81	73	85	71	80	66	65	38	54	43	39	30	43	19	57	38	53	34	66	47	81	52	87	69
15	85	70	86	73	83	64	48	43	52	42	54	31	44	34	44	20	57	46	67	45	85	65	88	72
16	93	69	84	73	81	68	52	40	46	28	48	31	49	36	36	19	61	37	61	48	85	66	86	69
17	96	80	75	65	68	50	66	36	39	25	31	6	58	44	36	24	40	22	54	41	89	67	75	59
18	89	79	75	64	53	48	56	43	54	34	25	9	60	51	45	25	29	16	56	40	89	68	71	54
19	81	72	72	61	64	45	53	34	60	50	43	25	54	36	48	34	36	19	69	40	89	68	76	53
20	84	71	77	61	56	44	64	37	55	49	58	36	51	33	57	29	31	24	80	52	90	68	74	56
21	78	71	78	62	59	43	72	43	50	32	60	50	55	36	51	35	31	17	69	54	89	69	80	54
22	83	72	74	62	60	42	75	47	46	28	60	53	62	44	48	29	39	18	65	49	78	59	83	65
23	85	70	77	57	66	43	72	49	55	42	63	57	62	38	45	22	42	30	58	47	67	52	92	69
24	83	70	79	62	71	45	75	51	42	29	66	55	39	31	50	22	53	35	59	44	70	50	91	68
25	88	73	81	63	68	56	75	53	52	27	62	46	46	30	67	43	53	39	60	44	73	58	85	75
26	87	74	83	62	65	46	70	49	58	43	62	45	52	30	63	48	54	35	68	44	79	60	89	70
27	88	73	84	67	72	47	63	43	50	38	48	32	60	51	69	55	53	35	80	52	84	63	91	73
28	84	69	86	67	76	48	75	47	53	37	47	36	66	52	63	34	53	28	69	56	85	61	89	69
29	83	71	80	71	80	56	74	62	49	27	58	42	58	22	43	30	45	27	76	49	87	63	84	70
30	83	72	83	69	69	57	71	40	39	23	71	48	37	19	.....	.....	48	33	65	46	90	64	78	69
31	84	72	88	70	.....	.....	47	33	.....	.....	74	58	51	28	.....	.....	54	32	.....	.....	86	71	.....	.....
Range	30°		31°		51°		46°		45°		68°		56°		61°		59°		45°		54°		39°	
Monthly means	79°.1		73°.7		66°.4		54°.0		44°.9		44°.9		43°.0		41°.5		42°.2		55°.9		68°.7		74°.0	

Maximum, minimum, and mean temperatures—Continued.

STATION, LYNCHBURGH, VA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	90	69	75	67	87	66	72	54	60	37	44	22	67	50	41	23	41	28	57	36	62	37	80	59
2	81	70	76	64	89	66	62	44	55	38	35	26	69	50	40	22	42	30	48	36	50	43	88	63
3	79	69	75	63	91	69	65	40	48	33	36	28	61	42	30	19	47	27	47	41	65	45	91	70
4	89	70	83	69	90	69	73	44	60	42	46	34	53	34	40	26	50	25	58	39	71	42	79	70
5	95	74	84	66	85	63	78	55	47	36	44	42	50	33	35	18	61	28	69	36	75	50	77	61
6	94	73	89	65	89	64	74	56	49	29	52	41	54	39	36	26	69	38	61	43	84	61	76	58
7	93	75	84	70	81	64	68	51	44	41	46	42	56	30	55	32	66	53	69	35	89	64	82	56
8	78	72	83	67	82	58	68	43	48	39	53	41	60	30	51	38	55	43	58	40	77	66	84	60
9	87	72	84	62	85	61	65	44	50	34	47	41	64	48	58	33	65	35	61	34	67	57	86	65
10	89	74	86	64	85	67	73	46	51	41	43	35	61	28	71	50	73	39	66	37	73	50	90	70
11	83	73	80	67	67	54	61	46	54	38	45	30	35	23	71	50	65	47	75	43	72	51	88	70
12	77	68	84	70	63	54	56	42	64	35	43	33	39	27	63	42	53	45	84	50	87	52	86	72
13	88	64	80	68	79	62	54	35	66	35	45	34	31	20	57	41	50	39	79	61	74	56	85	66
14	79	73	80	65	78	60	54	35	60	45	38	30	39	15	61	52	55	33	74	57	71	45	85	70
15	88	69	80	69	81	56	63	47	62	40	44	27	49	25	58	36	51	41	66	48	81	50	84	70
16	91	72	84	70	84	61	55	42	66	41	56	38	48	40	43	33	48	37	68	51	77	60	80	70
17	94	74	87	68	77	62	59	35	41	30	49	16	56	42	44	30	52	32	58	46	64	56	75	69
18	99	77	85	70	64	46	61	40	43	24	27	13	66	50	47	30	32	21	55	37	84	59	82	67
19	80	68	82	68	66	46	54	40	60	40	40	21	64	43	56	28	39	17	61	34	82	63	83	60
20	75	68	82	64	68	50	62	33	55	47	42	22	47	35	57	32	35	24	71	40	88	66	82	57
21	80	70	82	61	65	45	75	41	54	44	62	28	53	29	49	32	37	27	70	57	89	66	80	61
22	88	71	76	66	60	46	76	47	47	35	67	51	46	29	52	41	41	25	68	46	84	61	85	60
23	88	73	73	65	62	46	76	49	47	35	71	49	65	45	46	23	47	30	74	50	75	58	88	64
24	88	70	72	63	65	40	78	46	54	35	61	46	55	40	45	20	47	37	55	49	73	49	91	72
25	90	70	73	63	69	40	77	47	43	27	63	45	44	33	56	27	63	40	56	45	72	54	91	72
26	94	71	76	60	66	49	77	46	46	35	64	47	50	35	67	35	53	43	63	41	74	62	89	72
27	90	73	74	60	69	42	65	47	59	36	65	41	60	35	54	42	60	41	73	39	78	62	94	75
28	85	71	76	64	75	44	73	38	47	40	43	38	72	51	71	40	50	39	75	59	75	64	94	75
29	92	70	82	64	75	56	78	48	57	42	44	40	63	39	54	35	47	36	73	52	85	59	92	75
30	90	73	85	66	76	55	68	48	42	25	53	43	44	27	.....	.....	57	35	75	50	85	61	91	76
31	90	71	87	66	.....	.....	50	38	.....	.....	60	45	41	21	.....	.....	60	34	.....	.....	76	60	.....	.....
Range	35°		29°		51°		45°		42°		58°		57°		53°		56°		50°		52°		38°	
Monthly means	78°.9		72°.7		65°.4		54°.9		44°.5		42°.0		44°.5		42°.2		43°.2		56°.2		67°.0		76°.7	

Maximum, minimum, and mean temperatures—Continued.

STATION, MALONE, N. Y.

Day of month.	1875.												1876.											
	July.		August.*		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	.....	.....	.....	.....	87	62	50	37	31	23	4	−15	56	40	46	28	32	21	37	23	40	25	88	58
2	.....	.....	.....	.....	81	65	50	35	28	24	13	− 7	60	37	45	−11	25	13	40	67	51	33	87	65
3	.....	.....	.....	.....	74	59	63	35	29	23	29	4	42	22	20	−12	24	1	46	29	50	38	73	61
4	.....	.....	.....	.....	76	57	64	44	38	22	30	19	22	2	27	2	36	14	43	36	57	41	69	50
5	.....	.....	.....	.....	72	55	46	36	40	24	27	21	27	6	24	−15	48	27	50	34	57	40	64	50
6	.....	.....	.....	.....	70	58	54	34	40	24	28	17	19	11	46	22	55	40	45	37	64	50	67	51
7	.....	.....	.....	.....	66	53	60	45	40	33	29	17	21	9	48	34	65	48	40	28	62	46	67	47
8	.....	.....	74	62	78	57	54	37	37	25	31	20	41	20	34	23	52	26	31	22	75	54	70	46
9	.....	.....	80	60	81	61	48	35	39	25	30	25	46	34	25	16	28	19	31	16	61	47	83	50
10	.....	.....	79	57	74	41	57	44	40	31	27	22	51	5	28	15	30	19	42	18	55	44	75	64
11	.....	.....	82	62	60	35	52	35	37	28	35	21	16	− 5	50	28	45	20	50	30	55	41	79	61
12	.....	.....	85	68	67	42	41	30	52	28	38	21	10	1	44	28	46	39	56	(†)	51	41	84	65
13	.....	.....	79	69	68	54	45	28	50	33	37	14	9	− 9	44	21	45	3	63	.....	51	41	80	67
14	.....	.....	80	66	70	53	62	33	35	22	17	6	30	8	37	15	12	− 1	65	.....	52	36	80	64
15	.....	.....	82	62	72	56	64	41	44	24	25	4	41	11	39	24	21	3	56	.....	52	37	82	62
16	.....	.....	81	67	61	44	56	36	47	25	35	23	42	28	25	15	24	10	47	.....	58	33	90	70
17	.....	.....	80	65	44	37	44	31	25	13	30	3	44	27	20	10	34	18	42	35	70	44	80	67
18	.....	.....	67	61	30	34	41	34	34	10	6	− 6	56	42	25	10	21	− 4	42	30	65	53	77	63
19	.....	.....	77	63	49	39	45	32	45	30	6	−24	57	38	42	18	17	− 2	42	32	67	45	77	64
20	.....	.....	77	62	60	40	58	38	35	23	12	−28	40	22	32	8	32	5	50	31	72	44	77	60
21	.....	.....	78	61	50	39	58	48	45	15	50	8	26	2	38	6	35	22	44	31	78	50	65	57
22	.....	.....	70	51	49	36	55	38	32	10	53	39	17	− 2	38	5	34	21	52	35	70	37	67	56
23	.....	.....	64	44	57	35	72	49	42	15	56	22	32	13	32	−12	36	18	52	35	56	33	77	56
24	.....	.....	70	46	62	51	67	51	47	16	32	12	20	9	0	−16	34	20	52	32	69	42	81	65
25	.....	.....	78	49	69	48	58	36	30	12	45	12	29	4	10	− 4	40	25	55	34	59	39	80	65
26	.....	.....	78	53	55	41	54	35	46	15	50	21	17	4	18	3	40	30	54	35	70	37	78	57
27	.....	.....	80	57	62	42	52	35	40	17	52	14	42	16	20	− 3	40	30	58	32	80	60	83	63
28	.....	.....	81	59	56	36	38	31	41	14	30	15	42	30	22	3	37	25	56	36	80	64	77	65
29	.....	.....	83	58	53	36	40	32	40	−14	36	20	55	13	31	19	45	31	52	33	75	45	76	57
30	.....	.....	83	61	61	36	61	37	− 3	−18	54	30	17	− 3	.....	.....	35	27	45	34	60	34	78	55
31	.....	.....	81.5	56.5	.....	.....	44	26	.....	.....	66	40	43	19	.....	.....	37	26	.....	.....	78	44	.....	.....
Range	.....	.....	.....	.....	53°		46°		70°		94°		69°		66°		69°		.....		55°		40°	
Monthly means	.....	.....	.....	.....	55°.8		44°.6		28°.5		23°.4		24°.8		19°.9		28°.0		40°.1		53°.6		69°.7	

* Station opened August 8, 1875.

† Minimum thermometer broken.

Maximum, minimum, and mean temperatures—Continued.

STATION, MANHATTAN, KANS.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.*		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	54	29	10	— 7	33	15	38	32	54	38	.....	.....
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	52	24	40	1	41	23	37	31	57	34	.....	.....
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	51	23	28	17	60	24	55	27	68	38	.....	.....
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	57	34	45	5	65	38	63	37	54	36	.....	.....
5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	50	31	53	30	66	38	58	27	52	40	.....	.....
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	52	29	53	30	38	18	59	27	60	44	.....	.....
7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	60	37	54	25	46	17	67	35	55	38	.....	.....
8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	59	49	66	36	59	38	71	43	65	39	.....	.....
9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	49	13	63	36	54	26	71	52	78	42	.....	.....
10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	36	12	69	42	28	15	70	45	79	57	.....	.....
11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45	17	54	28	24	10	82	64	86	63	.....	.....
12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	44	19	64	23	26	6	65	40	71	54	.....	.....
13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	44	15	53	35	55	18	43	32	80	64	.....	.....
14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	54	27	43	26	57	39	59	10	82	63	.....	.....
15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	47	38	38	15	44	25	71	38	81	60	.....	.....
16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	55	37	38	23	30	12	58	48	78	55	70	52
17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	62	39	52	23	25	11	56	38	82	62	68	49
18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	50	25	58	31	29	7	73	39	79	63	66	33
19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45	18	55	20	22	15	80	50	82	67	75	49
20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45	25	65	35	20	4	72	45	82	63	82	48
21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	39	25	35	14	30	10	78	54	84	67	84	64
22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	39	24	56	21	35	25	74	53	75	57	90	75
23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	24	11	40	12	39	32	77	52	65	50	94	72
24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	42	8	65	23	40	32	62	50	70	51	92	74
25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	39	16	70	38	43	33	66	46	70	50	92	73
26	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	53	25	55	35	45	30	85	58	78	53	91	71
27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	47	25	35	17	45	30	75	58	83	62	91	71
28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45	13	34	13	35	19	70	44	†	.....	73	64
29	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28	3	43	12	39	23	83	50	.....	.....	79	66
30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45	19	.....	.....	40	24	65	49	.....	.....	79	60
31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	40	6	.....	.....	42	26	.....	.....	.....	.....	.....	.....
Range	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	59°		77°		62°		75°		.....	.....	.....	.....
Monthly means	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	34°.8		37°.8		32°.6		55°.4		.....	.....	.....	.....

* Station opened January 1, 1876.

† Observer sick.

Maximum, minimum, and mean temperatures—Continued.

STATION, MARQUETTE, MICH.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	66	46	68	42	80	64	50	35	37	22	29	18	36	27	12	−8	18	2	41	12	47	23	84	58
2	77	45	70	43	67	57	49	33	35	18	35	24	34	22	10	−16	29	6	46	21	47	32	70	39
3	79	60	81	54	73	54	54	43	47	27	41	34	22	2	12	−4	36	12	43	32	48	26	49	38
4	77	54	71	57	66	52	45	35	41	29	46	38	23	−2	9	−15	53	27	47	36	53	32	52	40
5	62	49	66	52	78	57	45	34	43	25	45	38	29	17	37	−8	46	30	43	28	44	36	67	46
6	73	43	64	50	71	53	47	37	43	34	41	38	27	14	33	12	49	10	49	20	53	39	57	40
7	77	49	71	55	82	51	56	36	45	35	39	35	38	20	25	9	11	2	47	26	45	37	59	37
8	87	57	71	54	74	61	45	35	45	39	37	26	41	32	21	11	19	4	41	20	56	36	79	44
9	72	59	76	57	73	50	44	37	43	34	28	25	33	3	32	19	34	16	52	24	48	37	64	51
10	70	47	66	55	57	37	39	31	52	30	31	24	10	0	39	27	42	32	48	37	57	36	90	51
11	73	47	58	50	67	37	34	27	51	37	30	18	18	−1	37	12	42	14	46	36	55	37	81	59
12	80	56	63	50	72	50	50	27	44	28	37	13	17	8	37	7	16	3	45	34	60	40	75	58
13	75	55	66	55	73	51	54	39	46	23	27	8	29	6	27	19	16	0	41	35	50	37	67	52
14	81	56	76	59	78	53	50	34	43	24	24	11	23	18	25	19	23	0	37	32	57	37	70	52
15	88	57	72	59	60	51	34	30	39	25	32	20	37	19	22	5	31	17	45	30	45	39	85	51
16	68	54	66	57	53	41	45	30	26	19	22	2	38	20	21	3	24	14	43	32	47	37	69	42
17	59	51	65	54	47	39	41	33	26	17	12	−1	52	36	33	10	14	2	41	27	55	45	43	38
18	66	45	62	51	53	38	42	32	35	21	7	−1	42	29	42	15	17	0	47	23	63	46	59	39
19	85	53	74	49	50	43	69	38	35	29	24	5	30	13	36	5	31	−6	57	22	65	42	59	46
20	85	63	75	48	45	35	63	47	38	14	37	24	15	3	25	−2	29	14	54	39	82	52	55	44
21	81	52	57	44	52	36	62	45	12	1	47	34	15	0	36	11	28	9	56	40	69	40	68	49
22	73	52	72	49	61	37	83	46	27	3	59	37	29	14	13	−6	38	8	53	35	50	36	84	54
23	71	51	75	53	70	46	67	41	30	16	48	21	25	16	15	−13	40	11	47	32	68	38	79	58
24	85	58	76	50	60	50	48	39	29	11	35	20	28	6	26	6	49	27	55	30	77	53	83	64
25	82	65	77	55	53	41	46	38	27	15	31	10	22	2	37	17	42	31	59	32	61	43	78	58
26	74	57	83	61	67	42	47	33	37	16	32	10	33	−1	25	17	35	24	56	43	78	42	73	49
27	77	56	88	65	61	36	37	29	27	15	17	3	36	29	23	15	28	19	59	39	86	64	74	55
28	84	61	87	70	55	30	41	34	32	−2	33	14	36	30	18	13	24	15	47	33	71	44	74	54
29	74	54	81	60	48	42	42	35	5	−9	40	18	32	−1	25	0	22	9	40	26	52	36	63	47
30	66	49	83	58	50	39	35	27	21	3	41	37	33	1	.....	.....	25	17	37	24	72	35	66	47
31	65	46	88	64	.....	.....	33	23	.....	.....	42	32	31	7	.....	.....	29	21	.....	.....	84	62	.....	.....
Range	45°		48°		52°		60°		62°		61°		54°		58°		59°		47°		63°		53°	
Monthly means	62°.9		62°.2		51°.8		40°.8		28°.3		26°.6		21°.1		16°.7		22°.1		37°.9		49°.4		58°.2	

Maximum, minimum, and mean temperature—Continued.

STATION, MEMPHIS, TENN.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	91	72	75	64	91	72	71	53	72	50	60	36	70	54	51	23	69	48	59	49	66	(*)	90	67
2	92	75	76	67	91	73	68	44	73	58	58	52	59	44	29	17	49	37	65	53	55	.....	93	72
3	93	74	80	67	92	74	74	48	72	63	59	54	57	41	33	29	51	30	66	49	65	.....	84	69
4	95	78	85	63	88	76	78	56	65	43	57	51	63	40	36	28	58	44	72	46	75	.....	76	63
5	97	75	82	71	92	71	70	62	54	43	57	51	65	48	45	22	70	50	64	53	80	.....	78	62
6	95	77	85	70	92	75	73	59	55	43	61	47	58	44	58	41	70	59	61	45	84	.....	86	61
7	93	75	82	69	92	73	63	48	56	43	50	37	59	35	64	49	66	45	67	45	77	.....	88	71
8	91	73	82	66	93	73	71	45	59	43	37	31	67	44	61	53	65	40	72	56	65	.....	88	68
9	93	75	84	64	93	76	71	50	53	43	41	31	68	36	65	53	71	51	75	51	71	.....	91	68
10	93	72	88	68	91	65	73	55	52	43	50	29	37	28	75	60	78	62	75	59	81	.....	91	68
11	90	73	80	64	70	63	63	45	60	37	47	37	41	29	70	62	78	52	73	63	85	62	90	72
12	89	71	81	67	74	64	55	35	66	44	52	35	46	33	73	51	53	33	74	63	84	66	88	70
13	90	74	81	65	74	63	61	40	70	51	53	42	38	26	71	48	50	32	73	60	83	63	81	68
14	92	76	82	(*)	85	65	60	43	56	44	51	39	47	27	48	41	50	39	58	47	85	62	84	64
15	95	78	80	.....	87	67	58	47	65	53	59	40	45	36	53	36	66	46	71	45	80	67	84	69
16	99	79	85	.....	87	70	58	39	55	35	55	43	56	40	47	32	61	43	73	55	84	66	84	65
17	97	80	85	.....	76	52	67	41	41	27	43	24	64	51	45	35	55	39	65	50	87	70	77	62
18	94	75	80	.....	56	49	57	45	57	35	43	21	65	56	55	33	41	29	63	44	85	69	78	58
19	92	76	78	.....	67	47	58	38	76	57	56	34	56	39	61	40	38	30	78	50	88	69	80	58
20	89	74	81	.....	65	47	65	39	72	57	64	44	55	34	64	40	32	28	77	59	88	71	83	65
21	87	74	83	.....	60	44	67	39	57	40	59	44	59	43	54	41	35	18	82	56	87	72	88	67
22	84	74	83	.....	63	50	71	41	49	36	64	54	67	49	50	34	38	24	82	62	87	68	97	72
23	81	74	83	.....	64	52	69	52	64	45	65	60	70	47	45	35	43	33	85	66	79	65	95	74
24	85	70	88	.....	71	49	72	51	47	36	68	61	47	35	59	30	61	40	74	57	65	62	95	76
25	88	70	91	67	69	55	77	56	58	34	69	57	43	35	65	50	51	44	68	51	79	62	95	75
26	89	71	91	68	69	51	65	49	61	52	67	47	60	42	68	55	55	38	75	50	82	64	93	78
27	92	77	89	69	72	46	71	47	53	43	47	36	72	60	73	59	62	46	80	56	83	67	93	75
28	91	75	88	66	74	51	71	57	62	46	50	37	73	59	66	41	50	36	72	60	85	67	92	76
29	92	71	84	70	79	54	79	58	56	32	56	44	60	29	54	38	53	34	79	52	88	67	92	75
30	91	71	85	67	81	61	59	44	46	30	73	52	37	23	.....	.....	64	41	85	(*)	88	69	92	75
31	92	76	87	68	.....	.....	61	41	.....	.....	74	64	56	30	.....	.....	71	47	.....	.....	85	68	.....	.....
Range	29°		.....		49°		44°		49°		53°		50°		58°		60°		.....		.....		39°	
Monthly means	82°.2		75°.0		69°.8		57°.1		50°.9		49°.8		47°.9		48°.6		47°.4		63°.2		70°.9		77°.1	

* Minimum thermometer broken.

Maximum, minimum, and mean temperatures—Continued.

STATION, MILWAUKEE, WIS.

Day of month.	1875. July.		August.		September.		October.		November.		December.		1876. January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	69	50	62	56	90	70	55	40	42	32	35	20	39	37	34	2	29	20	34	29	40	31	70	53
2	60	50	66	56	76	66	60	34	40	30	39	33	42	29	7	−10	31	17	34	30	46	36	71	61
3	72	56	71	51	82	65	68	49	40	36	41	36	33	16	22	4	34	14	39	33	52	37	66	53
4	80	64	73	61	72	61	56	45	48	34	41	37	36	15	6	− 8	44	24	44	34	46	34	60	49
5	70	54	72	59	86	68	50	44	41	28	43	40	42	25	38	2	50	39	43	35	43	37	60	49
6	64	54	69	61	78	60	49	41	48	31	40	38	29	18	45	28	61	49	56	31	40	36	68	51
7	74	55	79	57	77	59	54	37	50	36	39	34	45	29	33	25	49	21	48	34	63	38	72	48
8	78	60	85	54	78	62	48	38	42	35	40	32	48	39	36	27	28	20	37	31	52	44	80	56
9	86	64	89	63	84	56	46	34	42	37	32	25	47	3	38	32	40	28	42	31	65	41	84	63
10	78	56	68	58	65	47	47	32	48	30	34	25	8	− 8	58	31	59	35	45	37	52	41	73	60
11	65	55	72	57	64	51	39	29	53	36	31	27	21	1	57	30	61	26	45	37	45	41	74	56
12	87	58	69	57	67	46	46	28	54	39	37	18	18	5	51	30	28	21	69	43	62	40	70	55
13	76	60	77	59	67	46	54	28	42	35	34	21	21	0	41	33	24	10	44	35	54	42	62	54
14	75	61	80	60	65	57	50	41	44	35	29	13	33	16	33	14	31	20	44	35	50	39	60	54
15	90	68	80	65	67	59	41	33	40	30	41	27	45	26	21	12	30	28	44	35	64	45	66	54
16	77	59	79	57	66	45	42	30	30	19	29	5	36	30	25	8	30	20	46	33	75	44	65	56
17	65	58	76	56	48	39	51	38	30	12	6	−12	48	36	32	14	20	9	41	34	76	58	64	45
18	68	55	65	57	52	35	42	33	43	28	14	− 4	40	33	46	20	15	4	48	30	64	43	53	44
19	70	52	68	53	54	41	58	33	42	30	27	6	33	16	39	23	23	6	50	36	63	44	54	44
20	78	54	82	55	50	41	68	41	41	26	51	24	24	14	39	25	24	16	64	41	80	54	62	49
21	72	64	66	50	50	35	76	49	26	3	54	40	27	9	42	22	27	10	60	43	81	66	76	53
22	72	63	59	43	58	40	78	52	36	5	54	36	37	27	24	10	31	15	67	41	69	40	69	60
23	65	57	65	42	63	42	75	51	40	15	49	33	34	18	16	− 3	38	21	49	39	51	39	79	59
24	86	56	68	48	70	44	58	42	27	− 1	52	33	22	7	32	15	34	29	50	36	72	46	87	68
25	90	67	69	59	62	46	54	42	42	21	38	23	20	14	40	27	32	29	52	36	73	52	89	66
26	72	61	78	64	70	42	54	34	38	26	33	18	35	10	36	32	42	23	64	46	83	52	84	61
27	72	59	78	64	79	48	38	31	36	25	24	7	39	30	28	26	31	22	69	46	82	59	78	60
28	69	54	86	64	56	47	53	38	35	8	33	21	48	29	28	18	28	22	60	42	83	63	78	61
29	78	59	75	60	57	47	45	42	8	−14	41	27	29	0	23	9	28	18	57	34	78	49	78	62
30	71	58	76	57	49	41	42	31	24	3	54	37	34	8	.....	.....	36	21	35	31	61	47	66	56
31	62	56	89	65	.....	.....	35	28	.....	.....	59	38	41	25	.....	.....	32	26	.....	.....	71	51	.....	.....
Range	40°		47°		55°		50°		68°		71°		56°		68°		57°		40°		52°		45°	
Monthly means	65°.3		64°.7		57°.3		44°.7		31°.7		31°.9		25°.9		24°.9		27°.5		41°.9		52°.7		63°.0	

Maximum, minimum, and mean temperatures—Continued.

STATION, MOBILE, ALA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	91	74	85	76	84	73	82	63	67	44	65	61	72	67	73	47	70	51	69	61	83	73	87	74
2	93	74	87	73	88	72	70	56	71	55	68	61	70	60	47	28	68	47	69	64	81	54	84	73
3	91	73	88	69	89	72	76	57	77	59	67	56	65	51	59	36	59	36	77	60	73	48	91	72
4	90	76	89	75	87	75	72	67	80	65	60	55	66	46	44	37	65	42	74	55	75	53	92	74
5	90	77	90	75	88	76	74	68	73	54	68	60	69	53	53	33	68	55	77	58	79	66	84	68
6	91	75	84	75	93	76	80	70	63	52	67	58	68	55	59	46	71	58	66	56	81	69	85	63
7	94	76	88	72	94	77	77	63	62	55	61	46	65	45	61	53	70	54	66	55	83	63	86	65
8	86	76	91	75	94	77	73	54	59	53	51	37	69	48	62	54	64	45	71	59	72	62	87	76
9	88	75	88	75	91	74	76	55	57	50	52	36	71	62	70	55	68	45	70	58	75	54	89	70
10	92	76	85	71	91	75	68	59	55	50	59	36	65	42	70	61	73	57	75	59	78	54	86	72
11	93	76	81	70	89	75	77	55	59	43	66	43	50	38	71	62	76	64	71	64	83	60	87	72
12	93	76	84	68	85	74	67	50	63	41	59	43	55	36	70	62	70	46	77	67	88	63	88	72
13	95	79	87	69	86	71	67	47	70	50	61	42	49	37	71	63	59	38	77	69	88	63	91	75
14	95	79	84	72	87	74	69	48	79	64	56	41	48	32	68	53	65	44	72	52	89	67	82	76
15	97	80	84	70	88	77	68	55	79	69	62	37	59	37	59	42	70	59	69	48	85	70	88	71
16	99	80	85	75	87	79	66	47	79	58	66	52	68	50	64	43	73	58	78	54	83	71	88	76
17	84	73	83	74	86	79	66	44	58	42	56	38	71	59	58	46	67	46	70	57	88	69	87	73
18	87	76	89	75	82	66	74	53	64	47	46	30	66	61	58	45	56	43	72	49	86	70	88	71
19	88	78	86	71	74	60	62	46	72	64	56	32	67	47	62	38	59	40	71	49	86	68	88	69
20	92	75	79	72	74	58	67	41	76	69	63	47	58	40	67	41	61	35	76	52	88	73	92	70
21	93	75	76	70	74	57	70	45	75	64	67	55	65	38	65	57	51	31	76	57	86	71	91	69
22	92	77	85	69	77	57	73	53	72	58	71	63	71	53	59	50	57	33	78	58	89	72	92	71
23	93	76	86	69	82	58	73	54	74	65	70	63	72	64	63	43	62	44	77	59	89	69	96	74
24	92	76	86	73	79	65	75	57	72	60	70	64	71	60	61	39	64	56	80	62	88	70	94	79
25	93	78	86	72	74	64	77	55	70	59	71	62	68	56	64	41	70	55	76	42	86	71	98	77
26	94	74	88	71	65	62	75	58	72	62	69	66	70	55	70	49	69	55	77	55	87	72	94	79
27	97	75	87	71	69	64	71	48	67	61	69	62	70	63	70	60	70	55	78	61	82	71	91	79
28	97	79	89	73	73	63	74	48	71	56	72	66	71	64	75	59	58	46	81	67	86	69	97	76
29	93	79	89	75	76	64	77	67	65	63	75	67	68	43	72	49	60	39	82	63	89	71	96	78
30	93	77	89	74	77	67	72	53	63	58	75	67	51	33	.....	.....	63	46	82	65	89	69	94	79
31	90	81	88	74	.....	.....	67	47	.....	.....	73	65	59	35	.....	.....	69	52	.....	.....	89	74	.....	.....
Range	26°		23°		37°		38°		39°		45°		40°		47°		45°		40°		41°		35°	
Monthly means	83°.9		78°.4		75°.1		62°.7		62°.6		57°.6		56°.6		55°.3		55°.8		66°.2		74°.5		80°.3	

Maximum, minimum, and mean temperatures—Continued.

STATION, MONTGOMERY, ALA.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	95	74	88	74	90	72	74	60	70	42.5	59	52	75.5	63.5	66	38	75	49.5	65.5	55.5	85	68	89	70.5
2	94.5	73.5	81.5	71	91	70	69	50	75	49	59.5	54	67	59	41	24	66	39	62	57	75	52.5	86	71
3	95.5	75.5	82.5	65	91.5	70	74	56	75	53	57	46.5	63	50	51	31	54	32	69	48	71.5	46.5	87.5	72
4	97	75.5	88	65.5	91.5	72	74.5	65	77	63.5	51	45	63	43	49	34	56	38	73.5	51.5	75.5	51	90	72
5	89.5	76.5	91.5	70	93	74	77	66	66	56	62	49	67	43	50	30.5	70.5	50.5	79.5	54	80	59	82	65.5
6	92	75.5	83	74	94	76.5	78	68	63.5	52	65	49	65	50.5	54	42	73	55.5	69	54.5	88	61	85.5	61
7	94.5	76	88	72	97	76.5	74	59.5	56	50	59	45	64.5	40	56	48.5	67	50	70	54	82.5	66	89.5	63
8	90.5	72.5	93	71	96	72.5	73	50	55	50	48	41	69	43	63	54	63	42	61	56	68.5	63	90	71.5
9	93.5	75.5	94	72	95	72.5	73.5	53	50.5	47	46	34	72	56	68	57	72	43.5	66	53.5	70	53.5	88.5	69
10	93	75.5	90.5	73	93	73.5	73	54.5	55	46.5	52	30	66	41	75	60.5	77	51	71.5	58.5	80	53	89.5	69
11	94.5	76	81	72.5	89	72.5	78	55	60	39	63	36	42	35	74	63.5	77	57	72.5	59.5	87	59.5	88	71
12	95	77	87.5	70.5	74.5	64	63	44	66	39	53	36	52	32	78	63	67	44	81.5	60	88	63	89.5	73.5
13	96.5	75	90.5	70	85	65	60	45	69	41.5	59	38	44	32	76	64.5	58	34	82	67.5	88	65	93.5	72
14	97	80	89	74.5	86.5	72.5	66.5	43	72	60	56	37	47	27	67	52	67	38	73.5	53.5	86.5	65	83	71
15	98	80.5	86	72.5	88.5	71	62.5	52	79	65	59	32	54	28	55	41.5	68	58.5	68	46	85.5	67.5	79	73
16	102	80	86	73	88.5	72.5	60.5	44	75	54	65	49	67.5	38	62	41	69	55	80	56	87	60	87	72
17	100.5	79	85.5	74	85	69	64	40	54	36	57	32	70	53	57	40	62	45	67.5	55	86.5	67.5	83	70
18	96.5	73.5	85	73	84	69	72	46.5	56.5	38	45	23	73	59.5	57	39	53	35	67	47	88.5	68.5	83.5	64
19	93	75	85	67.5	73	59	63	43	78	49.5	55	29	65	45	59	34	46	32	71.5	45	91	67	83.5	66
20	96	75.5	83.5	68	72	56	66	42	79	68	63	35	55	35.5	65.5	38	49.5	34.5	77.5	49	92.5	70.5	81	65
21	96.5	78	82	66.5	73	53	69	42	74.5	59	69	48	62	36	64	55.5	45	30	80.5	57	92	71.5	92	66
22	95	79	85	68.5	74	54	65	46.5	66.5	53.5	73	56	68	53	59	47	52	28	81.5	61	88	62.5	96	72
23	96.5	78	86	67	79.5	57	74	51	64.5	55	73	64.5	75	61	61	42	64	41	81.5	61	90.5	66.5	96	72
24	96	75.5	87	71	79.5	61.5	75	50	61	56	75	64	72	59	57.5	32	62	51.5	81.5	64	87.5	67.5	97	76
25	98.5	79	88	70.5	68	60.5	78	58.5	63.5	54	70	66.5	60	54	67	37	66	56.5	76	58	87	69	96	76
26	99	78	86	69	74	61	70.5	56	62.5	49.5	75	65.5	66	53	71	43.5	66	49	76	52	83.5	67.5	93	74
27	97	77	86	69	65	58.5	70.5	45	68.5	55	71	62	74	57	75	54.5	68	46	80.5	56.5	83.5	65.5	93	71
28	97	77	86.5	66	66	60	73.5	44	64	55	70	64	77	63	71	57	58	44	83	65	86.5	69.5	98	71
29	97	75	90.5	67	74	61	74.5	60	66	60	69	62	66	40	67	45	54.5	36	83	62	85	69	99	76
30	97	78	90	70	77	64.5	69.5	52.5	64.5	52	75	66	52	31	.....	.....	71	42	89	57.5	83	68	93	73
31	94	73	90	73.5	.....	.....	63.5	44	.....	.....	74	63	55	35.5	.....	.....	75	47.5	.....	.....	84	70	.....	.....
Range	23°		29°		44°		38°		43°		52°		50°		54°		49°		44°		46°		42°.9	
Monthly means	86°.1		78°.6		74°.7		60°.8		59°.3		54°.8		54°.8		54°.5		54°.6		65°.4		73°.5		79°.6	

Maximum, minimum, and mean temperatures—Continued.

STATION, MONTREAL, CANADA.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	69	57.6	70	53.6	86.8	62.3	48.9	36.8	32.5	25	— 0.6	—12.7	54.5	30	31.8	20.6	26	21.1	41.6	25	41.7	30.8	79.6	55.7
2	73.6	58.1	71	53	83.1	65.6	49.2	34.8	30.2	21.2	7.1	— 6.3	53.3	31.7	30	—10	26.7	14.5	42	25.2	55.0	38.6	85	62.3
3	77.4	59.1	66.2	54	70.3	50.9	56	36.8	32.4	22.3	14.7	1.1	37.5	25	6	—13.6	25.1	9	40.7	23.6	49.6	37.6	69.8	56.5
4	68.8	61.1	65.7	55.7	77.6	62.1	55.5	42.9	36	25.5	25.2	12.2	27.5	4.5	15	— 3.2	32	14.2	34.1	29.8	51.1	39.3	59.8	50.2
5	75	66.6	73.8	62.4	72.5	57	44.2	33.7	36.9	22.1	20.4	10.2	11	0.6	— 2.1	—15.4	38	18.1	40.9	28.9	52.2	38.4	68.7	49
6	68.8	63	79.6	59.3	71.8	60	46.6	31.2	36.7	24.6	22	15.7	17.2	9	33.8	—12.4	42.2	35.3	39.4	35	60	43	67	53.7
7	77.9	61.9	77.5	66.9	69.6	55.9	50.2	41.2	32.6	26	19	10.3	12.8	5.5	41.2	30	52	32.5	37.6	32.6	46.7	40.9	64.9	48
8	76.8	63.6	74	63.6	73.4	56.0	47.2	35.1	34	22.8	27.3	16.8	20.2	10.2	32	13	37.9	28.3	33.5	21.4	59.7	41.1	65.4	49.5
9	78	63.6	75.5	59.9	75.6	56.9	45.8	37.8	30.7	26.8	27.7	24.3	25.6	19.2	12	— 0.5	30	20.3	39.1	17.0	59.7	46.5	81.4	53.9
10	79.1	64.1	80.3	63.0	72.5	46	50.7	39.2	34	26	26.9	14.2	42.2	3.6	22.1	11.4	25.8	18	44	28.2	55.1	48	75.7	62
11	68.8	60.1	81.7	64.6	61.8	41.7	46.9	36.3	38.6	29.9	23.9	14.2	7.8	— 5.3	39.8	12.3	37	22.1	50.2	34.8	57	42.6	73.9	56.5
12	74.8	57.2	78.1	67.9	63.5	49	40	31.3	40	31.1	26	16.1	5.5	— 3.2	38.3	24.9	38.5	32.9	52.6	33.9	55.6	44.2	80.1	57.6
13	68.8	59.1	76.8	70.0	71.8	53.1	42.9	26.9	41	27.2	32.1	15.8	3.2	— 6.5	31.2	12.4	36.8	4.3	54.2	28.9	52.8	43.2	79.1	63.8
14	74.8	58.3	81.1	66.4	72.8	53.8	52.8	30.7	27.9	19.6	16.8	7.9	21.2	— 4.1	27.4	8.2	14.8	2.4	48	35.9	51.9	37.5	77.7	65
15	79	61	84.1	65.4	70.6	52.8	57.5	39.7	30.6	22.3	9.7	2.6	26.8	9	32.2	22.7	23	1.8	43	35.8	53.8	39.8	83.6	64.6
16	78.9	65.1	80.9	64.5	53.8	43	51.8	42.7	38	26	28	3.2	30.6	17.1	24.7	14.6	20	5.5	45.2	33.5	57.8	39.3	83.6	70
17	73.2	60.4	77.6	64.4	43.8	38.2	40	33.9	26.1	13.7	23	4.4	33.2	12.5	18.3	7.9	20.6	16.6	39.8	32.7	65	40.4	78.9	66.6
18	64.5	50	71.6	64	51.4	36	37.5	33.8	25	8.3	5.8	— 6.6	40.3	32.2	23	10.8	17.5	3	41.1	31	63.5	49.3	80.3	67.4
19	70.1	49.8	79.9	65.1	48	38.8	45.5	34.7	35.5	20.8	— 3.3	—19	46.8	36.5	34.5	10.6	21	— 3.6	46.7	31.9	67.4	49.4	74.3	64.5
20	75.8	55.6	78	64.8	51	39.5	51.8	36.8	35.5	26.2	— 5.6	—22.1	46.6	16.1	24.6	8.7	21.8	3.3	50.9	32.3	69.1	46.6	77.5	60.5
21	72.8	62	78.8	63.2	50	39.9	58	39.3	35.3	15.2	42.8	— 5.8	19	1.4	20	9.2	25	19.1	43.4	32.8	72.5	58.1	67.8	57.2
22	76.2	57.3	68.3	53.4	46.6	38.8	46.8	33.9	17.5	5.7	41.8	33.8	8	— 3.4	29.5	16.8	29.4	22	55.2	36.2	68.2	35	70	54.9
23	76.9	64.1	66.6	51	56.8	38.1	52.5	34.8	32.9	13.8	45	17.5	19.8	1.8	18	— 7.4	33.8	16.8	51.8	35.3	57.4	33.9	77.5	58.4
24	74	62.1	71.8	51.1	63.5	45.7	50.5	32.8	32	15	21.5	1.7	17.8	6.2	— 0.5	—12	34.8	19.1	50	33.9	68.8	42.4	82.1	64
25	78.3	60.1	75	57.1	67.8	45.4	42.5	33.4	22.2	7.2	40.2	21.3	12.1	6.3	11.2	— 6.5	30	14.8	53.7	30.9	56.8	43.2	80	65.5
26	77.7	64.4	78.6	57.1	57.5	44.3	45	30	39	17.5	37.3	12	14.7	3	18	3.4	38.2	28.3	53.1	31.9	66.8	38.4	77	62.1
27	75.5	64	81.7	58.1	50.8	44.2	45.5	37.8	38.2	11.6	41.5	11.2	33	4.8	11.2	— 3.7	39	31.1	56.8	32.1	80.5	57.5	80	65.3
28	80	65.1	83	63.4	50.2	34.1	39.3	32	14	3.4	19	8.2	34.6	28	16.9	— 2.5	35	27.3	46.1	31.1	79.6	62.7	76.2	66.6
29	80.2	65.5	87	65.1	48.2	37.8	34.5	27.2	26.5	—13.2	22	10	45.8	12.7	27.7	8.3	41.8	27.6	49	32.9	66.9	40	79	61.7
30	75.5	58.5	86.3	60.8	56.5	39.7	48.7	30.5	— 5.3	—17.9	38	22	14.1	— 4.5	.....	.....	37	26.1	44.1	33	56	35.3	77.9	60.6
31	68.8	55.4	81.6	63.8	.....	.....	42.8	28.6	.....	.....	54	37.3	30.9	5.4	.....	.....	42.6	25	.....	.....	73	42.5	.....	.....
Range	30°.4		36°		50°.8		31°.1		56°.9		76°.5		61°		56°.6		55°.6		39°.8		49°.9		37°	
Monthly means	.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....	

Maximum, minimum, and mean temperatures—Continued.

STATION, MORGANTOWN, W. VA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	80	66	75	63	86	62	55	44	46	33	38	20	67	45	54	28	38	29	41	30	52	26	86	61
2	78	64	65	60	87	62	57	42	44	32	41	23	65	48	41	11	31	19	58	29	55	34	86	65
3	87	68	76	60	86	67	65	37	47	30	48	32	50	33	39	11	38	14	58	50	59	36	86	67
4	84	70	78	65	82	65	72	46	48	36	54	41	47	28	35	9	50	19	51	37	70	37	76	64
5	93	65	79	63	82	58	71	54	44	32	56	43	57	27	39	2	63	30	64	32	75	46	69	56
6	90	69	83	65	81	60	76	51	51	25	58	50	54	35	52	19	71	43	54	37	76	48	73	54
7	78	67	76	64	77	53	57	47	48	32	58	39	50	31	52	34	72	52	59	34	84	57	81	53
8	84	62	77	59	81	53	61	41	52	37	49	42	59	29	57	26	54	33	52	28	72	60	85	57
9	86	66	79	59	87	54	64	39	56	28	42	33	65	58	64	44	58	28	52	28	63	50	84	66
10	82	68	83	57	79	51	57	42	50	39	38	30	59	18	65	50	68	38	62	30	57	48	86	65
11	81	65	84	63	66	44	50	37	51	35	47	31	28	13	71	53	76	47	71	44	67	41	89	62
12	79	60	81	66	63	51	49	36	61	36	37	32	30	17	55	35	74	51	79	51	76	50	90	64
13	85	64	78	64	69	58	55	33	62	36	36	32	26	19	69	34	51	29	75	57	65	41	89	64
14	84	67	82	60	77	52	60	31	57	47	37	24	36	21	63	45	43	22	71	48	68	35	90	62
15	83	67	81	62	77	57	54	38	61	45	49	26	48	24	48	27	53	32	60	43	82	44	90	64
16	86	69	83	63	71	60	45	38	50	30	49	30	45	33	28	24	55	22	57	48	73	59	82	66
17	85	68	82	64	63	49	57	35	33	26	36	13	59	45	34	24	52	26	50	39	79	55	78	67
18	84	64	75	64	54	41	55	39	55	24	17	10	69	56	41	29	26	13	49	36	78	60	78	61
19	79	61	75	62	57	46	43	33	58	49	28	16	58	36	50	29	27	9	54	31	76	62	77	57
20	75	69	73	58	58	46	54	31	52	42	55	18	43	31	49	26	37	26	74	33	86	60	78	56
21	83	69	77	57	56	38	67	39	49	32	62	38	52	33	58	29	35	26	71	42	86	63	71	58
22	79	63	76	58	56	39	70	45	44	23	60	53	56	33	50	30	36	24	69	32	77	51	82	56
23	82	69	74	56	59	40	72	45	55	43	62	51	59	41	43	11	42	26	62	45	62	43	84	57
24	81	63	76	57	67	37	71	46	54	29	64	45	41	29	32	15	47	30	55	44	73	42	80	67
25	85	63	77	56	69	43	70	46	54	22	64	43	46	27	57	20	56	43	49	42	75	51	84	61
26	81	69	77	55	57	47	74	50	59	41	72	37	45	26	64	35	43	36	60	32	79	49	87	66
27	83	71	79	54	68	46	53	38	52	33	56	31	57	34	62	44	51	33	64	41	82	52	87	71
28	78	69	75	60	72	46	62	34	57	30	45	30	72	51	58	37	52	31	66	49	77	56	87	68
29	79	66	78	61	72	48	72	55	53	16	61	39	58	26	37	29	43	27	63	37	83	56	79	69
30	84	70	81	61	66	55	69	37	25	12	67	43	31	12	.....	.....	38	29	53	31	83	60	83	62
31	75	61	84	65	.....	.....	37	31	.....	.....	68	42	49	22	.....	.....	42	30	.....	.....	88	62	.....	.....
Range	33°		30°		50°		45°		50°		62°		60°		69°		67°		51°		62°		37°	
Monthly means	74°, 0		69°, 6		61°, 4		50°, 7		41°, 9		41°, 6		41°, 6		39°, 6		39°, 3		50°, 9		63°, 1		73°, 1	

Maximum, minimum, and mean temperatures—Continued.

STATION, MOUNT WASHINGTON, N. H.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	49	34	39	28	62	49	35	20	14	4	−8	−20	40	32	29	9	11	2	13	5	16	7	66	49
2	45	34	47	34	61	49	22	14	11	1	9	−17	23	8	20	−35	3	−5	20	5	28	16	65	52
3	52	39	48	35	58	48	36	16	25	5	24	9	8	−16	2	−42	−3	−10	30	17	33	20	60	48
4	52	43	52	46	55	43	39	29	20	9	28	15	15	−8	2	−17	10	−5	21	12	32	20	52	50
5	55	50	51	44	44	29	41	32	13	5	27	15	19	−4	3	−30	23	5	31	21	34	23	50	36
6	56	53	55	42	44	36	38	28	14	7	28	18	7	−6	28	3	35	19	22	13	38	32	40	33
7	53	46	54	46	39	31	43	26	24	10	26	18	20	5	28	12	47	32	25	10	51	32	38	32
8	52	44	55	45	49	32	36	19	28	16	26	20	20	5	18	2	39	34	19	0	48	41	49	32
9	55	47	53	44	57	42	32	17	28	14	26	17	36	19	27	7	34	22	9	3	45	30	60	47
10	52	42	51	39	52	21	38	24	28	21	23	5	41	−6	25	7	26	19	15	6	40	32	51	46
11	49	36	56	45	35	15	32	17	22	11	21	7	−6	−30	32	15	42	18	25	13	35	22	55	47
12	47	35	56	48	43	33	18	9	27	8	19	10	−9	−18	28	12	42	32	22	18	31	20	60	49
13	53	42	57	53	43	31	25	4	29	13	19	−1	−5	−20	19	14	35	−10	39	20	29	24	55	49
14	48	40	54	48	40	34	34	22	29	10	−1	−10	0	−10	25	17	−10	−25	43	37	24	15	54	48
15	59	44	57	45	41	34	41	24	31	19	7	−10	10	−3	34	15	2	−25	42	14	26	15	59	49
16	52	47	58	49	43	36	39	35	29	16	10	6	14	8	19	9	26	2	26	14	30	17	60	50
17	47	38	61	49	42	18	35	15	16	−12	25	−1	24	10	14	−7	26	−1	22	13	38	25	61	49
18	42	36	55	50	20	15	36	20	15	−14	−1	−26	40	20	16	−3	−1	−25	30	12	40	32	54	49
19	37	28	57	51	38	16	36	27	26	11	23	−40	40	25	18	10	−10	−25	17	10	33	28	55	46
20	46	32	55	48	33	23	31	23	20	9	20	−26	25	0	10	−10	15	−10	19	10	42	25	53	47
21	49	41	53	42	27	19	30	22	35	−6	32	16	0	−16	23	−5	30	−4	25	16	49	41	48	38
22	53	41	48	39	21	16	31	22	−6	−16	29	20	4	−15	23	2	26	1	24	17	49	35	38	34
23	53	46	48	29	24	15	44	31	26	−13	29	−4	18	3	2	−35	17	−6	35	19	35	24	45	35
24	48	39	51	38	33	21	44	37	23	−3	18	4	3	−15	−27	−40	14	4	30	14	45	30	53	42
25	54	38	52	40	40	28	37	22	16	−10	33	5	15	−19	−6	−27	13	4	26	16	37	15	52	43
26	55	49	54	41	36	24	37	19	37	3	32	4	9	−15	1	−7	32	12	21	12	41	15	50	41
27	51	46	56	44	34	20	24	15	32	0	34	−9	22	1	14	1	25	12	26	16	53	27	61	48
28	48	43	58	47	22	15	18	8	25	2	14	−10	29	15	31	11	27	10	33	21	55	44	54	45
29	52	43	60	47	36	18	34	12	22	−35	25	11	36	1	14	0	36	18	33	10	47	28	56	45
30	52	38	60	48	38	35	35	20	−18	−40	38	18	5	−30	.....	.....	18	4	23	13	35	18	54	46
31	38	32	59	48	.....	.....	25	6	.....	.....	40	32	17	2	.....	.....	14	3	.....	.....	53	33	.....	.....
Range	31°		33°		47°		40°		77°		80°		71°		76°		72°		43°		48°		34°	
Monthly means	45°.5		49°.1		35°.6		28°.3		12°.1		12°.5		8°.1		6°.9		13°.8		19°.5		33°.1		48°.8	

Maximum, minimum, and mean temperatures—Continued.

STATION, NASHVILLE, TENN.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	88	66	85	69	90	69	65	49	71	37	62	34	73	58	55	18	67	38	56	44	60	48	85	67
2	90	72	70	63	91.5	70	62	39	70	50	56	42	60	45	29	12	50	35	67	50	59	46	84	72
3	92	74	76	63	91	71	72	42	69	58	56	49	56	36	37	23	49	26	67	50	65	42	84	68
4	95	73	81	59	90	74	79	59	68	42.5	58	47	61	35	34	19	56	31	63	42	73	43.5	78	63
5	93	73	83	62	90	65	80	55	52	42	58	49	64	44	39	9	65	41	64	50	72	57	75	58
6	92	75	80	71	90	71	73.5	57	52	32.5	64	51	56	36	50	32	73	53	60	39	84	60	81	55
7	89	73	81	59	90	67	60	49	52	45.5	59	39	56	29	54	41	67	11	67	37	76	62	86	60
8	86	72	82	60	93	68	69	40.5	57	43	42	33	65	40	65	44	59	33	69	47	66	57	88	70
9	89	71	83	60	93	71	70	46	52	40	37	30	68	37	64	51	70	43	71	43	67	46	80	70
10	90	73	85.5	62.5	86	65	73	47	51	38	46	29	49	26	71	58	76	55	72	49	78	54	88	66
11	87	70	80	65	69	58	61	43	58	31.5	46	35	38	23	73	56	74	57	78	53	83	50	88	65
12	80	71	79	66	70	61	55	35	64	39	46	32	41	30	68	41	67	35	78	61	84	60	84	69
13	85	72	83	60	76	63	59	33	67	52	49	38	34	19	73	55	49	29	76	68	71	59	82	69
14	87	72	83	65	82	62	64	37	57	45	47	32	44	17	58	42	57	35	68	50	82	54	87	67
15	92	75	80	67	86	63	61	44	65	45	59	32	47	27	57	28	63	46	69	47	84	53	83	70
16	96	75	84	67	86	66.5	53	35	52	32	55	35	54	37	44	23	62	45	62	50	85	61	84	67
17	97	76.5	81	67	76	53	65	32	37	23	38	14	62	51	44	28	47	32	60	45	85	65	75	64
18	94	77	79	68	57	49	55	43	54	31	37	12	61	55	48	24	36	18	59	40	86	65	73	58
19	92	76	80	60	68	48.5	57	37	73	53	53	27	60	40	59	30	39	21	70	40	88	65	78	58
20	88	72	79	57	63	44	64	33	75	59	69	33	52	32	63	34	39	29	80	57	88	69	82	60
21	82	70	80	57	61	42	69	36	61	39	60	46	58	35	55	39	32	18	74	61	87	70	86	63
22	89	71	80	59	63	46	71	38	59	34	67	56	64	49	52	31	38	14	68	56	84	68	79	69
23	84	71	83	63	66	45	71	48	60	45	66	60	72	55	43	30	46	32	80	56	73	59	91.5	66
24	80	71	85	62	67	48	74	44	49	34	68	61	57	34	56	22	56	39	74	54	78	56	94	74
25	91	68	86	63	70	55	76	48	58	30	68	57	50	35	68	41	56	44	63	47	75	64	91	73
26	89	68	86	64	66	51	71	50	60	49	73	46	58	37	69	45	54	38	69	44	75	57	89	72
27	89	72	86	63	73	41	71	42	54	42	49	37	69	56	66	35	52	40	80	50	80	60	91	73
28	91	75	85	64	70	47	73	46.5	60	35	49	41	73	60	64	43	55	33	73	60	84	63	93	72
29	89	74	88	64	77	46	75	60	55	36	64	46	69	27	53	32	48	32	75	47	85	61	90	73
30	91	71	87	70	70	60.5	72	46	50	28	72	51	40	21	.....	.....	60	35	73	57	90	63	93	73
31	86	70	89	67	.....	.....	55	36	.....	.....	73	59	53	29	.....	.....	66	40	.....	.....	78	70	.....	.....
Range	31°		32°		52°		48°		52°		61°		56°		64°		62°		43°		48°		39°	
Monthly means	81°.3		71°.0		69°.2		56°.4		50°.4		49°.2		47°.3		46°.2		46°.6		60°.5		70°.3		76°.5	

Maximum, minimum, and mean temperatures—Continued.

STATION, NEW HAVEN, CONN.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	83	67	75	51	80	63	69	44	47	35	19	6	60	39	42	30	37	22	44	32	51	32	68	42
2	76	58	67	55	79	59	62	40	42	29	29	9	63	43	43	15	31	23	49	30	62	41	73	50
3	78	59	66	55	82	64	63	39	49	27	34	9	58	36	30	8	29	15	43	44	53	45	78	61
4	79	58	80	55	86	72	71	51	41	32	42	20	43	18	36	20	42	20	46	32	58	40	78	62
5	81	66	80	67	80	62	71	58	45	31	39	24	42	14	24	6	48	29	45	31	63	46	73	56
6	84	71	80	61	81	65	59	49	49	33	40	31	45	25	41	4	53	35	54	38	65	51	70	56
7	82	71	80	61	73	61	63	46	53	32	48	32	34	20	51	35	57	37	55	36	75	51	76	54
8	81	65	76	69	76	52	71	40	47	36	40	31	46	26	50	32	52	30	50	31	75	60	79	59
9	78	65	80	63	81	52	58	40	45	27	42	33	52	40	47	31	45	28	43	25	65	54	80	64
10	80	66	82	63	77	51	62	38	44	34	39	30	55	22	43	31	45	26	50	31	65	54	84	65
11	84	66	79	65	63	43	62	43	50	38	40	26	43	18	52	32	42	28	60	36	64	48	82	64
12	78	59	84	73	64	44	50	35	55	34	45	33	36	19	51	37	42	28	63	42	58	50	69	61
13	80	59	83	71	72	55	59	32	66	39	50	32	26	9	58	35	52	30	60	47	63	43	76	61
14	81	67	83	71	71	58	55	33	50	36	40	22	33	9	48	30	31	18	66	48	62	46	78	63
15	82	64	84	68	72	58	56	45	43	32	38	19	45	22	52	30	36	17	62	48	62	46	79	65
16	75	65	80	71	72	58	66	51	57	38	49	33	49	32	49	31	36	21	58	46	60	45	78	64
17	83	62	78	70	69	52	58	44	41	28	45	20	52	35	47	28	45	29	57	38	60	42	80	64
18	76	62	78	69	58	44	65	42	44	24	26	15	54	35	36	22	38	7	50	34	60	50	82	68
19	72	54	82	71	51	43	60	43	51	41	25	0	52	45	48	23	25	6	50	36	75	50	80	69
20	77	56	82	70	64	47	60	39	48	34	34	−2	50	32	46	27	31	12	61	36	69	53	80	68
21	76	62	82	66	59	44	65	47	39	27	52	32	40	22	41	20	49	30	65	43	73	55	79	68
22	81	63	80	63	60	39	67	46	36	23	57	32	30	20	43	27	41	26	62	40	80	58	76	60
23	77	66	70	61	59	36	70	48	53	21	62	35	45	22	32	8	48	29	59	44	60	47	81	58
24	80	66	71	57	65	39	65	51	59	29	51	28	41	27	22	3	48	27	57	39	69	45	85	67
25	79	60	72	58	70	48	72	43	39	27	47	29	40	25	33	11	42	32	50	40	80	51	88	70
26	81	63	75	54	66	48	61	43	54	29	48	31	40	20	36	20	55	37	53	36	64	48	89	68
27	85	69	76	54	67	45	62	46	56	29	48	27	45	18	30	20	48	35	65	38	78	50	88	68
28	79	67	74	55	69	52	60	40	47	24	32	20	43	30	28	21	46	33	62	41	79	57	89	73
29	75	62	81	55	62	49	52	44	51	8	42	27	50	33	38	21	56	37	60	43	80	62	83	69
30	79	60	82	63	71	53	60	44	20	2	42	33	39	16	.....	.....	47	32	60	35	67	51	84	69
31	77	63	82	63	.....	.....	56	40	.....	.....	52	37	35	13	.....	.....	53	33	.....	.....	65	44	.....	.....
Range	31°		30°		47°		40°		64°		64°		54°		55°		51°		36°		48°		47°	
Monthly means	72°.5		71°.0		62°.3		52°.9		37°.8		32°.7		34°.2		31°.2		35°.5		47°.3		58°.8		72°.1	

Maximum, minimum, and mean temperatures—Continued.

STATION, NEW LONDON, CONN.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	82	66	73	61	80.5	62	69	51	43	33	18	6	60	39	36	28	34	21	44	33	50	32	65	43
2	77	59	65	55	77	59	59	42	41	30	27	10	58	40	41	13	34	26	49	30	61	39	73	49
3	75	58	73.5	56	76	64	63	42	47	28	32	13.5	53	36	31	7	32	18	40	33	50	39	66	55
4	72	58	78	65	85	69	69	56	40	32	41	25	37	21	33	21	38	18	45	33	53	37	70	56
5	78	65	73	66	78	62	71	58	43	27	39	26	39	16	22	9	45	28	44	33	53	43	67	56
6	81	65	74	62	80	65	62	49	48	30	40	32	44	27	42	5	52	36	52	35	55	47	72	56
7	80	68	79	68	76	60	67	48	51	32	40	30	34	20	50	36	56	37	54	33	64	47	74	54
8	81	65	77	68	76	54	60	42	49	35.5	39	34	41	26	47	34	49	35	48	33	67	54	75	56
9	72	62	79	67	82	64	59	42	47	31	40	32	50	39	43	30	44	32	45	26	61	52	76	62
10	72	63	81	65	78	53	40	40	54	35	38	28	50	22	45	32	43	30	51	29	62	50	78	60
11	84	67	75	67	65	47	59	46	49	36	37	24	25	17	49	32	39	28	60	35	62	47	78	61
12	73	59	80	69	62	45	51	37	54	34	45	33	32	18	49	39	38	30	62	37	54	46	67	59
13	80	60	79	71	74	55	49	32	60	41	42	30	23	13	55	34	46	27	54	45	60	44	70	60
14	80	65	81	71	71	61	51	33	48	43	33	21	28	9	43	37	33	17	62	44	62	44	70	59
15	77	65	82	71	69	61	57	49	43	33.5	35	19	39	2	49	36.5	37	16	58	46	54	47	75	61
16	70	62	74	69	70	62	60	51	51	38	42	32	47	34	39	31	39	23	56	43	60	46	69	60
17	83	61	72	67	67	50	55	41	41	29	41	21	42	32	35	27	38	32	55	39	55	42	72	62
18	70	58	74	68	61	44	62	43	41	24	22	13	51	36	35	24.5	34	11	50	36	59	48	73	64
19	72	56	79	71	53	44	61	47	47	40	16	1	50	43	40	23	25	7	48	36	74	49	73	64
20	74	55	79	70	63	47	61	43	47	36	35	−1	47	33	40	27	32	14	53	33	67	52	75	62
21	73	63	81	68	61	45	63	47	41	30	45	33	40	26	41	20	48	30	64	41	64	51	78	65
22	78	63	79	66	59	41	65	45	39	26	53	38	32	21.5	36	29	37	25	57	39	74	55	75	57
23	80	64	72	58	59	40	67	46	51	22	56	40	42	23	31.5	8	40	24	53	41	63	48	77	57
24	79	62	71	58	65	39	59	52	48	34	50	29	40.5	27	16	2	47	28	51	38	65	44	82	62
25	78	61	72	59	66	50	67	46	39	28	42	31	36	23	28	11	46	31	46	38	76	49	87	64
26	79	64	73	54	62	48	59	44	52	30	47	32	35.5	23	35	19	54	40	48	34	61	48	86	68
27	84	69	74	54	67	46	62	44	52	35	50	33	42	21	34	23	45	36	64	35	73	48	79	66
28	77	67	74.5	55	69	55	54	38	47	26	35	25	42	33	33	26	46	32	52	41	73	56	88	69
29	71	60	80	55	62	52	55	44	46	14	38	31	48	37	38	23.5	54	35	61	45	77	58	83	71
30	76	61	79	63	67	58	60	45	15	4	44	34	37.5	18	.....	.....	45	33	56	35	67	49	77	67
31	77	63	80	63	.....	.....	57	37	.....	.....	43	37	32	16	.....	.....	50	32	.....	.....	59	45	.....	.....
Range	29°		28°		46°		39°		56°		57°		58°		53°		49°		38°		45°		45°	
Monthly means	69°.9		70°.1		62°.5		57°.2		39°.0		32°.7		34°.1		32°.6		35°.2		45°.3		55°.5		67°.5	

Maximum, minimum, and mean temperatures—Continued.

STATION, NEWPORT, R. I.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	.....	.....	*75	60	80	60	67	55	42	34	19	5	53	37	38	26	34	22	41	35	46	33	68	45
2	.....	.....	66	58	79	63	58	43	40	31	26	10	50	39	43	12	32	25	46	31	61	41	72	51
3	.....	.....	71	58	78	65	60	44	46	29	33	15	48	37	32	6	30	20	40	35	50	37	68	55
4	.....	.....	76	65	77	65	66	57	40	34	39	36	37	20	34	20	34	20	43	32	50	35	68	57
5	.....	.....	75	65	78	63	66	52	44	31	39	28	39	15	21	8	41	28	38	31	54	42	63	54
6	.....	.....	77	63	79	66	58	49	48	33	41	33	44	26	42	12	45	37	49	34	53	46	75	56
7	.....	.....	78	68	75	61	64	52	49	36	41	32	33	19	48	37	48	38	49	35	56	45	74	57
8	.....	.....	76	67	72	57	57	45	45	35	39	34	43	32	45	33	48	58	46	34	60	50	68	58
9	.....	.....	.....	66	75	66	58	44	45	29	40	32	46	40	42	31	48	35	45	26	58	49	66	59
10	.....	.....	78	65	74	52	61	43	55	36	38	30	47	23	42	28	40	30	51	30	60	48	67	57
11	.....	.....	79	66	64	45	60	46	52	37	38	27	24	17	47	32	36	28	57	36	62	47	69	58
12	.....	.....	79	69	63	50	50	40	52	36	45	34	29	19	48	39	40	31	56	40	52	46	67	58
13	.....	.....	80	71	72	58	48	35	54	45	43	33	22	14	47	37	43	28	56	40	58	45	73	61
14	.....	.....	79	69	71	60	53	40	50	40	34	22	27	10	44	36	31	19	57	45	62	44	74	59
15	.....	.....	81	69	70	60	57	47	41	32	34	18	38	25	52	36	36	16	55	44	54	48	73	60
16	.....	.....	75	70	70	62	61	51	50	36	43	33	45	35	40	31	36	23	52	42	58	44	73	60
17	.....	.....	76	66	68	51	54	43	42	27	40	21	42	34	32	26	37	32	50	38	56	43	77	64
18	.....	.....	79	68	59	45	60	46	42	23	21	14	49	37	34	23	35	12	50	38	56	48	77	66
19	.....	.....	80	71	52	45	54	47	47	42	16	1	48	42	38	22	25	9	47	37	68	49	78	65
20	.....	.....	79	70	61	47	61	44	48	35	37	− 3	43	32	39	25	32	16	51	35	64	50	76	64
21	.....	.....	78	67	62	48	61	51	45	31	43	37	35	23	37	20	48	30	61	40	61	51	76	65
22	.....	.....	78	67	57	45	61	47	37	25	49	40	30	29	37	29	58	26	52	38	62	52	76	60
23	.....	.....	71	59	58	42	62	48	52	24	51	40	42	24	30	6	39	26	51	41	55	47	73	59
24	.....	.....	71	57	62	49	57	47	48	35	45	30	39	25	17	1	42	30	52	37	61	44	74	63
25	.....	.....	73	59	63	54	65	48	37	27	41	32	35	18	28	10	45	33	47	37	67	50	83	63
26	.....	.....	73	55	61	50	57	43	53	33	46	32	36	20	32	18	48	40	42	34	61	45	85	65
27	.....	.....	73	56	62	49	60	45	52	32	48	28	43	20	32	20	46	36	62	36	62	49	79	65
28	.....	.....	75	55	66	56	50	41	47	24	36	21	42	34	34	26	42	33	50	39	65	51	89	67
29	.....	.....	79	58	62	50	54	43	47	14	38	30	47	36	32	23	47	36	60	45	65	53	80	70
30	.....	.....	78	64	66	56	57	45	14	4	43	35	37	19	.....	.....	44	34	50	38	62	49	80	68
31	.....	.....	80	62	.....	.....	57	38	.....	.....	43	38	34	18	.....	.....	47	32	.....	.....	60	45	.....	.....
Range	.....	.....	26°		38°		32°		51°		54°		43°		51°		49°		36°		35°		44°	
Monthly means	.....	.....	69°. 6		61°. 7		52°. 5		38°. 9		33°. 0		33°. 5		31°. 1		34°. 5		43°. 6		52°. 5		67°. 0	

*Station opened August 1, 1875.

Maximum, minimum, and mean temperatures—Continued.

STATION, NEW ORLEANS, LA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	87	76	88	78	87.5	76	79	68	72	53	69	62	77	66	72	51	79	59	75	64	83	68.5	87.5	75
2	87.5	74.5	86	76	87.5	76	71	61	75.5	54	67	58	67	64	51	36	70.5	54.5	76	70	79	59	81	70.5
3	86	77	87.5	75	87	77	75.5	62	78	61	69	59	64	55.5	64.5	41	58	42	76.5	63	69	54	87.5	73
4	88	77.5	90	76	86.5	77	77	69	80	67	65	62	66.5	51.5	63	42	66	48	78.5	59	74	57	87	76
5	88	78	90	77	88	77	79	69	74.5	57	69	61.5	72	55	52.5	37	72.5	60.5	76	55	79	65	82	73
6	87	78	86	76	90	77	82	70	62	54	72	57.5	68	59.5	66	49	74	64	69.5	60	80	70	81	70
7	88	78	85	75	91	78	79	69.5	63	55	57.5	47	68.5	53	62	55.5	70	57.5	66	61	81	64	84	68
8	87.5	77	89	76	92	79	75	61	65	56	53	41	74	51	69	56	66	49	70	62	73	64	86	71.5
9	85	76	90	76	89.5	79	76	62	66	53	61	40	75	60	72	54.5	76	53	72	61	75	60	84.5	72.5
10	87	77	86	76	89.5	78	75.5	64	59	54.5	64.5	45	68	50	75.5	61	76	63	76	61	76	62	86	73
11	88.5	77	87	70	86.5	78	78	62.5	61	48	66	51	52	44	78	68	77	65	77	68.5	80	62.5	84	74.5
12	89	78	86	70	85	75.5	70	59.5	70	49	62	50	55	43	78	68	71.5	52	81	71	81	65	84.5	74
13	89	78	87	75	84	74.5	69	58	74	57	62.5	49	54	44	77	62	58	42	81	72.5	84	68	86.5	75
14	91	79	81	75	86	76	76	57	79	65.5	56	47	51	38.5	71	54.5	67	50	75.5	58	85.5	68	81.5	75
15	92	78	84	75	85	79	68	61	80.5	69	69	48	61	43	61	49	73.5	61	69.5	53.5	83	67	84	73
16	92.5	78	82	76	87	78	67	53	79	63	70	47	74	53	65	48	72	58	76	57	83	70	87	75
17	85	76	81	75.5	84.5	77	69.5	54	64	50	60	45.5	75	62.5	60	51	67.5	50.5	71.5	61	84	69	85	74.5
18	85	75	87.5	74.5	80.5	64	77	59	71.5	51	51.5	36	74	64	60	47	61.5	50.5	72	56.5	84	69	87	74
19	82	73	85	74.5	74.5	62	67	51	79.5	70	56.5	40	65	53	61	46	66.5	48	73	55.5	84.5	68	83	73
20	88	77	81	75	75	65	67	51	78	71	69	51	58	44	67	47	57.5	39	76	58	85	72	87.5	73
21	87	78	77	72	74	61	71	55	80	68.5	73	60.5	67	51	75	58	51	36.5	76	60	84.5	70	87.5	73
22	89.5	77	84.5	70.5	75.5	61	74	58.5	72	62.5	75	62	76	62	61	52	55	40	77	61	85	69	88.5	73.5
23	89.5	78	85	73	80.5	62	75.5	61	79	67.5	76	65.5	77	62	62	48	66	48	78	60	85.5	72	89.5	77
24	87	77	82	75	77	68	79	60	73	62	76	67	71	62	62	45.5	67	59	79	62	84	72	93.5	77
25	88	78	84	73.5	78	68	79.5	62	72	61	76.5	70	66	61	67	45.5	71	53	76	67	82	70	91	78
26	89.5	77	84	74	70	64	72	63	77	65	77	70	73	58	72	52	69	59	76.5	63	85	72	90.5	77
27	90	78	84.5	74.5	69	63	72.5	58	69	62	74	66.5	74.5	62	75	62	71	55	78	61.5	81	71	89.5	72.5
28	90	77	86	75	76	66	78	57	72	61	77	70	71	62	73	62.5	63	52	81	65	84	72	89.5	76
29	88.5	78	87	76	74	65	80	70	69	64	77	70	70	50	70	54	63	45	81	67	83.5	73	89	78
30	88	79	86.5	76	80.5	67	70	61	65	60	78	67	53	41	.....	.....	67	46	82.5	65	85	73	88	77
31	89	78	86.5	76	.....	.....	67	56	.....	.....	77	68	64	44	.....	.....	67	54	.....	.....	86	73	.....	.....
Range	19°.5		20°		31°		31°		32°.5		42°		38°.5		42°		40°		29°		32°		25°.5	
Monthly means	81°.8		79°.3		76°.2		67°.3		65°.6		61°.5		60°.3		59°.0		59°.9		69°.1		74°.8		80°.6	

Maximum, minimum, and mean temperatures—Continued.

STATION, NEW YORK, N. Y.

Day of month.	1875. July.		August.		September.		October.		November.		December.		1876. January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max	Min.	Max.	Min.	Max	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	81	63	73	64	84	68	75	44	43	33	23	9	56	39	42	28	34	27	42	35	53	34	78	49
2	76	62	68	58	86	65	63	40	43	31	35	12	64	45	43	13	36	24	48	30	61	41	76	56
3	75	61	77	55	94	69	66	43	49	28	34	16	56	37	27	8	35	17	43	32	53	44	80	61
4	76	64	82	68	91	72	70	53	43	33	42	30	39	24	31	20	40	21	45	37	53	41	83	66
5	84	69	80	69	86	63	75	55	47	32	41	29	40	20	29	11	51	28	56	36	63	44	73	62
6	88	72	81	67	86	66	63	53	48	34	42	32	46	31	34	11	59	36	53	36	72	49	70	56
7	87	70	80	66	80	61	64	45	51	34	43	35	41	26	49	31	63	46	57	38	83	60	75	54
8	84	67	78	68	82	59	(*)	42	53	38	41	32	46	30	47	33	54	31	49	35	79	64	83	60
9	77	67	83	66	85	63	60	43	49	33	44	35	54	42	45	32	52	26	46	29	67	55	82	65
10	76	68	86	66	(†)	55	63	43	48	39	39	30	54	22	50	38	47	30	57	31	64	51	85	64
11	86	70	78	70	68	48	55	44	49	39	38	28	27	18	50	35	40	32	58	38	63	47	83	67
12	74	64	84	70	66	53	53	38	58	37	45	30	31	17	53	41	38	30	63	43	60	52	69	62
13	82	63	83	70	74	60	57	33	60	40	45	28	25	14	57	36	46	30	60	46	63	46	74	64
14	84	68	84	69	75	62	56	40	55	39	33	22	30	12	45	35	35	17	68	45	65	45	77	63
15	83	70	85	70	78	63	56	49	43	36	33	18	39	24	53	34	43	19	62	47	66	50	78	60
16	74	67	86	68	71	61	60	42	50	35	45	30	49	34	37	27	39	27	59	45	60	48	71	60
17	88	66	83	71	69	50	53	39	40	27	42	19	49	35	34	26	45	31	52	39	55	46	76	63
18	82	66	82	69	64	44	63	46	42	27	22	13	56	34	35	27	32	12	49	37	61	49	75	67
19	76	59	84	68	53	45	56	42	52	37	22	6	58	44	46	26	30	9	50	35	76	54	80	67
20	74	61	86	69	67	46	63	37	47	40	30	2	45	31	40	29	34	12	56	34	70	53	76	66
21	79	62	84	67	61	45	68	47	43	35	48	23	42	26	37	24	48	29	65	43	80	53	77	65
22	81	69	83	66	61	42	70	51	42	25	56	40	34	23	41	33	38	22	57	40	79	62	76	59
23	86	71	70	59	64	44	69	51	52	28	61	40	44	26	34	10	39	27	62	43	64	47	80	60
24	83	69	73	60	65	43	72	53	47	32	50	34	41	29	24	7	48	28	55	44	67	47	88	65
25	82	64	75	62	68	47	(†)	52	43	30	40	34	35	27	37	14	51	32	49	41	76	53	87	69
26	82	68	76	60	63	49	63	48	55	33	44	35	34	21	37	24	51	37	56	39	67	52	92	70
27	85	71	77	59	71	47	55	42	50	35	50	32	42	27	32	26	42	33	68	39	78	51	90	71
28	81	70	82	61	76	53	55	39	45	31	36	28	47	40	33	26	47	32	66	50	79	57	89	73
29	72	63	90	65	72	56	67	49	45	16	40	32	54	30	39	25	51	39	59	46	80	62	85	72
30	82	63	88	68	78	56	60	42	19	7	46	35	33	19	.....	.....	40	32	57	35	70	53	87	70
31	79	69	87	68	.....	.....	46	34	.....	.....	43	35	35	21	.....	.....	48	31	.....	.....	63	49	.....	.....
Range	29°		32°		.....		.....		53°		59°		52°		50°		54°		39°		49°		43°	
Monthly means	72°. 6		74°. 0		63°. 8		52°. 7		38°. 9		33°. 1		35°. 1		31°. 6		35°. 0		46°. 1		58°. 4		70°. 8	

* Maximum thermometer broken. † Maximum thermometer out of order.

Maximum, minimum, and mean temperatures—Continued.

STATION, NORFOLK, VA.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	95.5	73	82	73	80	69.5	77	62.5	58	33	41.5	26	60	55	50	38	51	34	44	38	59	38	76	53
2	82	70.5	93	74	82	67	63	48.5	51	44	36	31.5	73	58	49	28.5	45	31.5	45	37	50	44	86.5	58
3	84	69	91	73	90	71	68	48	52	39	45	35.5	62	46	40	24	39	28	64	40	51	43	95	69
4	90	69	91.5	72	92	73	75	57	60	45	44.5	40.5	52	40	37.5	29.5	44.5	30	57	44	64	43	89.5	72
5	93	72	90	70	80	71	79	60	40	42.5	54.5	44	53	37.5	32	24	59.5	33	65	42	74	50	72	62
6	95	76	93	72	90.5	68	81	62.5	50	38	46	40.5	57	39.5	46.5	32	69	41	58	45.5	86	62	74	59.5
7	94	73	93	69	77	69	69	55	52.5	41	50.5	44	51	35	49	40	73	53	69	43	88.5	67	84.5	60
8	87	72	80	69	81	63.5	62.5	50	49	45	54.5	44	60	38.5	50	42	61.5	43	53	43	87	68	87.5	65
9	87	73	84	69	85	65	66	51	51	43	50	44	68	54	60	36	52	37	50	39	79	63	87	64
10	93	72	87	71	89.5	63	73	52.5	56.5	46	44	36.5	61	32	63	50	62	69	57	39	75	56.5	90	66
11	89	76	87	72	66.5	58	63	53	51.5	40	50	32	37.5	26	72.5	49	57	45	66	43	70	54	90	69
12	89	72	85.5	71	75	63	53	45	61	38.5	45.5	38	44	27	64.5	46	66	45	77	49	82	55	90	70.5
13	89	70	88.5	74	76.5	68	55	44	65.5	42.5	49	34.5	32	22	69.5	43	61.5	39	82.5	62	64	59	85	69.5
14	91.5	74	88	71	76	66	58	51	65.5	51	41	31	35	21	73	58	49	34	83.5	66.5	70	53	84	68.5
15	91.5	74	86	74	77	64.5	67	50.5	60.5	47	46	26	48	26.5	64	44	55	40	68	51	80	52	83	67.5
16	94	74	87.5	73	86	65	62	46	70.5	52	58	42	56	41	48	37	69.5	44	73	52	67	54	87.5	68
17	97	75	90	73	81.5	66	57.5	38	52	34	54	21	61	46	47	31	63	41	59.5	48	71	54	86	71
18	101.5	78	89.5	73	61	55	65	42.5	48.5	30.5	28	17	68	54	46	34	41	26	54	45	83	59	83	70
19	83	68	86	72	68	58	56	44	61	39	34	22	71	50	55.5	33	32	19	56	41.5	78	65	92	70.5
20	81.5	67	86.5	70	69	56.5	54	38.5	61.5	49	49	21.5	50	39.5	54	40	57.5	29	73	42.5	82	66	92	71
21	89	72	84	70	63	55	70.5	43	56	46	62	36	56	37	54	36	58	33.5	70	56.5	88	65	87	71
22	94	75	83	73	63	52	71.5	50.5	46	40.5	67	55	58	40	54	41	42	29	66	52	89	69	85	67
23	94.5	75	82	69	63	51.5	73	54	68.5	43	70	49.5	68	55.5	41	22	47	31	73	51	70	55	87	69.5
24	85.5	73	80	70	63	50.5	75	55	65	44	61	52	60	40.5	41	19	51	39	61	47	70	51	94	74
25	92	75	71	68	70	58	75	53	50	36	71	56	47	35	50	30	65	46	48	43	80	53.5	93	76
26	98.5	74	71	67	68	58	77	54	67	41	73	55	41.5	35.5	64	36	58.5	45	58	39	78	64	94	76
27	98	77	71	66	71	51	66	52	58	42	67	44	68	34	60.5	46	63	39	73	45	81	63	100	78
28	95	75	76	68	77	54	68.5	48	55	39.5	49	43	72	53	70.5	45	67.5	49	79	57	82	63	97.5	78
29	97	73	76	68	71.5	63	74	53	60	38.5	53.5	42	75	48	45	36.5	53.5	44	67	54.5	84.5	63	94	79
30	98.5	77	80	68	78	61	70	53	38.5	27	57	48	36	32	.....	.....	55	40	80	45	78	59	87.5	74.5
31	92.5	76	82	69	.....	.....	53	42	.....	.....	68	54.5	39	33	.....	.....	56	39	.....	.....	63.5	56	.....	.....
Range	34°.5		27°		41°.5		43°		43°.5		54°		51°		54°		54°		46°.5		51°		47°	
Monthly means	81°.2		76°.1		68°.7		58°.3		49°.0		46°.3		47°.7		45°.0		46°.5		55°.3		65°.7		78°.1	

Maximum, minimum, and mean temperatures—Continued.

STATION, NORTH PLATTE, NEBR.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	83	59	85	65	81	58	65	30	61	35	60	29	45	14	19	—14	32	11	32	27	57	42	71	48
2	87	65	87	62	87	60	85	43	57	30	52	27	40	14	49	9	43	13	39	24	67	34	61	41
3	78	59	86	66	84	46	67	45	51	35	53	28	36	16	28	8	61	19	55	27	57	37	64	33
4	72	59	90	66	95	60	78	39	48	34	56	30	46	23	54	9	60	25	43	26	53	38	82	36
5	72	57	84	65	90	65	55	39	48	30	40	25	46	25	57	21	44	24	48	16	45	36	90	48
6	79	52	82	61	96	68	65	31	55	27	34	13	56	24	48	26	36	15	62	26	41	34	63	64
7	79	57	85	58	97	63	75	40	48	34	37	22	59	18	55	24	65	20	68	29	56	37	78	58
8	88	65	90	63	94	66	(*)	.....	45	30	46	24	52	23	46	34	66	24	71	40	67	39	82	53
9	79	65	86	66	78	48	75	33	51	23	54	25	23	0	61	27	30	9	61	40	81	42	94	58
10	78	65	80	63	67	40	58	39	66	28	46	25	26	—5	54	27	10	—2	62	30	86	49	75	59
11	81	62	81	53	74	51	49	36	61	35	56	29	33	4	58	20	19	—9	57	35	76	54	80	52
12	84	61	83	57	72	54	73	33	43	29	50	29	36	9	58	21	36	0	37	28	66	46	70	46
13	84	58	80	59	75	60	80	35	42	25	45	25	39	9	45	21	55	20	47	30	75	51	76	40
14	90	57	82	56	84	62	58	39	55	24	56	25	40	9	41	24	40	12	60	28	82	58	80	46
15	98	63	79	62	79	63	66	33	24	—3	48	26	45	14	52	21	18	8	66	42	70	55	75	56
16	94	66	77	60	79	50	77	37	13	—8	31	18	45	19	49	22	26	0	58	40	76	43	75	46
17	81	68	75	48	61	47	66	39	43	0	52	16	50	18	55	20	26	4	63	36	83	53	67	53
18	76	58	74	47	70	43	65	33	52	28	49	20	35	21	52	29	30	7	79	37	87	60	68	43
19	86	56	76	51	56	45	80	35	51	33	61	22	37	12	56	19	21	3	68	43	78	54	76	41
20	85	62	73	57	52	32	81	34	47	7	52	23	27	3	43	23	43	—4	70	39	80	50	89	45
21	77	62	81	47	55	32	81	37	17	—3	53	24	11	0	50	9	55	23	77	46	75	50	100	65
22	86	59	80	48	62	36	80	37	50	8	61	28	20	9	55	23	39	32	76	47	64	51	96	67
23	90	57	87	54	71	40	64	45	40	19	50	27	17	—3	55	12	54	31	67	50	57	48	90	64
24	87	59	83	64	64	42	69	43	45	22	38	20	27	6	67	28	54	29	70	41	61	49	96	60
25	78	59	79	59	73	36	55	30	38	27	34	17	38	5	68	26	40	27	80	47	64	54	101	69
26	81	61	84	49	82	39	57	21	35	11	33	16	48	15	33	18	39	24	85	44	64	54	83	65
27	79	58	80	56	81	43	73	32	38	23	35	20	46	12	29	12	34	26	68	52	80	55	70	57
28	83	63	70	53	87	39	59	39	30	—2	48	17	35	8	42	9	45	19	72	36	84	58	86	53
29	89	63	83	55	75	48	46	32	22	—4	58	21	44	0	30	20	54	30	76	40	88	64	86	58
30	74	62	84	67	63	45	51	26	68	15	44	31	52	19	.....	.....	48	26	64	46	83	62	76	61
31	78	56	84	63	.....	.....	74	30	.....	.....	39	23	34	—9	.....	.....	43	29	.....	.....	70	56	.....	.....
Range	46°		43°		65°		.....		76°		48°		68°		82°		75°		69°		54°		67°	
Monthly means	72°.5		71°.7		62°.5		53°.4		31°.5		34°.0		23°.6		32°.4		27°.9		50°.3		59°.6		67°.9	

* No observation taken.

Maximum, minimum, and mean temperatures—Continued.

STATION, OMAHA, NEBR.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. Jannary. Max.	Jannary. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	79	65	79	58	85	70	55	41	57	35	52	28	34	28	3	−10	31	24	38	31	53	37	79	61
2	86	68	78	58	86	69	71	42	55	32	58	36	36	26	33	0	30	9	41	34	58	38	67	52
3	86	67	83	65	78	62	70	48	50	35	51	40	37	19	25	3	50	23	51	34	61	45	60	43
4	75	66	84	64	84	61	65	46	48	31	47	37	49	19	37	1	60	36	62	33	50	38	74	43
5	70	61	83	67	85	65	56	44	54	37	51	26	41	24	53	32	64	27	48	29	52	41	87	52
6	77	58	76	60	86	67	57	37	59	39	26	19	51	28	43	30	28	14	59	35	51	42	89	67
7	81	59	79	57	90	72	75	49	60	36	33	16	52	32	44	27	33	9	66	36	49	40	78	63
8	84	63	82	61	90	72	60	45	50	34	32	14	58	30	44	28	50	32	70	40	63	38	72	58
9	83	67	82	64	78	57	73	43	46	22	39	14	30	10	43	37	40	19	71	49	76	46	88	62
10	86	67	76	65	64	49	54	41	60	29	39	19	18	2	65	30	24	10	66	40	72	48	78	60
11	83	69	78	59	66	49	48	29	69	36	42	18	40	18	49	22	18	8	75	48	80	56	82	60
12	89	66	77	58	75	59	58	34	42	31	54	28	29	11	57	37	22	5	59	39	68	49	69	58
13	83	70	80	55	71	58	70	39	41	23	46	32	38	10	47	24	46	19	43	31	72	53	77	59
14	88	69	82	62	81	68	61	42	42	32	51	22	49	24	31	19	52	39	56	31	82	60	80	63
15	97	70	78	61	80	66	54	36	33	15	43	31	45	35	26	5	43	34	61	42	81	66	80	65
16	97	74	70	60	70	54	70	39	26	9	31	2	53	34	32	16	34	17	56	39	79	56	65	53
17	81	67	73	56	59	46	61	44	39	12	16	−5	55	26	46	17	18	10	53	34	85	60	64	52
18	79	61	74	54	71	45	58	31	63	32	31	13	39	24	51	33	29	4	64	36	78	66	66	45
19	81	64	76	54	56	41	69	40	40	25	42	17	32	20	47	19	27	7	79	52	84	68	65	47
20	83	62	80	55	55	37	73	41	31	7	57	36	27	18	63	25	16	−4	66	48	84	66	76	47
21	83	63	76	57	59	38	75	44	16	0	57	31	28	14	35	6	31	5	73	51	79	59	87	58
22	81	67	75	55	62	38	77	51	35	15	63	39	28	16	37	15	35	26	69	52	70	59	94	73
23	87	62	76	59	65	45	65	52	26	9	49	33	16	7	27	4	41	32	61	49	67	54	93	74
24	91	68	83	67	62	48	67	43	42	14	38	26	25	4	62	27	39	34	58	46	73	55	81	69
25	78	66	84	66	63	42	60	41	47	25	36	20	29	12	64	38	41	34	66	43	77	53	91	71
26	81	61	75	65	74	45	45	35	29	12	33	18	41	25	38	20	44	30	81	53	80	52	91	71
27	82	65	82	67	78	51	55	35	38	21	32	19	43	24	36	17	38	32	73	54	83	58	74	61
28	85	68	73	62	79	52	62	35	33	−1	43	20	39	5	26	15	39	27	69	41	88	64	82	61
29	87	68	79	54	68	51	46	30	9	−6	54	37	25	−2	31	14	41	25	67	49	85	66	80	62
30	83	65	86	68	62	49	32	22	43	8	66	36	45	23	.....	.....	45	25	64	41	86	70	82	63
31	76	66	86	66	.....	.....	48	23	.....	.....	43	29	36	−1	.....	.....	48	31	.....	.....	85	69	.....	.....
Range	39°		32°		53°		55°		75°		71°		60°		75°		68°		52°		51°		51°	
Monthly means	74°.4		70°.2		62°.9		49°.6		32°.6		33°.5		26°.8		30°.1		29°.3		51°.3		63°.6		68°.6	

Maximum, minimum, and mean temperatures—Continued.

STATION, OSWEGO, N. Y.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	65	52	67.5	54.8	82	61	71	48	37.1	28.6	14.2	4	60	40	41.5	26	30	23.5	39	29.5	47	31	82	58
2	80	49	73	57	82	63	61	40	37	29	21.5	8	58	40	38	0	25.5	20	40	28.5	47	36	77	65.5
3	85.5	52	70	56	78	68	65	41	36	28.2	33	11	42	23	23.5	— 2	28	8	45	35	58	41	68.5	53
4	86	66.5	75	60.2	77	62	67	49	38	28.5	33	21.5	25	12	23.5	11	42	19	40	36	57.5	39.5	68	50
5	77	61.3	77	58.6	79	58	51	41	42.5	27	38	21.5	41.5	12	19	8	47	22	53	35	59	39.4	63	50
6	77.5	58.8	86	61	72	63	64	41	45	33	39.5	31	40	20	40	17	55	39	45.5	37	63	50	67	47
7	75	57	77	62	68	53	57	44.5	46	34.6	42.5	33	36	12	43.5	33	58.5	46	47	36	81	49	72.5	49
8	74	56	82	60.5	81	50	51	42	38	31	38	29.5	41	29	41.5	31	49.5	23	38.5	27	76	50	89	56
9	81	59.8	76.5	56	87	61	52	40.5	41	31.5	33	27	52	39	40	27	28	23	37	26	54	44	81	61
10	82	62	84	58.5	76	51	59	45	42	32.2	33	25	53	14	37	20.5	38	23.5	43	32	55	39	84	63.5
11	68	52.1	83	66.6	65	44	47	38.5	43	34.5	36	30	22	10.5	49.5	37	47	30.5	50	32	56.5	39	83	64
12	74	52.5	85	68	68	45	41.5	36.3	52	33	37	27.5	21.5	13	47	32.5	47	36.5	61.5	37	54	42	89	67.5
13	78	56.5	78	68	70	53	47	35.5	46	35	37.5	24.5	20	5	43.5	32	41	13	65	45	50	40.5	92	69
14	74	55.5	85.5	64	71.5	50.5	59	33.6	37	28.2	27	12	31	16	42	32	22	10	69	49	52	38	91	69
15	78	56.5	82	60.3	69.5	55.5	62	42.5	42	32.5	35	12.5	41	26.5	40	25	24	11.5	46	41	50	42	82	69
16	80	64.5	77.5	67.5	64	49.4	53	36	42.1	30	40	31	44	35.5	30.5	23	35	16	45	34	60	41.5	94.5	71
17	80	63	80	66	51	44	46	35.5	32	24.5	34	9	45	34	25.5	18	39	23	44	33.5	71	49	81	70
18	69	57	73.5	66.5	52	44	50	37	39	23	18.5	2.5	55	37	29.5	20	24	6	39	31.5	64	52	74	62
19	81	51	75	60	57	43	42	34	48	36	14	— 9	54	36	41	20	23.5	7.5	40	33	72	46	77	61
20	80.5	53.5	77	60	57	47	60	34	42	29	35	—14	36	27.5	34	21.5	28	12	46	33	75	51	74	58
21	75	59	83	59	51.5	45	56	44	44.5	23.5	49	33.5	38	18.5	38	13.5	34	23.5	47	38	80	58	68	56
22	87	55.5	71	59	52	40	59	40.1	31	21	53	41	29	18	38	16	31	23.5	58	36.5	68	40	70	51.5
23	74	62	69	50	61	43	75	48.5	42	23.5	52	28	38.5	24	16	4.5	37	24	50	40	52	36	75	54
24	75	58.8	73	49	67	41.5	67	50	41	27	37	21	32	22.5	16	2	43	23.5	52	35	70	40	88	65
25	87	55.1	74	53	71	46.2	55	39.5	37	26.1	45	31	35	21	18	5.3	41	30	50	39	65	45.5	80	65
26	83	67	74	56	64	48	59	39	42	30.1	52	29.8	31.5	17	18.5	14	40	33.5	54	37	73	42	87	56.5
27	74	64.4	78	52	68	47	51	40	42	21	52	24	44	21	22	11.5	34.5	30	61	36	84	51.5	87	69
28	79	63	78	58	73	55	49	37	42	22	34	20.5	45	35	29	19	37	29	56	40	80	59	75	61
29	86	59.5	82	59	70	57	51	42	39	3	40	29.5	52	18	29	19	39	30	55	36	67	45	84	57
30	72	60	76	61	70	59	56	41	11	— 1	55	36.5	25.5	10	.....	.....	38	27	41	32	57	49	72	61.5
31	71	60.2	77.5	58	.....	.....	43	29.7	.....	.....	65	38.2	40.5	19	.....	.....	37	31	.....	.....	91	48	.....	.....
Range	38°		37°		47°		45°.3		59°		79°		55°		51°.5		62°.5		43°		60°		47°.5	
Monthly means	67°.4		68°.6		58°.7		47°.9		34°.5		31°.0		32°.0		26°.4		30°.3		41°.8		52°.8		68°.6	

Maximum, minimum, and mean temperatures—Continued.

STATION, OTTAWA, CANADA.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	72.7	57	74.7	51	87.7	56.4	44.7	34.7	32.3	24.2	1.5	—14.9	51.7	34.7	31.7	13.9	32.7	18	41.7	19	41.7	30.8	87.7	55
2	80.7	52.6	78.7	50.2	88.7	94.6	48.7	31.5	31.7	20.2	8.6	—14.9	53.1	33.9	— 2.5	—13.9	27.7	9.9	42.7	16.4	55	38.6	90.2	66
3	82.7	53.4	62.7	54.8	70.5	59.5	62.7	29.4	32.7	24	17.1	— 8.9	42.7	17	3.5	—20.9	24.7	— 1.7	42.7	20.2	49.6	37.6	74.7	55.9
4	80.7	63.4	70.7	54	76.7	59.5	54.5	44.4	33.7	20.2	29.7	15	17	0.1	11.6	— 4.7	34.7	— 1.7	36.7	25	51.1	39.3	74.3	57.9
5	83.7	65.9	78.9	61.4	72.9	54	42.7	30.7	37.7	18	27.7	19	11.6	0.5	3.5	—25.9	42.7	15	37.7	25	52.2	38.4	74.7	46.3
6	73.2	58	83.3	56.4	71.7	53.4	44.7	33.7	38.1	23.2	30.7	19	14.6	7.7	37.7	— 9.9	45.7	35.7	41.7	29.4	60	43	67.7	46.8
7	84	56	76.1	62.9	69.3	52.4	54.7	34.7	37.3	29.5	30.7	19	13	— 5.7	42.3	28	49.7	36.7	42.7	28	46.7	40.9	70.7	48.8
8	85.7	65.8	74.5	57.9	79.9	56	53.3	32.9	32.1	24.2	30.9	19	22.7	10.9	28	12.9	45.1	22	31.7	20	59.7	41.1	76.7	48.2
9	85.7	59	79.3	57.9	87.1	60.2	46.7	32.7	32.5	22	27.1	22.2	32.7	21.2	15	1.5	27	16	34.7	15	59.7	46.5	86.7	58
10	81.1	59.3	83.7	59	56.9	46.9	52.1	38.7	33.1	26.8	24.7	8.7	42.7	1.5	39.7	9.9	32.1	13.5	40.7	24.5	55.1	48	79.7	62
11	75.9	57.2	77.7	54.4	61.7	37.3	46.1	33.3	40.9	30.7	22.7	5.7	9.6	— 5.7	41.7	15	33.9	15	51.7	27.4	57	42.6	83.7	63
12	82.7	54	83.7	64.8	69.7	39.7	39.9	28	42.7	30.7	28.7	18	3.6	—10.9	38.5	20.2	39.7	32.7	56.7	27.2	55.6	44.2	88.7	63
13	74.7	57.4	84.3	69.7	73.7	48.6	46.7	25.4	41.7	27.5	29.7	15	2.6	—10.9	32.7	17	33.9	0	49.7	34.7	52.8	43.2	86.7	65
14	84.7	58.4	83.7	61	74.7	47.8	54.7	27.4	29.7	21.2	12.4	4.7	16.6	—10.9	27	9.9	16.6	— 4.7	45.2	36.7	57.7	34.3	86.7	65
15	88.7	56	83.9	59.4	74.3	52	57.5	33.7	28.7	22.6	9.6	— 2.7	18.6	3.5	27.7	20.2	17.6	— 4.5	44.7	31.9	57.1	37.7	85.7	62
16	83.7	57	84.1	64.9	51.7	42.8	46.9	35.7	36.7	24.4	23	1.5	36.7	15	22	9.9	19.6	2.5	45.2	33.5	64.7	36.2	88.1	67
17	80.1	57	82.7	64.9	44.3	38.7	38.7	33.5	24.7	11.5	23	— 2.7	30	13.9	16.6	5.7	28.9	15	39.8	32.7	63.7	39.2	82.7	69
18	65.7	49.9	70.1	62	56.3	35.5	38.7	32.5	22.7	7.1	— 1.9	—15.9	37.7	25	22.7	8.1	10	— 5.7	41.1	31.0	67.1	53.4	73.7	61.9
19	75.9	46.8	75.2	57.8	55.3	37.3	42.7	26.8	36.7	17	— 3.5	—25.9	44.7	34.7	35.7	2.5	17.6	— 6.4	46.7	31.9	72.7	43.8	81.7	61.9
20	82.7	51	79.5	60	50.7	39.9	56.7	34.3	32.7	26	0.5	—30.9	35.9	15	15.6	5.7	20.7	— 2.7	50.9	32.3	72.9	47.8	80.7	58.6
21	79.1	56.2	78.7	54	48.7	38.9	60.7	43.8	36.7	12.7	41.7	— 1.5	17	0.1	25.7	— 7.9	32.7	16	43.4	32.8	81.2	56	71.7	55
22	78.9	52.8	66.7	49.9	51.7	36.7	55.7	35.3	20	2.5	40.7	29.4	12.6	— 8.1	22.7	9.9	32.7	17	55.2	36.2	67.7	35.7	71.7	52
23	82.7	63.8	69.7	43.8	64.7	39.7	63.5	34.3	26.7	9.9	42.7	12.9	21.7	5.7	— 1.5	—12.9	32.7	4.7	51.8	35.3	61.1	55.9	78.7	56
24	81.7	60.9	74.7	47.8	65.7	42.2	56.5	35.5	31.7	15	14.6	— 0.5	19.6	0.1	2.5	—12.9	35.7	4.7	50	33.9	76.7	37.7	88.9	61
25	89.7	54	77.7	52.4	68.7	44.8	45.3	31.5	21.7	2.3	41.7	9.9	12.6	— 1.7	10.6	— 8.9	36.1	13.9	53.7	30.9	69.7	38.5	87.5	59.6
26	87.1	61.4	79.7	54	56.5	40.8	38.7	31.5	38.7	11.3	31.7	4.7	12.6	— 4.7	14.6	0	40.7	28.4	53.1	31.9	71.7	35.5	83.7	59
27	82.1	62.4	83.7	54	54.7	39.7	44.7	31.7	35.9	7.7	34.1	1.5	32.7	— 3.7	14.6	— 7.9	45.7	28.4	56.8	32.1	85.3	42.2	84.7	61
28	86.7	59.4	84.7	56	50.7	31.7	38.7	31.7	13	6.7	26.7	0.5	36.7	29.9	20	2.5	34.7	18.4	46.1	31.1	80.7	57.8	79.7	63.9
29	87.1	56.4	87.7	54	51.7	34.7	36.7	20.4	21.1	—13.9	22	1.5	45.7	5.7	31.7	18.4	36.7	23.2	49	32.9	62.7	42.9	83.7	57
30	79.7	58.9	85.9	64.6	54.1	39.7	48.7	31.9	— 6	—22.9	42.7	22	9.8	— 7.9	.....	.....	37.7	18.4	44.1	33	62.7	35.2	81.1	59.9
31	73.5	53.4	86.1	60	.....	.....	36.7	20.4	.....	.....	52.1	36.7	31.7	0.5	.....	.....	40.7	26.4	.....	.....	80.9	38.9	.....	.....
Range	42°.9		43°.9		58°		37°.1		65°.6		83°		64°		68°.2		56°.1		41°.8		54°.5		43°.9	
Monthly means	.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....	

Maximum, minimum, and mean temperatures—Continued.

STATION, PARRY SOUND, CANADA.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1									33.8	20	13.6	−3	42.8	35	42	−8	23.8	5.2	40.7	15.2	46.8	25.3	82	61.2
2									34.3	17.6	25.3	10.5	49.7	30.3	82	−22.4	23.8	−2	47.7	5.7	53	25.8	71.8	50.2
3									31.5	15.5	34.3	14.5	37	2.2	19.6	−22.9	31.8	−11.2	40.7	31	54.8	30	64	46.2
4									31.8	16.5	34.8	27.8	11.6	−4	21.3	−16.7	34.8	0.2	39.5	32	45.7	32	57.8	43.2
5									36.3	23.6	34.8	26.8	30.3	7.2	21	−20.2	41.7	13	40.7	27.8	46.8	31	57.3	40.2
6									38.3	28.6	35.1	26.8	28.8	3.2	40.7	16.5	47.4	36	40.7	31	52.8	36.1	67.8	41.2
7									40.7	30	34.6	24.8	35	7.7	38.7	20.8	52.3	24.8	40.7	25.8	53.5	37.1	70.3	43.2
8									40.7	22.3	30	19.5	37.7	26.8	27.8	14.5	29.1	11.5	34.3	16.5	53.8	38.1	79.2	49.1
9									45.7	23.8	22.9	7.2	46.7	34	27.3	16.5	31	8.2	40.7	9.5	52.8	36.9	72.8	57
10									37.7	29.8	28	1.2	45.2	−2	30.3	3.5	43.7	22.8	42.7	12.5	52.8	35	79.7	53.1
11									39.7	22.6	31	14.8	13.7	−5	44.5	23.8	41.7	32	56.8	23.8	55	29.8	90.7	55.1
12									47.8	28.3	32	8.7	11.1	−5	41.7	12.5	41.7	17.5	50	32	53.3	36	87.2	63.2
13									41	29	38.5	6.2	12.8	−7	39.7	12.5	20.8	−8	52.8	39.2	53	31	89.7	60.2
14									37.5	20.8	10.6	−6	28	8.2	36.8	23.8	17.6	−13.2	52.8	35.1	49.3	26.6	77	60.2
15									42.2	26.8	29.8	−13.2	36.8	−2	34.6	22.3	28.8	−13.2	41.7	32	53	35.1	81.7	60.2
16									41.7	18.7	29.8	7.2	37.3	29	23	13	19.8	12.5	41.7	26.8	64.8	36.6	84.7	66.2
17									24.8	12.5	12.6	−15	38.7	30.9	18.6	1.2	19.8	0.2	41.7	25.8	64.3	46.2	78.8	67.2
18									31.3	13.5	8.7	−27.4	39.7	36	30.8	10.5	9.2	−15.2	41.7	25.8	60.3	41.2	77.8	55.1
19									41.7	28.8	−6.2	−28.9	39.2	25.8	35	9.2	19.6	−19.2	43.7	25.8	71.8	35.1	70.8	49.1
20									34.3	25.8	36.1	−13.7	28.1	8.2	17.1	−2.5	23.3	−6	45	20.8	75.8	43.2	60.8	53.1
21									39.7	10.5	45.2	34	16.6	−6	34.1	−5	28.8	13.5	45	24.3	73.8	54.1	62.8	51.6
22									24	10.5	46.7	27.8	19.1	−4	20.1	−32	28.8	12.5	53	27.8	65.8	36	70.3	48.1
23									37.2	20.8	46.8	13.5	27	17.5	1.8	−15.2	34.8	7.2	53	29.3	54	29	78	50.1
24							49.8	35.8	35.8	17.5	37.1	9	26.6	7.2	8	−11.2	46.7	4.2	54.8	25	63.8	32	74.8	55.1
25							59.8	37.1	32.3	16.5	42.7	20.8	26.8	2.2	24	−8	33.8	25.8	54.8	28.6	61.8	39.2	81.7	58.1
26							42.7	34.1	39.7	27.8	35	9.2	25.3	−12.2	19.8	8.2	36.8	26.8	58.3	23.8	70.8	33.5	82.7	53.6
27							46.7	34.1	34.3	12.5	28	3.7	36	20.8	18.1	3.2	34.3	20.8	60.3	39.2	75.8	43.2	70.1	57.1
28							44.7	27.3	33.8	13.7	28.2	15.5	37.7	27.8	18.6	9.7	31.8	14.5	52.8	29.8	73.8	48.1	72.8	53.1
29							35.2	27.6	33.8	−15.2	36.8	15.5	43.7	−1	25.8	12.5	39.7	18.5	44.7	24.8	57.8	39.8	78.8	47.6
30							49.7	33	0.5	−20.2	42.7	34.6	21.8	−7			36.3	18.5	42.7	23.3	64.8	31	65.8	51.1
31							53.8	24.6			52.7	38.8	34.1	12.5			36.3	25.8			86	43.2		
Range									68°		81°.6		61°.9		67°.4		71°.5		54°.6		60°.7		50°.5	
Monthly means																								

Maximum, minimum, and mean temperatures—Continued.

STATION, PECK'S BEACH, N. J.*

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	88	67	74	64	76	63	71	48	45	34	23	12	55	43	43	31								
2	71	62	69	64	78	61	61	40	45	28	30	12	56	43	43	15								
3	76	58	79	66	80	66	64	44	42	25	36	12	55	36	34	11								
4	77	62	80	71	86	72	69	60	45	33	43	30	39	25	31	19								
5	79	70	82	72	81	62	70	61	39	29	42	35	42	18	30	6								
6	80	71	81	69	85	66	68	61	49	26	43	35	50	32	43	30								
7	81	70	79	67	77	58	67	35	50	33	45	35	42	25	50	35								
8	73	69	78	70	79	54	63	49	47	34	44	37	44	30	40	29								
9	76	68	83	66	78	65	63	44	49	35	44	39	56	44	44	27								
10	81	70	79	67	85	66	63	40	50	41	43	27	55	20	55	39								
11	88	72	78	73	60	48	62	46	51	39	41	27	28	17	53	40								
12	76	66	81	73	68	60	53	36	55	36	45	33	36	12	55	35								
13	79	60	81	71	74	64	49	31	56	42	42	32	27	14	47	34								
14	82	70	81	63	72	64	59	35	56	49	34	25	31	9	50	44								
15	82	70	80	68	75	63	59	54	50	43	38	23	38	12	52	37								
16	83	71	80	70	75	64	61	46	54	40	43	26	48	36	37	28								
17	90	71	79	71	74	53	53	42	40	29	43	17	49	35	35	25								
18	94	68	78	71	58	45	60	49	44	22	22	14	48	38	39	25								
19	73	56	78	70	61	50	53	44	55	41	26	9	52	41	43	22								
20	73	60	78	69	65	47	59	36	48	36	35	4	42	33	48	30								
21	79	68	81	69	62	44	62	35	46	35	45	26	48	33	41	24								
22	80	67	76	67	59	41	64	47	38	24	61	39	43	34	46	35								
23	88	72	71	64	60	39	62	49	53	38	60	39	47	41	38	14								
24	81	61	69	63	62	38	69	52	50	31	50	39	45	29	38	10								
25	83	60	76	61	65	48	72	51	41	24	52	40	38	23	(*)									
26	84	72	69	59	64	48	64	50	56	41	47	38	34	26										
27	86	71	69	61	68	47	59	40	51	31	53	29	52	32										
28	82	66	69	67	73	55	57	35	47	31	41	25	51	41										
29	81	63	74	66	70	57	69	52	50	20	42	39	57	37										
30	79	63	77	67	70	59	61	45	20	10	47	41	37	22										
31	78	70	77	64			46	38			50	44	38	25										
Range	36°		22°		48°		41°		46°		57°		46°											
Monthly means	73°.7		71°.8		64°.0		54°.3		40°.4		36°.0		37°.6											

* Station discontinued February 25, 1876.

Maximum, minimum, and mean temperatures—Continued.

STATION, PEMBINA, DAK.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	82	58	73	56	74	53	47	19	33	18	16	−4	19	−5	−18	−40	14	−23	32	4	40	32	48	39
2	72	52	85	52	64	45	57	39	37	16	26	15	12	−16	−8	−37	22	−3	37	10	41	22	52	40
3	74	55	80	47	70	54	44	33	30	8	20	10	−10	−25	−15	−27	26	−5	35	24	51	30	56	36
4	73	47	84	50	75	52	37	27	32	−1	36	17	5	−29	−7	−48	26	18	35	20	52	30	74	34
5	77	40	78	58	79	47	45	23	33	12	32	11	0	−23	7	−11	18	−4	41	12	60	35	74	44
6	80	46	82	46	83	47	46	36	42	11	11	−1	14	−8	0	−20	3	−12	34	22	62	36	75	45
7	87	52	84	49	82	57	45	30	40	32	14	−7	9	−14	−2	−18	10	−22	34	5	62	31	60	52
8	86	59	83	52	73	48	45	24	33	11	−3	−19	5	−13	9	−20	23	5	43	22	69	30	60	52
9	85	47	85	61	59	38	39	32	26	14	22	−3	−8	−18	21	9	17	2	43	35	58	26	67	52
10	77	45	83	51	61	27	35	27	39	25	9	−6	−3	−27	32	−1	2	−10	43	32	55	30	76	58
11	86	50	79	41	65	48	39	24	41	18	19	2	7	−17	5	−10	2	−3	38	22	63	39	68	52
12	80	57	81	39	73	40	56	31	22	5	40	15	2	−30	−4	−25	14	−16	40	22	70	31	70	48
13	83	49	78	44	70	43	61	33	37	18	22	0	27	−4	6	−9	16	−20	45	20	65	35	85	51
14	80	53	72	55	71	52	39	28	30	10	33	10	20	6	4	−13	14	−23	45	19	51	47	81	60
15	74	50	66	50	63	47	50	29	18	8	33	6	24	15	−4	−24	14	−8	42	22	52	44	71	52
16	64	48	68	54	56	35	72	37	18	2	7	−21	34	13	9	−25	15	9	37	25	49	42	53	44
17	77	42	75	53	55	21	46	27	21	7	3	−24	32	20	21	−7	9	−18	52	22	69	42	62	34
18	84	48	81	42	49	39	68	25	25	4	−1	−20	21	8	24	8	10	−27	61	31	60	45	65	42
19	84	51	84	44	49	36	73	41	10	−10	24	−6	9	−10	−7	−26	10	−12	60	44	72	58	70	36
20	88	51	65	47	49	37	80	37	4	−11	22	8	−10	−27	8	−20	11	−18	55	36	72	50	83	47
21	81	58	69	26	61	36	80	36	−6	−28	27	7	−6	−43	−5	−15	22	−10	54	32	67	52	87	51
22	76	55	76	36	82	40	70	38	14	−9	44	5	0	−15	−7	−23	32	−7	63	26	69	33	90	65
23	82	44	83	54	89	43	53	29	5	−16	12	−12	−10	−27	2	−33	31	12	60	31	79	41	81	57
24	76	54	70	58	60	37	46	19	3	−21	20	−6	−2	−29	12	−3	35	25	61	32	85	43	91	51
25	72	50	80	56	71	34	39	30	5	−19	8	−14	2	−22	5	0	27	12	65	36	84	53	84	61
26	79	49	70	60	77	33	33	12	−1	−16	2	−17	16	0	10	5	18	10	77	38	87	50	73	57
27	81	48	77	55	63	40	34	2	12	−9	2	−28	12	0	10	0	26	2	53	33	83	58	72	49
28	81	59	66	52	49	36	36	30	−9	−30	21	−30	1	−23	10	−6	27	−5	42	21	84	45	71	50
29	71	44	75	48	51	41	32	13	−7	−33	38	21	4	−37	10	−16	21	−11	40	14	71	56	76	44
30	70	47	70	53	51	38	30	12	10	−8	23	5	15	−12	.....	.....	26	−7	42	18	81	55	79	50
31	76	48	72	45	.....	.....	30	4	.....	.....	6	−7	−12	−34	.....	.....	35	−4	.....	.....	63	41	.....	.....
Range	48°		59°		68°		78°		75°		74°		77°		80°		62°		73°		65°		57°	
Monthly means	64°.9		64°.3		52°.7		37°.5		11°.1		8°.1		−2°.6		−4°.5		6°.5		35°.4		54°.6		60°.5	

Maximum, minimum, and mean temperatures—Continued.

STATION, PHILADELPHIA, PA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	81	70	71	64	80	69	72	47	42	34	22	11	53	44	42	30	36	29	44	34	56	35	73	53
2	75	63	65	58	84	65	60	43	43	32	29	11	67	48	43	15	32	22	47	30	58	41	83	58
3	77	62	75	59	90	69	65	47	40	29	34	19	58	39	27	12	32	19	45	33	51	45	88	65
4	82	62	81	69	87	72	69	42	40	34	42	31	41	(*)	31	21	42	24	49	40	58	38	82	68
5	89	71	83	70	81	65	74	57	40	32	39	32	44	.....	23	14	54	30	57	39	71	44	72	63
6	92	73	85	68	84	66	66	58	48	33	35	32	46	.....	34	14	44	37	54	41	78	55	70	58
7	84	73	80	66	76	63	65	49	49	35	38	33	43	.....	49	32	66	48	59	37	85	61	77	58
8	83	69	81	68	80	61	63	45	46	38	39	34	46	.....	46	34	59	36	50	36	79	67	85	62
9	80	67	81	65	82	63	58	45	46	33	43	36	54	44	48	30	46	29	48	31	69	54	84	62
10	83	68	84	66	83	54	64	45	42	38	39	31	56	20	52	37	53	32	55	31	66	50	87	67
11	86	70	79	69	61	47	53	41	50	41	40	33	26	18	62	36	43	35	61	42	66	47	87	68
12	74	65	76	71	68	49	49	40	60	32	44	33	33	19	55	42	40	35	66	42	70	53	76	68
13	85	61	84	72	75	60	50	35	62	39	43	30	26	18	53	37	46	29	68	52	62	49	76	67
14	81	70	81	70	76	63	56	35	57	43	33	25	30	15	46	37	39	23	74	53	64	47	83	66
15	85	70	81	70	76	63	58	50	45	41	34	24	40	26	55	37	44	22	62	47	74	53	84	52
16	82	71	82	71	67	62	60	43	51	39	46	29	46	35	37	27	46	32	62	47	56	49	80	62
17	85	70	83	72	70	53	51	40	39	31	43	16	49	37	34	27	46	32	53	44	56	48	81	67
18	92	69	83	71	60	46	59	42	40	28	20	13	63	35	38	30	32	13	50	38	63	41	77	69
19	76	60	82	71	53	47	52	42	52	32	24	9	60	42	48	28	31	9	49	38	75	55	85	69
20	81	61	82	69	65	48	58	36	47	38	35	4	43	31	46	34	47	19	56	37	77	57	82	67
21	82	62	80	67	59	47	69	43	42	36	46	24	45	31	39	26	50	28	67	47	83	58	77	66
22	83	69	80	67	56	46	74	52	38	26	61	41	35	25	40	35	57	24	56	43	81	65	76	64
23	86	73	71	62	59	45	69	51	42	23	65	38	43	29	36	13	38	29	65	44	65	49	81	61
24	81	70	68	61	64	46	74	53	45	35	54	34	43	31	29	6	45	30	55	43	70	45	87	68
25	84	67	72	60	66	47	73	52	43	29	45	35	36	28	39	18	54	35	44	40	78	54	89	69
26	89	70	72	60	61	49	70	47	51	34	45	35	36	25	44	27	48	39	57	38	72	55	92	72
27	86	74	73	60	69	46	55	45	49	36	49	30	47	25	36	28	46	36	65	46	78	53	93	76
28	75	68	74	62	75	51	55	39	44	32	35	26	66	40	33	28	55	32	73	52	79	59	91	74
29	70	65	81	62	74	52	72	48	45	18	39	32	60	33	36	29	53	34	63	48	85	63	88	72
30	84	63	83	69	77	55	64	44	18	8	47	35	38	21	.....	.....	40	32	60	36	69	53	88	73
31	76	70	84	69	.....	.....	46	37	.....	.....	44	41	35	21	.....	.....	44	33	.....	.....	70	53	.....	.....
Range	32°		27°		45°		39°		54°		61°		.....		56°		57°		44°		56°		41°	
Monthly means	74°.6		72°.4		64°.1		53°.7		39°.7		34°.7		37°.7		34°.0		37°.4		49°.1		60°.9		74°.2	

* Minimum thermometer broken.

Maximum, minimum, and mean temperatures—Continued.

STATION, PIKE'S PEAK, COLO.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	56	33	52	34	47	27	37	24	31	20	23	13	13	— 2	15	—17	12	— 7	3	—13	20	10	23	7
2	51	33	53	36	40	28	38	26	29	17	16	4	11	— 2	15	— 2.5	20.5	4	10	— 4	32	5	27	13
3	49	32	52	37	48	28	39	25	20	6	14	0	16	— 2	10	—16	24	9.5	18	1	34	19	27	17
4	42	28	53	37	51	31	40	25	11	5	19	9	13	— 4	16	5	17	8	13	— 2	25	14	37	15
5	38	25	49	36	49	35	34	23	10	— 1	11	— 2	16.5	— 8	14	3	16.5	2.5	15	— 3	20	11	40	25
6	45	26	52	35	55	36	33	21	22	3	13	— 2	19	5	9.5	— 1	10.5	— 7	18	2	15	5	38	24
7	40	27	50	36	49	35	39	23	16	7	10	— 3	20	11	13	0	22	5	20	3	13	2	24	14.5
8	52	31	50	38	49	33	35	25	10	— 1	14	— 4	17	— 4	15	4	16	9	20	3	22	5	36	16
9	51	33	51	36	41	32	37	20	17	— 5	13	5	0	— 8	18	3	12.5	5	10	— 2	33	15	37	25
10	40	32	55	33	45	29	41	29	25	13	13	0	9.5	— 6	9.5	— 3	7	— 8.5	12	3	37	20	30	16
11	42	30	45	33	43	28	45	27	26	15	24	12	10	— 1	14	— 5	— 5	—18	18	4	37	23	34	17
12	46	32	40	32	41	27	38	26	14	9	23	18	11	— 1	9.5	— 2.5	5.5	—19	12	— 2	33	20	32	19
13	46	31	37	29	44	29	33	25	11	4	22	13	12	0	— 4	—12	18.5	0	2	— 8	30	20	37	23
14	52	33	39	29	43	31	27	17	11	3	25	14	13	2	10.5	—11	15	6	10	—10	27	15	42	30
15	56	36	43	28	42	32	34	20	15	— 3	22	9	12	2	14.5	— 3.5	9	— 8	24	8	28	12	39.5	31
16	52	36	46	30	37	27	37	19	5	— 1	13	6	10	3	3	—12	2	—14	24	12	27	12	37	29
17	38	33	42	30	33	19	37	21	17	0	17	9	19	6	17	— 2	11.5	— 4	31	14	31	13	34	26
18	40	30	41	30	37	25	35	21	17	5	17	12	—10.5	—18	14	— 1	14.5	2	30	17	30	12	35	24
19	38	31	40	29	35	24	34	22	16	4	21	12	4	—22	14	— 3	11	—16	26	10	26	8	39	26
20	40	31	37	28	30	22	36	20	12	6	12	2	6	— 5	7	—10	18	— 7	23	10	36	11	41	27
21	37	27	42	27	28	19	34	20	12	2	16.5	0	7	— 1	9	—12	19	5	35	16	31	18	44	32
22	34	24	44	29	26	17	35	22	11	2	26	11	5	— 9	17	3	19	9	34	20	22	12	50	32
23	42	26	46	33	36	21	31	19	10	— 3	20	10	1	—17	22	11	20	5	31	19	32	12	45	31
24	43	32	43	28	30	22	31	16	16	4	8	— 3	11	— 2	29	14	13	— 3	32	16	32	20	42	33
25	49	30	39	24	30	20	26	— 5	12	2	12	— 3	11	1	22.5	10	5.5	—12	37	20	37	23	46	33
26	47	30	45	26	37	25	25	(*)	7	— 3	7	— 8	9	—10	16	0.5	12	—11	38	22	39	26	48.5	33
27	44	31	39	25	37	26	30	14	22	6	12	0	1	—10	9.5	— 8	— 7	—20	33	19	38	24	52	33
28	44	29	45	26	36	27	25	12	22	5	19	3	— 4	—20	14.5	— 1	12	—17	33	15	39	26	52	34
29	41	31	45	28	37	24	5	— 2	27	9	14.5	5	4.5	—18	12	— 5	25	6	39	20	35	26	47	32
30	33	27	47	30	37	26	24	— 4	27	18	11	—10	9	— 1.5	.....	.....	19	10	37	20	34	24	42	23.5
31	47	30	42	27	.....	.....	33	17	.....	.....	0	—16	8	— 8	.....	.....	10	—11	.....	.....	28	6	.....	.....
Range	31°		31°		38°		.....		34°		42°		42°		46°		45°		52°		37°		45°	
Monthly means	35°.7		35°.9		32°.1		25°.0		10°.8		9°.7		2°.1		4°.5		4°.5		14°.9		21°.4		31°.0	

* Index thrown into bulb by wind shaking shelter.

Maximum, minimum, and mean temperatures—Continued.

STATION, PITTSBURGH, PA.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	77	65	68	59	87	61	52	42	37	31	32	14	69	45	47	22	31	27	45	29	55	27	91	69
2	74	59	70	57	92	63	59	38	44	28	37	20	65	43	37	10	30	19	55	28	56	33	89	67
3	90	62	78	57	92	67	70	37	38	30	40	22	45	31	30	6	35	15	57	42	61	36	88	63
4	85	70	80	62	81	66	71	45	42	34	51	34	39	24	30	14	45	20	44	38	72	42	78	60
5	94	67	83	60	89	54	70	57	45	30	49	36	58	22	37	7	62	29	60	34	69	49	70	54
6	95	73	81	68	82	64	77	54	50	29	48	37	50	23	46	23	72	48	54	35	78	55	76	53
7	81	64	77	62	79	50	57	45	49	28	54	35	48	23	46	36	71	51	55	34	86	56	84	50
8	86	60	80	59	87	53	58	43	50	35	46	37	57	27	52	29	51	32	54	29	73	53	88	62
9	87	64	85	58	92	57	60	34	52	28	39	31	59	52	62	40	57	30	54	27	60	47	87	66
10	82	67	86	59	81	51	56	38	44	36	35	27	56	13	60	45	66	36	58	30	57	45	91	63
11	79	64	86	65	68	43	50	36	51	31	36	26	24	7	69	44	80	49	72	37	68	41	95	61
12	85	57	87	66	59	47	46	33	62	36	34	27	26	18	55	32	76	34	84	54	72	48	92	65
13	89	62	84	62	71	54	54	31	57	35	34	25	23	12	66	30	34	25	73	58	63	37	92	68
14	88	65	85	62	81	50	62	31	53	40	27	22	31	11	61	46	39	20	67	44	71	34	93	65
15	81	66	86	60	78	54	57	42	51	39	44	17	43	20	46	22	50	27	62	37	24	48	89	66
16	90	65	86	64	70	59	46	35	44	29	42	27	42	30	26	19	52	39	55	41	72	52	79	69
17	83	67	83	63	65	47	59	31	33	25	32	8	54	35	30	22	48	22	48	35	69	52	77	65
18	79	63	76	63	54	41	54	38	50	24	14	1	67	42	39	25	22	12	44	33	78	57	82	60
19	79	57	79	61	60	43	45	35	58	44	20	8	58	32	47	29	25	8	55	30	69	56	80	60
20	73	62	77	59	58	44	58	31	48	38	52	9	40	20	47	25	31	22	76	31	88	57	80	60
21	86	62	82	57	66	37	71	43	44	30	56	32	40	24	52	(*)	30	21	65	42	91	62	74	55
22	75	62	77	58	55	39	74	45	38	21	59	44	48	30	41	.....	34	21	66	38	75	48	81	60
23	83	62	74	51	55	38	71	45	52	34	60	47	57	37	32	.....	40	24	56	42	64	38	90	56
24	83	57	78	55	69	36	75	45	47	29	58	41	37	26	25	.....	43	26	50	40	74	39	85	69
25	88	59	80	56	67	42	68	48	48	20	62	35	37	24	49	.....	52	35	47	40	76	46	93	70
26	85	69	82	55	61	48	73	50	55	34	68	29	35	20	67	.....	40	34	60	32	82	47	94	70
27	87	70	83	55	72	47	50	37	38	32	56	29	56	32	52	.....	46	30	63	43	85	50	92	77
28	72	60	83	56	77	50	69	33	51	27	41	23	70	42	56	29	45	26	68	50	88	54	89	69
29	80	65	86	62	77	48	74	51	46	18	59	31	56	20	30	25	41	21	61	38	88	57	78	69
30	86	66	86	61	66	50	67	36	21	8	68	37	30	18	.....	.....	34	25	51	31	85	58	86	64
31	73	63	88	63	.....	.....	38	31	.....	.....	69	35	48	22	.....	.....	36	30	.....	.....	89	61	.....	.....
Range	38°		37°		56°		46°		54°		68°		63°		.....		72°		57°		64°		45°	
Monthly means	72°.9		69°.8		65°.5		50°.2		33°.7		38°.3		38°.4		36°.2		36°.2		48°.8		62°.3		74°.1	

* Minimum thermometer broken.

Maximum, minimum, and mean temperatures—Continued.

PORT DOVER, CANADA.

Day of month.	1875. July. Max.	1875. July. Min.	1875. August. Max.	1875. August. Min.	1875. September. Max.	1875. September. Min.	1875. October. Max.	1875. October. Min.	1875. November. Max.	1875. November. Min.	1875. December. Max.	1875. December. Min.	1876. January. Max.	1876. January. Min.	1876. February. Max.	1876. February. Min.	1876. March. Max.	1876. March. Min.	1876. April. Max.	1876. April. Min.	1876. May. Max.	1876. May. Min.	1876. June. Max.	1876. June. Min.
1	(*)	.....	63.8	53.7	80.8	54.7	52.8	35.0	36.0	30.0	20.0	9.8	53.8	43.0	36.0	17.0	28.0	16.0	1.9	24.0	29.8	29	77.8	58.8
2	.....	.....	64.8	55.1	83.8	70.8	55.8	35.0	37.9	27.0	28.0	14.8	53.8	38.0	17.0	1.4	26.0	10.8	44.9	16.0	46.9	32	74.7	62.8
3	.....	.....	64.8	56.7	81.8	(*)	60.8	38.0	33.0	25.0	36.0	14.8	38.9	23.0	19.0	3.6	32.0	7.6	45.9	34.0	47.8	34	71.1	57.8
4	.....	.....	70.7	57.8	73.7	(*)	61.8	53.7	39.9	29.0	34.0	28.0	23.0	11.8	19.0	− 1.4	34.0	12.8	41.9	35.0	53.8	42	67.7	55.7
5	.....	.....	74.7	62.8	75.7	(*)	53.8	44.9	42.9	29.0	35.0	33.0	42.9	19.0	28.0	− 1.2	41.9	27.0	42.9	33.0	51.8	44	58.8	47.7
6	.....	.....	74.2	62.1	75.7	(*)	66.8	44.0	43.9	24.0	35.0	32.0	41.9	27.0	37.9	26.0	48.8	37.0	44.9	34.0	55.8	46	66.8	45
7	(*)	(*)	65.8	59.8	70.7	(*)	53.8	40.0	48.8	34.0	36.0	34.0	37.9	27.0	45.9	30.0	45.9	38.9	42.9	32.0	71.7	47	71.7	47
8	(*)	(*)	71.7	56.7	79.8	(*)	51.8	38.0	41.9	31.0	36.0	30.0	45.9	33.0	38.9	23.0	38.9	22.0	42.9	29.0	59.8	47.7	74.7	57.8
9	(*)	(*)	71.7	58.8	79.0	(*)	51.8	32.0	41.9	30.0	33.0	25.0	48.8	41.0	32.0	30.0	35.0	21.0	39.9	23.0	50.8	42.9	69.7	60.8
10	(*)	(*)	84.8	58.8	70.7	47.0	50.8	39.9	39.5	34.0	30.0	24.0	45.9	12.8	35.0	27.0	42.9	27.0	47.8	26.0	50.8	40.9	77.8	58.8
11	(*)	(*)	76.7	65.8	66.8	40.0	43.9	33.0	46.0	33.0	34.0	29.0	19.0	12.8	52.1	34.0	48.8	33.0	57.8	33.0	55.8	(*)	85.8	60.8
12	(*)	(*)	79.8	63.8	61.8	49.7	40.9	28.0	50.8	42.9	34.0	24.0	20.9	13.8	40.9	29.0	38.9	32.0	53.8	38.0	56.8	....	87.8	62.8
13	(*)	(*)	74.7	64.8	70.7	44.0	48.8	28.0	45.9	33.0	34.0	21.0	20.0	13.8	44.9	32.0	32.0	8.8	53.8	38.0	56.8	42.9	86.8	67.8
14	82.8	53.7	75.7	63.8	70.7	52.7	56.8	33.0	34.0	29.0	23.0	14.0	27.0	16.0	42.9	33.0	26.0	4.6	48.1	39.9	53.8	35	84.0	64.8
15	80.0	55.7	85.8	56.7	73.7	57.8	52.1	44.0	41.9	28.0	37.0	20.0	36.0	27.0	34.0	26.0	25.0	13.8	48.8	37.0	52.1	41	88.9	64.8
16	81.8	65.7	76.7	65.8	61.8	47.7	44.9	34.0	40.9	27.0	35.0	24.0	36.0	34.0	26.0	22.0	37.9	22.0	43.9	33	51.8	42	81.8	69.8
17	75.7	59.8	75.7	62.8	52.1	42.0	49.8	30.0	40.0	21.0	24.0	8.8	40.9	34.0	27.0	22.0	37.0	11.8	37	31	61.8	47	72.9	66.8
18	74.7	59.8	75.8	57.8	56.8	35.0	47.0	33.0	40.9	22.0	15.0	3.6	49.1	37.0	32.0	20.0	12.0	2.6	37.9	29	71.7	50.7	72.9	60.8
19	78.0	50.7	74.7	60.8	54.8	40.0	42.9	31.0	45.9	36.0	14.0	− 0.4	43.9	30.0	39.9	30.0	23.0	2.6	44.9	28	69.7	55.7	71.7	53.7
20	79.8	52.7	70.7	56.7	56.8	40.9	54.8	39.0	42.9	32.0	40.0	1.4	30.0	24.0	32.0	21.0	25.0	15.0	53.8	29	69.7	56.7	69.7	59.8
21	77.8	61.8	75.7	59.8	53.8	38.0	59.8	45.9	39.9	23.0	44.9	36.0	25.0	17.0	37.9	22.0	26.0	20.0	55.8	38	69.7	56.7	67.8	54.7
22	77.8	63.8	69.7	53.7	50.8	38.0	62.1	39.0	31.0	17.0	48.8	34.6	33.0	19.0	33.0	10.8	35.0	18.0	47.8	34	62.8	43.9	69.7	55.7
23	75.7	58.8	74.1	46.0	57.8	32.0	58.8	49.7	40.9	23.0	50.8	32.0	43.9	32.0	12.0	2.6	38.9	22.0	29.8	36	50.8	36	69.7	57.8
24	78.7	52.7	78.0	49.7	61.8	46.0	59.1	49.7	38.8	25.0	44.9	27.0	32.0	25.0	18.6	5.6	39.9	13.8	55.8	34	60.8	41	81.8	60.8
25	82.8	59.8	80.0	52.7	61.8	45.9	56.8	45.0	41.9	19.0	51.8	31.0	31.0	21.0	31.0	13.8	38.9	33.0	51.8	39	65.8	50.7	79.8	60.8
26	78.8	68.8	84.8	54.7	60.8	43.0	57.8	43.9	46.9	35.0	46.9	29.0	32.0	16.0	26.0	19.0	34.0	30.0	53.8	35	68.7	45	74.7	62.8
27	80.8	62.8	80.8	53.7	67.7	51.7	45.9	37.0	37.0	30.0	37.0	26.0	45.9	32.0	22.0	18.0	34.0	25.0	58.8	41.9	68.3	55.3	72.7	61.8
28	77.8	59.8	82.8	53.7	59.8	45.0	49.8	35.0	38.9	30.0	34.0	22.0	40.9	35.0	28.0	21.0	31.0	24.0	59.8	42	68.7	53.7	71.7	61.8
29	81.8	57.8	77.8	54.7	67.7	45.9	45.9	41.0	36.0	4.6	40.9	26.0	40.9	15.0	26.0	20.0	31.0	23.0	48.8	36	68.7	53.7	72.7	53.7
30	78.8	51.8	78.8	62.8	59.8	40.9	56.8	36.0	11.1	1.4	51.1	37.0	28.0	11.8	.....	.....	32.0	23.0	37.9	30	67.7	41.7	69.7	57.7
31	76.7	49.7	80.8	52.7	.....	.....	37.0	30.0	.....	.....	52.1	39.9	37.0	27.0	.....	.....	37.0	28.0	.....	.....	85	40	.....	.....
Range	.....	.....	39°.3		.....	.....	38°.8		49°.4		52°.5		42°.0		53°.5		46°.2		43°.8		.....	.....	43°.9	
Monthly means	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* Observations not recorded.

Maximum, minimum, and mean temperatures—Continued.

STATION, PORT HURON, MICH.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max	Min.	Max.	Min.
1	63	56	64	58	87	64	48	39	35	29	24	12	64	37	40	6	25	17	29	18	39	30	80	66
2	70	52	69	54	86	70	54	35	37	26	31	15	64	38	9	1	21	14	41	15	43	34	80	53
3	77	62	62	57	83	68	62	44	33	29	40	19	41	18	18	5	35	11	41	35	55	34	65	50
4	84	68	73	56	72	62	58	49	38	31	38	26	25	12	16	8	40	21	46	35	53	38	61	52
5	69	61	77	62	79	57	51	48	40	29	38	35	45	22	28	8	46	34	41	35	55	38	57	47
6	67	59	71	59	73	62	61	39	47	29	36	33	34	26	41	26	50	43	48	33	54	41	70	48
7	70	56	63	58	75	52	55	37	46	32	37	34	46	26	39	31	57	34	45	34	66	41	57	48
8	70	54	74	57	83	43	50	43	40	32	35	32	50	36	41	26	34	20	35	24	63	49	81	57
9	77	59	79	57	82	62	48	35	39	31	32	27	54	34	37	30	37	21	35	22	53	42	76	64
10	83	59	80	62	62	50	48	37	38	33	31	25	34	10	48	29	53	32	47	29	49	40	86	65
11	66	50	76	64	60	44	40	32	49	31	34	27	19	12	54	32	57	37	59	37	55	41	85	68
12	78	56	77	60	69	44	43	27	55	41	34	22	18	11	43	28	37	22	67	44	57	41	89	58
13	75	61	76	60	65	51	48	25	43	33	34	20	19	13	50	32	25	13	59	36	47	40	64	58
14	75	53	79	60	71	55	58	38	36	30	22	16	27	14	47	32	24	11	57	38	59	38	68	57
15	83	63	80	64	70	61	54	36	40	30	38	19	40	24	32	24	27	18	48	37	53	45	75	57
16	81	62	78	64	63	54	37	29	38	26	33	17	39	32	25	19	40	24	42	34	56	44	77	70
17	68	62	74	62	54	42	56	30	29	19	17	7	44	34	30	21	34	13	37	31	76	54	75	66
18	65	57	68	57	54	37	41	31	42	24	13	2	50	40	37	18	13	5	38	29	61	45	66	54
19	75	52	67	58	53	43	46	27	42	35	16	5	47	26	38	28	21	2	49	30	66	54	65	51
20	79	55	65	58	50	40	63	36	43	32	44	10	27	22	29	20	21	16	63	36	81	58	60	51
21	75	62	69	55	48	37	69	44	36	16	48	43	22	13	40	25	25	17	57	38	80	63	67	53
22	79	64	59	50	51	39	70	49	33	11	51	37	36	19	29	4	33	13	57	39	64	41	70	59
23	68	57	63	46	60	41	69	50	42	32	49	31	40	28	13	−4	41	23	41	31	55	41	78	60
24	80	55	68	52	64	43	68	47	33	24	50	29	28	23	20	5	40	24	44	34	71	45	87	65
25	83	64	71	56	55	49	48	45	40	20	51	29	29	17	35	13	38	32	49	37	65	45	86	65
26	82	65	80	56	62	38	54	37	46	32	41	28	34	14	33	22	34	30	60	34	76	45	85	64
27	75	58	83	61	75	45	39	34	32	27	32	19	48	33	23	22	31	25	65	51	80	61	79	69
28	76	60	83	62	56	49	54	34	35	28	35	24	50	33	31	22	26	21	57	37	81	58	75	63
29	80	61	84	63	75	48	59	46	33	5	47	25	50	11	25	18	25	20	50	34	71	47	76	59
30	70	61	74	67	58	41	62	32	12	3	52	46	27	8	.....	.....	32	21	35	29	68	46	74	56
31	66	54	85	58	.....	.....	34	31	.....	.....	65	51	39	24	.....	.....	34	26	.....	.....	86	51	.....	.....
Range	34°		39°		50°		45°		52°		63°		56°		58°		57°		52°		56°		42°	
Monthly means	67°.2		66°.0		58°.2		45°.2		32°.5		31°.1		30°.3		26°.1		27°.7		40°.2		53°.1		66°.0	

Maximum, minimum, and mean temperatures—Continued.

STATION, PORTLAND, ME.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	78	63	77	58	81	62	57	46	38	30	18	−3	58	46	32	17	37	18	43	35	46	34	73	46
2	79	55	69	57	73	59	57	42	36	27	21	5	51	40	36	0	32	22	50	30	57	40	66	44
3	80	58	61	54	78	64	59	39	44	31	34	11	51	33	16	−5	32	20	48	35	52	41	65	54
4	70	59	68	54	81	63	69	49	38	31	38	23	33	14	30	12	39	15	40	30	61	38	56	50
5	80	63	78	62	80	63	60	45	47	30	38	18	35	11	16	0	41	25	38	29	54	42	61	49
6	75	60	79	62	80	62	48	40	43	30	34	20	38	20	36	6	50	36	49	33	49	42	62	52
7	77	62	75	60	74	58	59	48	45	34	34	18	27	14	47	33	52	42	50	33	53	44	73	52
8	85	62	81	65	81	55	59	44	45	31	34	26	37	17	42	33	48	42	42	31	56	45	63	52
9	77	62	81	64	76	64	58	39	46	31	34	27	37	31	34	22	42	34	43	27	54	45	81	52
10	73	62	83	62	69	50	58	47	46	36	38	30	42	22	33	20	35	27	45	34	60	47	77	62
11	82	61	79	63	66	45	52	46	48	38	34	23	22	8	39	23	41	26	56	38	54	44	61	57
12	78	58	74	65	63	45	48	37	48	35	35	26	24	13	47	33	37	30	64	39	58	43	66	55
13	78	60	82	67	76	55	51	34	54	38	37	24	19	6	47	31	41	28	54	38	53	41	68	54
14	82	60	87	69	75	55	54	33	46	28	30	17	26	6	33	16	28	14	56	43	59	43	79	56
15	86	62	88	67	69	55	52	42	33	27	28	13	32	16	45	26	32	12	55	42	59	43	83	62
16	72	61	77	66	59	53	56	48	42	28	35	18	40	29	37	30	37	20	51	40	64	39	12	57
17	79	61	66	62	59	47	56	42	38	22	34	21	37	22	32	19	28	24	50	37	60	40	82	62
18	69	60	68	62	57	43	57	41	34	20	21	3	39	22	36	15	28	10	50	36	57	48	80	63
19	76	55	80	67	53	43	58	46	44	28	8	−11	49	37	34	15	28	6	47	37	70	50	76	62
20	81	53	78	67	60	40	58	38	42	32	16	−12	45	29	35	19	37	12	58	36	71	47	82	64
21	73	59	83	65	60	41	63	50	43	25	44	16	29	15	37	12	42	26	45	39	61	52	79	63
22	66	57	80	64	54	40	58	40	37	20	50	43	25	10	38	26	40	30	56	37	61	50	75	59
23	63	56	74	58	59	38	53	42	34	17	56	41	22	15	26	−3	42	27	47	40	63	42	81	56
24	82	61	76	57	66	41	54	48	41	27	41	18	28	12	4	−7	46	26	58	33	64	42	88	59
25	88	58	77	58	67	45	56	41	33	21	37	14	27	5	24	2	41	27	46	39	70	50	84	67
26	76	63	81	55	66	45	49	38	47	16	39	30	29	13	34	10	44	33	48	34	65	41	90	65
27	87	63	83	58	68	42	53	42	47	28	42	23	37	8	30	10	48	38	58	40	87	49	80	62
28	85	67	82	57	62	45	47	39	38	16	28	17	37	23	25	16	49	35	50	37	77	60	89	65
29	85	64	90	62	52	37	44	37	39	5	35	24	40	33	38	21	53	37	63	40	77	56	87	69
30	78	63	88	63	62	46	47	34	6	−6	41	31	33	7	.....	.....	45	31	56	41	67	47	79	64
31	79	60	81	66	.....	.....	50	36	.....	.....	50	31	29	3	.....	.....	45	30	.....	.....	65	44	.....	.....
Range	35°		36°		44°		36°		60°		68°		55°		54°		47°		37°		53°		46°	
Monthly means	67°.8		68°.4		58°.0		48°.0		33°.4		27°.8		27°.4		25°.0		33°.4		42°.8		52°.6		64°.9	

Maximum, minimum, and mean temperatures—Continued.

STATION, PORTLAND, OREG.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	66	54	80	51	68	54	64	53	57	46	57	49	46	36	54	38	56	40	54	43	69	45	61	48
2	65	56	78	52	67	58	68	56	56	41	55	49	45	36	49	38	59	41	50	33	62	49	67	52
3	77	46	70	60	68	53	66	56	55	37	60	52	50	39	55	38	50	42	53	37	61	48	74	52
4	90	54	83	52	69	53	70	53	57	46	49	41	50	39	54	43	50	36	56	33	59	45	66	54
5	88	57	82	60	67	56	70	52	57	44	48	38	58	40	48	38	51	38	61	35	56	44	65	51
6	94	61	76	50	70	57	76	48	58	45	58	44	49	37	47	37	50	42	55	44	63	41	65	50
7	93	61	78	61	70	54	72	52	53	38	61	52	48	35	52	39	50	36	54	41	72	51	62	48
8	91	62	80	53	66	47	78	50	59	46	63	52	51	36	49	39	45	34	50	40	82	52	66	45
9	95.5	65	83	55	70	45	78	52	63	50	57	49	46	37	44	36	46	34	50	39	74	52	63	49
10	94	65	84	55	70	44	73	49	58	48	60	49	47	33	50	35	45	33	53	37	63	47	63	54
11	90	65	85	58	74	44	72	54	56	41	55	45	45	32	51	41	45	35	55	36	64	47	75	51
12	83	62	82	57	78	50	74	52	50	38	52	42	43	30	50	36	48	38	60	40	64	46	85	54
13	81	62	81	57	76	46	74	48	53	42	50	43	43	29	55	42	50	36	54	45	56	41	80	62
14	74	60	76	61	78	47	75	53	50	37	58	45	41	31	57	48	50	35	57	50	60	40	81	51
15	67	57	81	55	83	53	68	49	40	35	48	37	45	34	55	43	47	37	57	45	54	44	87	52
16	78	54	75	55	80	58	63	50	51	30	45	35	58	38	54	33	50	35	64	47	53	36	92	62
17	90	59	78	55	86	55	62	49	51	40	42	33	55	44	51	43	54	39	58	48	55	42	99	67
18	92	62	81	56	75	59	67	55	51	40	45	35	51	39	50	35	56	44	55	42	62	47	82	58
19	90	61	80	55	65	55	65	59	49	38	57	41	52	38	48	38	57	41	57	38	72	42	75	59
20	90	61	88	58	71	59	62	57	47	35	54	43	43	30	52	39	57	48	61	40	56	45	72	60
21	87	66	80	60	85	53	61	54	46	36	60	52	36	24	58	46	56	47	67	43	68	39	66	55
22	80	58	73	64	78	52	64	55	48	38	59	53	29	20	59	40	55	42	57	46	77	47	66	51
23	84	58	71	58	71	58	61	54	39	33	53	43	37	22	59	45	52	44	60	45	53	51	61	50
24	85	58	72	56	81	52	63	48	41	34	44	35	36	25	53	40	51	40	60	47	65	48	64	50
25	83	57	70	55	80	52	55	45	40	30	45	34	41	23	46	37	46	33	60	48	59	50	66	51
26	90	62	68	49	71	50	66	49	36	29	41	35	47	27	50	36	51	37	62	48	67	34	73	58
27	80	57	72	46	70	54	57	49	35	28	53	35	41	30	52	32	55	36	67	41	68	48	78	56
28	75	52	68	49	71	45	57	45	53	32	52	43	45	31	53	33	57	45	67	44	64	45	82	60
29	68	51	71	55	79	52	52	36	60	37	43	39	53	35	47	36	55	40	61	45	57	46	82	59
30	74	48	73	51	78	53	58	47	58	33	46	38	50	41	.....	.....	50	35	61	48	60	46	87	59
31	77	52	68	53	.....	.....	56	49	.....	.....	54	42	46	39	.....	.....	53	34	.....	.....	61	46	.....	.....
Range	49°.5		42°		42°		42°		35°		30°		38°		27°		26°		34°		43°.		54°	
Monthly means	71°.8		67°.7		63°.8		58°.1		44°.6		47°.8		39°.0		45°.2		44°.9		50°.4		55°.5		65°.1	

Maximum, minimum, and mean temperatures—Continued.

STATION, PORT STANLEY, CANADA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	75.0	53.1	61.5	54.7	81.8	53.4	54.[illegible]	32.4	38.0	24.6	22.5	10.2	51.4	40.4	38.5	14.0	33.4	15.0	39.8	20.0	50	29	81.0	60.2
2	74.0	45.1	65.0	53.4	83.2	68.1	57.0	30.0	41.0	23.0	32.0	14.0	50.6	34.2	14.7	— 6.7	26.0	7.9	41.0	20.0	54.2	29.8	74.0	60.7
3	74.0	52.1	65.0	57.0	83.0	61.1	63.4	34.8	34.0	26.4	38.0	16.0	38.2	21.0	20.4	— 6.7	35.5	— 1.7	43.4	34.7	65	31.8	71.2	57.6
4	77.0	65.1	74.0	59.2	75.8	55.1	65.8	54.2	43.0	24.6	38.8	29.0	27.6	17.0	22.2	— 5.5	38.2	10.9	46.0	33.2	64.2	43.4	65.6	52.4
5	78.2	66.1	77.4	60.2	75.0	49.2	56.[illegible]	45.2	44.6	20.0	39.0	33.2	42.8	24.0	30.2	— 8.5	38.8	20.0	44.4	31.4	53	44.2	63.0	48.2
6	76.8	62.6	74.0	60.6	77.0	56.1	63.2	42.6	48.5	20.0	37.0	32.2	42.0	26.0	40.0	20.2	48.8	36.6	45.0	32.4	60.2	44.4	66.0	42.7
7	76.5	58.1	65.2	58.2	74.0	41.8	56.[illegible]	38.2	51.5	25.2	40.5	33.2	38.0	28.0	42.0	23.0	48.4	34.2	50.2	31.0	64.2	47.2	73.0	47.2
8	77.0	53.1	72.6	56.2	76.6	63.3	53.0	34.2	43.8	31.4	56.5	31.0	43.5	30.2	38.6	14.2	35.6	22.4	44.0	27.4	62.8	46.7	81.0	59.2
9	76.0	53.6	80.6	55.0	81.4	66.3	55.0	28.2	41.6	30.0	33.0	26.6	47.8	38.2	36.5	24.0	33.8	22.0	46.2	21.0	54	42.7	74.2	60.1
10	80.0	60.1	78.0	64.3	71.4	45.1	52.0	39.2	43.0	35.2	34.0	25.4	41.5	11.5	42.6	30.0	46.6	29.0	43.2	25.0	54	43.2	79.0	59.2
11	74.2	50.2	78.2	64.5	65.2	39.4	46.6	30.0	48.0	30.0	35.6	30.5	18.6	12.0	48.5	35.2	51.2	38.2	50.0	33.1	58.2	36.6	82.2	58.2
12	76.0	47.2	78.0	58.6	65.6	49.1	41.8	28.0	51.4	36.8	34.8	22.0	22.0	12.5	39.5	25.4	43.6	24.6	58.0	39.2	86.6	42.2	90.0	61.7
13	80.0	61.1	78.0	65.3	71.8	44.2	49.8	26.0	41.6	32.4	34.6	21.0	24.5	11.5	48.0	30.0	30.8	8.7	56.0	40.0	55.8	40.4	81.0	62.3
14	79.4	55.2	79.8	56.6	72.0	51.4	59.0	47.2	35.0	28.0	24.0	16.0	28.0	17.5	44.0	30.5	29.2	3.4	51.5	40.2	56	32.2	83.0	62.1
15	79.1	56.8	80.0	55.2	71.2	51.2	56.0	41.2	42.2	28.0	37.8	19.0	37.8	27.5	35.0	24.0	28.2	15.2	52.0	37.0	64	43.2	80.4	67.0
16	85.2	64.0	78.0	64.1	65.6	46.8	42.[illegible]	29.4	40.0	26.0	35.0	21.4	37.2	31.0	31.0	20.4	39.8	22.4	46	32.2	55.6	43.2	80.0	68.7
17	80.4	60.3	78.8	56.8	53.0	39.2	54.8	(*)	30.4	22.0	23.2	7.9	38.0	32.2	30.0	18.5	35.0	11.5	40.4	30.2	63.4	49.2	79.0	65.1
18	73.0	56.1	77.0	58.2	56.8	32.2	46.0	.....	44.4	21.0	13.0	2.9	47.0	34.2	33.5	15.0	12.7	2.9	43.0	26.4	73	50.8	73	60
19	75.8	49.2	74.8	54.2	55.0	40.2	45.0	.....	45.8	32.2	16.4	3.1	47.0	27.0	41.4	28.2	25.2	3.4	45.0	27.0	62.6	47	80.2	58.2
20	79.8	50.2	75.8	53.2	55.0	41.4	55.0	.....	45.0	29.0	40.0	12.4	30.6	21.0	33.2	22.0	26.2	15.0	58.0	28.8	65.2	51.2	67	57.4
21	80.8	58.2	75.0	58.4	53.2	36.2	59.0	.....	36.8	17.0	41.0	35.0	24.6	15.2	38.4	23.0	26.8	16.5	66.6	38.2	69.6	53.2	71.8	54.6
22	81.0	64.1	67.2	49.1	53.0	34.4	61.[illegible]	.....	31.6	13.0	45.0	33.2	35.2	20.0	31.0	9.4	36.0	14.0	53.6	53.2	65.2	40.2	73	57.2
23	74.0	56.1	71.0	41.6	61.6	28.6	59.[illegible]	.....	44.0	39.0	50.6	29.0	42.6	30.0	10.4	— 1.3	37.8	22.0	50.4	34.2	55.0	33.2	77.2	55.2
24	79.0	50.2	76.0	48.2	64.2	38.2	61.4	40.6	36.6	17.6	44.0	28.0	32.0	24.2	20.6	4.9	42.4	16.5	60.4	33.4	61.0	36.0	74.6	62.3
25	81.2	58.4	76.0	51.6	64.6	45.4	52.0	45.2	42.8	15.4	47.6	27.0	32.4	20.0	33.0	12.0	41.6	32.6	53.2	33.2	66.5	42.2	76.8	61
26	79.6	67.5	78.8	52.4	62.0	40.8	57.8	44.2	47.0	34.2	47.0	26.4	32.5	15.0	33.8	20.5	36.0	31.0	51.0	29.8	65.8	44.2	80	60.5
27	80.4	59.2	78.2	52.2	66.0	51.6	45.0	34.6	35.0	30.0	36.0	24.0	43.0	29.5	30.0	20.4	35.0	21.4	56.0	43.6	70.6	49.2	80.2	64.1
28	78.0	55.7	80.0	52.2	66.0	45.4	52.4	33.6	40.0	32.2	33.4	23.2	43.4	29.2	33.0	22.5	29.4	20.6	65.0	38.2	70.0	48.4	74.8	57.2
29	81.6	56.2	79.8	53.4	66.0	44.2	54.0	43.2	36.5	6.3	44.8	23.4	42.8	13.5	38.5	19.0	34.4	21.0	52.0	32.2	72.0	55.2	77	52.2
30	78.0	54.3	79.0	60.2	62.8	40.2	58.4	33.2	12.0	1.7	44.4	34.2	28.0	7.0	.....	.....	35.4	21.0	50	28	64.0	44.2	76.4	53.8
31	75.2	48.7	80.4	53.2	.....	.....	37.4	30.4	.....	.....	50.4	39.2	36.8	26.2	.....	.....	41.2	25.2	.....	.....	77.4	44.8	.....	.....
Range	46°.1		39°.0		54°.6		.....		49°.8		47°.7		43°.5		57°.0		50°.5		44°.6		48°.4		47°.3	
Monthly means	.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....	

* Observations not recorded.

Maximum, minimum, and mean temperatures—Continued.

STATION, PUNTA RASSA, FLA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	83	71	88.5	74	88	74	87	75.5	75	55	79.5	67	79	64.5	76	57	81.8	63.5	78.5	61.5	83	73	88	70
2	82	71.5	90	76	77	69.5	87	75	76.5	60.5	78.5	68	81.5	66	71.5	54.5	76	63.5	79	69.5	83.5	72	86	70
3	83	72.5	87	71	88	71.5	89	71	78	62	77.5	67	79.5	66	79	51.5	72	51	80.5	66	79.6	67	85	75.5
4	87.1	69	85	73.5	89.5	75	86	73	81	65	76	65	79	64	78	64.5	74.5	53	77	66	79	61.5	87	74
5	85	72	87	72	89	74.5	86	74	81.5	71	79	65	79.5	66	81.5	60	76.5	57	77	60	88	60.5	84	74
6	84	73	91	72	89.5	74.5	85	74	85	73.5	80	72	78	64.5	73	66	77.5	61	80	61	89.6	72	87.5	74
7	84	71	89	71.5	90	74.5	83	75.5	83	60	76	69	75	62	81.5	66	77.5	63.5	81	68	88	71	86	73
8	86	70	88.5	74	89	75	84	72	83	67.5	70.5	65	75.5	59.5	79	66.5	79	62	80.5	65.5	85	70	85.5	72.5
9	86	72.5	89.5	74	89	75	81	68	82	69	67.5	54	75	58	80.5	64	75.5	65	78.5	72.5	85	66	86	72
10	88	75	87.5	73.5	87	75	85	67.5	78	71	65	49	75.5	60.5	78.5	63.5	78	62	78.5	65	80	63.5	85.5	72.5
11	89	76	85.5	74	88.5	75	78	70	71.5	55	71	58	73	60.5	79	61.5	78	67	84	64	84	63	79.5	73.5
12	87.5	76	88.5	71.5	88	72	80	65.5	75.5	51.5	70	55	68	53	78	65	79.5	63	83.5	71	87	66	83.5	73
13	88	77	85.1	72.5	82	74	80	65.5	81	62	62.5	48	61.5	47	78.5	63.5	76	69	82	65	83	68	84	76
14	88	77	86.5	74.5	83	73	77.5	65	81	67	63	55.5	63.5	42	77.5	69	78.5	62	82.5	71.5	87	66	86	76.5
15	88	77.5	90	74	88	73.5	79.5	65	81.5	73.5	61.5	45.5	71	50.5	70	56.5	78.5	63	78	65	86	69	88.5	76
16	85	78	89	74.5	87	76	79	63	81	73	69.2	47	75.5	55.5	66	51	80	69.5	75	56.5	88	67	90.5	76
17	88.5	80.5	89	77	87	75	78	55.5	80.5	65.5	72	57	77.5	59.5	73	51	75.8	68.5	73	61	81	70.5	87	78
18	91.1	75	88	77.5	87	76.5	78	64	82.5	63	64	45	74	61	74	56.5	69	57	74	59	83	70	86	81
19	90	76	86	70.5	82	73	80	63	81.5	67	66	42	76	65.5	77	59.5	77.5	51.5	78	56	84	68	87	76
20	89	75	85	73	81	72.5	78	64	83	69	73	54	77.5	61.5	77	64	78	64	79.5	61.5	84	69	88	76
21	88.5	74	87.5	72	81	73	76	67	80.5	68	77	61	78.5	62	80	65.5	62	52	77	59.5	85	70	90	76
22	90	75	86	72	84.5	70.5	76	66	82	67	78	61.5	80	63	78	64.5	67.5	44.5	82	65	83	73	92	74
23	90.5	76	87	72	85	71.5	76	77	82.5	67	74.5	60.5	80	65	74	62	75	50.5	82.5	66.5	85	73	90	74
24	90.6	76.5	87	76.5	86	73	80	60	82	68.5	76.5	61	76	66	75	52	75.5	56.5	81	67.5	86	71	88.5	73
25	90	76.5	88	71	86	72	82	67.5	30	68	76	63	77.8	61.5	76.5	58.5	75.5	68	81	68.5	86.5	71	88.5	73
26	91	76	86	72	85.5	75	82.5	69	79	68	77	65	74.5	59.5	79	60	77.5	67	84	67	84.5	71	89.5	76
27	90	71	85.6	73	87	78	84	71	79.5	67	80.5	67.5	77	59	81	63.5	80	52	84	69	85	73	88.5	77
28	88	74	80	71.5	88.5	76	86	68	82	67.5	79.5	66	79	64	79	66	80	68.5	83	66.5	83	71.5	91	78
29	90	73	86	74	88	76.5	87	71	81.5	67.5	79.5	67	76.9	65	77	64	64	59.5	81.5	67.5	85.5	71.5	89.5	71
30	88.1	76	86	74.5	86	74	84	72	82.5	73	81	66	75	64	.....	.....	67	49.5	81.5	68.5	90	74	88	74
31	88	75.5	88	74	.....	.....	73	60	.....	.....	81	66.5	69.5	59	.....	.....	76.8	53	.....	.....	88.5	72	.....	.....
Range	22°.1		20°.5		20°.5		33°.5		33°.5		39°		39°.5		30°.5		37°.3		28°		28°.5		22°	
Monthly means	81°.1		79°.6		80°.1		75°.4		73°.9		67°.0		67°.5		69°.2		68°.4		73°.0		76°.9		80°.8	

Maximum, minimum, and mean temperatures—Continued.

STATION, QUEBEC, CANADA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	.....	.....	.....	.....	65	57	43	36	43	25	5	—15	44	27	30	9	37	12	43	23	.....	26	.....	55
2	.....	.....	.....	.....	84	64	50	34	44	24	2	—11	45	29	28	—11	36	14	44	20	.....	32	.....	63
3	.....	.....	.....	.....	77	54	51	30	48	24	14	— 5	42	29	—3	—17	37	7	43	21	.....	28	.....	51
4	.....	.....	.....	.....	64	53	52	43	48	21	29	— 5	37	— 3	5	— 8	41	2	32	20	.....	29	.....	42
5	.....	.....	.....	.....	70	57	49	32	43	24	32	8	8	— 4	—5	—20	42	4	46	25	.....	29	.....	42
6	.....	.....	.....	.....	69	52	43	32	49	24	32	1	11	7	25	—11	43	18	43	25	.....	32	.....	51
7	.....	.....	.....	.....	64	52	48	38	44	21	20	2	24	3	38	5	43	20	43	26	.....	31	.....	45
8	.....	.....	.....	.....	67	48	47	33	44	23	35	15	21	5	26	4	43	21	35	22	.....	22	.....	41
9	.....	.....	.....	.....	62	53	47	33	44	22	33	24	23	4	21	— 9	28	19	43	16	.....	30	.....	49
10	.....	.....	(*)	.....	63	38	50	40	43	23	44	21	32	2	16	9	43	13	58	26	.....	38	.....	47
11	.....	.....	85	58	59	39	48	38	38	30	35	14	23	— 9	34	10	43	19	53	30	.....	34	.....	48
12	.....	.....	62	56	61	42	46	30	48	29	35	19	6	— 9	34	22	36	21	53	32	.....	36	.....	50
13	.....	.....	65	58	68	42	44	26	43	25	41	20	4	— 8	29	8	37	14	48	24	.....	37	.....	63
14	.....	.....	78	59	70	45	54	32	43	14	31	10	11	— 8	30	6	36	— 2	39	20	.....	31	.....	63
15	.....	.....	81	60	71	52	60	35	43	17	13	0	14	4	28	15	37	— 4	47	27	.....	28	.....	63
16	.....	.....	79	55	63	41	55	41	43	22	21	0	22	9	30	11	26	— 2	44	23	.....	27	.....	58
17	.....	.....	66	56	57	34	47	35	35	16	37	11	22	7	19	6	24	10	45	30	.....	32	.....	67
18	.....	.....	75	60	52	33	43	29	44	9	15	— 4	34	16	37	11	28	1	44	28	.....	46	.....	66
19	.....	.....	77	62	55	34	45	29	39	13	—5	—21	37	25	32	13	36	— 5	44	27	.....	44	.....	62
20	.....	.....	80	62	56	34	50	34	43	17	0	—20	34	7	39	11	37	— 4	47	28	.....	39	.....	58
21	.....	.....	80	61	55	39	48	42	35	14	8	5	12	— 6	37	5	38	14	†	28	.....	46	.....	54
22	.....	.....	77	51	47	38	46	26	33	3	38	23	14	— 9	43	6	43	17	.....	29	.....	34	.....	50
23	.....	.....	69	43	56	37	45	33	19	0	35	11	17	— 4	14	—15	39	12	.....	29	.....	30	.....	49
24	.....	.....	69	43.5	64	40	48	32	42	15	18	— 3	17	— 5	3	—30	39	14	.....	27	.....	39	.....	51
25	.....	.....	81	55	68	46	51	33	18	(?)	36	4	7	—15	11	— 14	43	7	.....	24	.....	38	.....	55
26	.....	.....	91	55	49	44	44	25	40	10	36	4	10	— 2	32	—10	47	24	.....	24	.....	31	.....	54
27	.....	.....	81	64	49	39	48	30	37	4	44	6	18	— 2	17	— 4	35	27	.....	25	.....	45	.....	62
28	.....	.....	82	60	50	31	44	24	22	— 2	16	3	26	13	18	— 6	38	29	.....	28	.....	46	.....	59
29	.....	.....	85	54	52	34	48	20	15	—15	38	6	40	10	37	13	35	30	.....	27	.....	42	.....	57
30	.....	.....	84.5	56	50	33	47	27	9	—15	35	16	20	—10	.....	.....	43	26	.....	25	.....	33	.....	57
31	.....	.....	84	58	.....	.....	47	30	.....	.....	43	34	36	— 4	.....	.....	40	20	.....	.....	.....	40	.....	.....
Range	.....	.....	.....	.....	54°		40°		.....		64°		50°		63°		52°		.....		.....		.....	.....
Monthly means	.....	.....	.....	.....	.....		.....		.....		.....		.....		.....		.....		.....		.....		.....	.....

* Observations began August 11, 1875.

† No maximum reported.

Maximum, minimum, and mean temperatures—Continued.

STATION, ROCHESTER, N. Y.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	70	59	65	57	88	59	45	38	37	30	12	3	68	42	42	31	30	20	38	28	45	30	84	63
2	73	53	66	57	87	65	53	34	33	30	21	4	62	29	34	3	25	17	43	21	53	34	81	63
3	82	55	67	56	87	67	66	42	34	26	39	10	41	22	21	5	27	12	48	34	54	41	69	53
4	84	69	70	61	79	58	66	51	39	27	35	25	23	13	23	10	36	15	46	35	59	39	71	56
5	84	67	75	57	82	53	51	44	46	25	35	30	49	16	27	3	51	24	48	33	57	41	62	51
6	79	62	82	64	76	60	68	41	47	33	35	30	42	24	43	25	61	43	46	35	65	53	68	48
7	78	59	73	62	70	55	57	44	49	33	43	33	38	22	45	34	66	50	43	35	79	50	70	54
8	78	60	73	61	81	55	52	41	39	33	36	32	47	30	44	30	50	23	39	29	72	52	83	61
9	82	64	77	56	89	65	51	36	42	31	35	28	55	40	38	28	30	23	37	25	55	47	84	67
10	81	61	83	60	77	51	57	42	43	34	32	23	56	14	35	23	41	23	49	27	55	43	79	63
11	72	55	85	68	59	46	46	35	48	34	34	28	21	11	51	35	64	32	62	33	57	44	83	66
12	76	54	81	68	66	48	41	34	60	39	35	26	24	13	48	32	56	42	60	39	55	44	86	64
13	79	61	79	68	70	53	50	34	47	35	36	22	20	8	44	31	42	13	66	49	53	42	87	69
14	75	55	83	62	73	51	61	33	35	31	22	13	28	17	52	32	23	12	70	43	57	38	85	68
15	83	58	84	62	72	56	61	47	41	31	36	14	40	27	41	28	23	14	50	39	51	41	83	66
16	81	68	80	66	62	49	51	35	40	30	37	24	40	34	28	23	36	17	46	34	59	41	86	71
17	75	65	82	64	50	43	48	32	30	21	29	12	48	33	26	21	36	20	39	32	70	51	79	66
18	68	58	73	64	53	39	51	36	39	24	19	5	60	42	29	21	28	8	40	31	70	54	73	63
19	74	53	75	62	52	41	44	34	50	36	11	— 6	59	30	40	23	21	7	44	33	68	49	78	58
20	76	55	74	58	53	45	59	34	41	31	42	— 8	32	25	28	22	23	12	50	30	74	53	72	58
21	78	60	80	59	52	42	61	50	43	24	51	42	28	19	40	19	30	19	51	39	83	60	67	56
22	84	57	68	56	54	41	69	44	31	21	54	42	32	18	40	10	29	20	53	34	70	41	73	56
23	79	64	66	53	60	36	75	54	41	23	55	32	42	30	10	4	38	19	50	33	56	36	78	58
24	76	57	69	49	66	41	70	54	39	29	41	23	30	22	15	5	40	25	51	32	76	40	84	67
25	86	57	73	52	70	48	56	42	37	24	50	34	34	20	19	10	44	30	50	41	61	49	84	70
26	82	69	78	54	56	44	62	40	49	35	52	27	28	19	21	13	40	30	59	36	72	46	85	64
27	77	67	83	59	70	51	47	37	39	27	44	42	48	27	22	16	36	29	64	38	83	54	86	71
28	81	64	82	58	53	44	46	37	42	23	36	21	51	34	26	19	35	26	57	40	83	58	76	63
29	79	62	82	61	55	43	48	40	36	4	44	32	57	17	26	17	32	25	54	35	69	46	80	59
30	78	60	81	64	60	45	66	40	7	1	56	42	23	12	.....	.....	32	22	38	29	53	41	77	61
31	73	55	81	57	.....	.....	40	31	.....	.....	70	42	42	23	.....	.....	39	28	.....	.....	83	46	.....	.....
Range	33°		36°		53°		44°		59°		78°		60°		49°		59°		49°		53°		39°	
Monthly means	69°.4		67°.9		57°.9		46°.4		33°.8		31°.0		31°.4		26°.5		23°.6		42°.0		55°.5		70°.0	

Maximum, minimum, and mean temperatures—Continued.

STATION, SAINT LOUIS, MO.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	85	70	76	59	89.5	73	57	46	71	41	54	32	67	47	47	8	49	32	49	(*)	54	42	86	68
2	86	70	78	56	92	76	66	42	58	38	59	37	55	40	25	4	36	25	61	.....	56	39	82	67
3	90	75	77	61	86	76	76	47	61	45	63	47	54	32	31	23	52	22	53	40	68	44	70	61
4	93	76	83	65	81	66	72	56	46	39	60	52	61	37	26	5	66	35	67	40	68	52	70	55
5	93	72	87	70	88	66	81	58	52	36	55	48	62	37	44	16	64	39	58	36	62	57	79	58
6	84	72	80	68	88	73	70	48	58	37	54	40	47	28	54	37	67	58	62	38	79	54	87	67
7	80	66	79	64	89	71	64	47	56	37	40	30	62	36	51	34	58	32	67	43	68	56	82	69
8	83	67	82	64	92	74	62	51	56	38	32	25	67	48	65	39	68	36	67	45	58	48	87	69
9	88	72	83	66	90	76	64	45	51	41	37	23	65	20	73	57	74	50	71	48	73	48	82	68
10	82	71	83	66	84	50	58	40	51	31	46	30	29	16	72	56	76	63	76	55	68	56	89	69
11	76	70	77	63	69	49	48	36	65	38	38	26	41	19	67	49	70	31	81	60	87	53	89	70
12	86	70	81	64	74	62	52	34	64	47	57	27	38	19	66	43	34	25	80	66	74	57	79	69
13	83	73	83	63	77	60	62	40	54	39	44	34	28	15	62	37	45	25	73	49	73	57	78	69
14	86	72	84	66	79.5	62	62	43	46	36	49	30	55	24	46	28	54	34	60	39	85	58	83	67
15	90	70	85	69	82	65	51	37	49	39	57	39	51	41	30	17	57	42	73	49	81	66	79	71
16	97	78	83	68	77	61	59	33	39	25	42	20	48	39	35	21	54	31	58	48	87	68	80	61
17	97	80	77	63	62	51	71	45	37	19	20	− 3	60	45	39	23	31	20	51	43	86	69	61	52
18	82	72	76	61	59	43	51	35	57	32	43	10	61	39	61	30	30	15	60	39	86	69	67	52
19	76	66	76	58	62	50	60	37	53	40	47	21	43	28	50	33	28	21	75	47	89	72	61	58
20	82	71	79	59	59	40	71	46	56	40	60	39	55	35	61	37	29	18	73	63	86	70	74	55
21	80	70	76	65	56	42	77	50	44	18	62	48	58	33	57	33	32	8	70	56	76	67	86	60
22	81	65	71	55	58	44	75	51	43	20	61	49	63	47	52	28	45	26	68	55	77	57	90	69
23	83	66	75	55	67	46	74	51	48	29	62	54	53	25	34	16	38	31	74	50	67	44	93	72
24	85	70	82	62	71	47	76	53	48	20	67	55	28	20	67	24	48	(*)	60	47	68	57	88	71
25	83	73	84	65	66	56	74	48	45	24	50	36	37	25	68	48	42	.....	63	47	76	60	88	71
26	85	71	87	67	68	44	56	41	50	23	63	31	51	31	66	50	51	.....	72	53	79	62	89	73
27	88	68	87	69	76	50	68	40	49	24	37	22	54	46	72	38	45	.....	82	58	82	64	90	74
28	76	70	87	67	81	55	81	54	46	29	49	28	65	33	46	25	35	.....	66	52	85	64	84	73
29	84	71	83	70	84	59	81	47	31	12	60	39	33	13	44	24	43	.....	81	53	86	67	76	70
30	79	71	84	68	69	54	50	34	37	16	66	48	39	19	.....	.....	44	.....	68	47	87	70	74	64
31	84	70	86	71	.....	.....	50	28	.....	.....	74	61	58	29	.....	.....	53	.....	.....	.....	81	71	.....	.....
Range	32°		32°		52°		53°		59°		77°		54°		69°		.....		.....		50°		41°	
Monthly means	78°.2		73°.1		67°.2		54°.7		41°.7		43°.7		41°.4		40°.9		39°.9		57°.3		67°.2		72°.9	

* Minimum thermometer broken.

Maximum, minimum, and mean temperatures—Continued.

STATION, SAINT MARKS, FLA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	91	67	87	71	80	72	82	66	71	39	63	55	76	58	(†)	44	71	47	72	50	81	58	93	72
2	90	68	79	70	88	68	74	61	74	41	63	56	74	55	.....	33	69	47	71	57	86	64	87	74
3	89	70	88	70	87	70	83	64	75	46	62	52	72	56	.....	30	60	36	69	55	72	53	82	72
4	90	72	88	68	88	71	81	70	79	61	53	47	(†)	49	.....	47	66	37	79	50	79	47	90	73
5	86	72	86	68	90	69	82	70	73	67	78	52	.....	53	49	43	71	53	78	50	83	60	90	71
6	92	71	86	69	92	72	83	70	68	58	68	58	.....	55	65	47	74	56	74	52	87	57	93	62
7	89	73	85	68	93	76	83	68	71	58	67	49	.....	42	74	53	69	62	77	54	85	67	92	71
8	87	71	86	69	89	70	76	56	68	53	57	44	.....	42	68	56	69	46	71	62	79	67	93	68
9	90	69	88	69	91	73	75	57	61	48	53	36	.....	48	62	54	70	39	69	58	70	55	91	62
10	91	68	86	69	89	68	72	55	69	61	52	35	.....	48	70	49	73	41	78	54	82	47	86	72
11	90	70	84	70	91	71	74	60	63	44	58	41	.....	37	71	58	75	47	76	61	91	53	82	71
12	90	71	84	60	82	72	70	53	67	39	59	40	.....	34	71	60	74	57	79	60	90	59	88	71
13	89	72	88	69	83	70	70	49	73	45	67	34	.....	33	71	60	64	41	76	68	91	57	91	73
14	94	73	88	70	(*)	.....	70	47	78	54	57	36	.....	28	73	57	75	38	78	58	92	63	89	70
15	94	75	88	70	.....	.....	75	45	82	66	58	29	.....	27	60	43	75	59	69	53	88	67	85	72
16	93	73	88	72	.....	.....	64	46	83	68	67	52	.....	38	66	37	77	59	76	49	89	64	84	70
17	89	70	87	72	.....	.....	66	41	71	47	64	40	.....	42	64	39	70	51	72	56	89	62	89	71
18	90	69	87	74	.....	.....	72	42	72	45	45	28	.....	53	60	46	57	42	73	43	91	61	87	66
19	94	67	87	73	80	64	68	48	78	51	56	27	.....	53	65	40	58	34	75	45	88	68	89	66
20	94	72	89	71	78	58	70	44	81	68	68	40	.....	39	73	51	62	43	79	51	92	64	94	68
21	94	73	76	71	80	54	73	47	78	64	73	53	.....	42	73	61	52	35	79	53	90	65	97	69
22	94	69	82	70	83	61	73	55	69	61	70	55	.....	55	69	58	56	32	79	57	89	63	95	71
23	90	68	87	70	86	63	79	51	66	57	70	52	.....	49	58	48	65	38	81	53	88	67	95	72
24	93	66	86	70	83	62	79	56	73	58	72	60	.....	53	61	37	67	51	80	57	92	62	96	73
25	93	69	88	71	78	63	78	53	68	59	72	59	.....	56	66	34	77	62	86	65	90	67	94	77
26	96	69	87	71	72	64	79	52	70	58	72	60	.....	49	70	41	74	54	83	56	87	68	95	75
27	93	69	86	69	79	64	74	48	71	63	70	64	.....	54	73	47	72	50	83	60	87	65	94	71
28	91	70	87	70	84	72	76	41	71	63	71	63	.....	50	77	62	70	51	79	63	89	65	97	70
29	92	68	89	70	82	67	80	56	69	63	71	62	.....	53	76	52	62	42	85	64	89	67	98	73
30	94	70	90	70	80	62	75	55	69	60	77	62	.....	42	.....	.....	67	40	85	55	90	71	93	72
31	85	71	88	73	.....	.....	68	43	.....	.....	76	61	.....	46	.....	.....	70	46	.....	.....	91	71	.....	.....
Range	30°		30°		.....	.....	42°		44°		51°		.....		.....		45°		47°		45°		36°	
Monthly means	81°.3		77°.2		.....	.....	63°.7		62°.6		56°.2		55°.9		56°.7		56°.9		65°.6		73°.6		79°.7	

* Observer sick.

† Maximum thermometer broken.

Maximum, minimum, and mean temperatures—Continued.

STATION, SAINT PAUL, MINN.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	73	60	82	53	83	63	50	36	40.5	31	29	16.5	32	16	− 1	−15.5	27	16	44	25.5	48	40	78	62
2	70	62	80	58	69	61	67	36	42	31	38	26	30.5	9	6	−22	32	1	37	30	55	40	65	52
3	84	67	90	58	69	60	59	46	48	32	40	35	10.5	− 7.5	8.5	−13	38	12.5	43.5	29.5	45	33	57	46
4	73	60	85	57	78	55	56	40	36	24	46	38	22.5	− 2.5	5	−19	44	25	42	27.5	56	31	69	43
5	72	66	81	60	80	57	43	37	46.5	23	46	40	24	10	39.5	2.5	46	28	41	24.5	54.5	43	81	49
6	80	49	78	56	82	54	51	35	53.5	33.5	45	30.5	35	3	34.5	13.5	29.5	11.5	52.5	28.5	52	42	82	57
7	86	60	85	57	85	64	54	38	55	35	30.5	20.5	35.5	16	25.5	2	25	9	47	27	48	41	77	61
8	86	64	90	58	89	69	48	34	48.5	36	22	8.5	41	19	30	12	34	13	56	28	65	35	71	61
9	86	65	75	63	76	53	49	36	43	26	21	8	20	− 5	32.5	23	36	26	52	40	64	48	84	59
10	79	64	80	61	62	43	42	32	44.5	26.5	25	18	8.5	−10	39	23	33	22	57	41	66	37.5	81	67.5
11	86	55	78	56	65	44	39	26	50	33	23	13.5	25	3	31	8	22.5	3	51	41.5	58.5	47	80	62
12	90	66	75	54	72	50	50	27	42.5	24	43	9	18.5	− 1	36.5	21.5	15	− 2	46	33.5	67	42	74	58
13	87	60	80	55	70	52	62	35	40	17.5	30.5	19	27	3	36	16	26	8	45	30.5	68	46	80	56
14	92	66	75	55	69	61	56	35	37	26	33	9	33.5	18.5	16.5	− 1	27	18	52	33	75	50	87	58
15	95	67	75	55	77	59	47	25	36	17	37	22	40	22.5	12	− 4	30	17	52	34	61	48	87	64
16	80	67	72	56	59	44	53	39	20.5	12	25	−10.5	41	23	23	0	26	14	50	31	67.5	47	64	52
17	75	62	71	55	56	34.5	43	33	26	9	5.5	−17	43	35	30	2	29	7	48.5	29	73	48	54	44
18	83	54	75	57	51	45	51	25	33.5	20	13	2.5	39	13	41.5	20	23	− 6	57	30	80	56	50	39
19	83	59	78	50	50	37	61.5	33	25	10.5	24	7	19	7	27.5	7.5	27.5	7	56	42	81	62	57	43
20	84	62	84	55	47	34	71.5	38.5	25	− 0.5	36	20	13.5	1	40.5	15.5	18.5	− 8	61	45	83	60	72	47
21	90	61	64	52	51	38.5	76	44	8	− 9.5	40	30	10	− 5	36	4.5	29	− 0.5	67	40	73	57	85	55
22	80	60	73	43	56.5	38.5	72.5	49	22	4.5	50	34	19	6.5	8	− 4	35	12	60	38.5	66	49	85	66
23	80	53	73	47	66	45	57.5	45	22	4	45	29	20	4.5	11.5	−14	38.5	11	60	45.5	75	42	89	69
24	86	58	70	54	64	46.5	55.5	37	32	− 3.5	24	23	15	− 3	36	9	41	32	61.5	34	77	52	92	62
25	80	60	80	65	60.5	40	49	34	33	26	23.5	7	19.5	− 2	4.6	28	44.5	30	59	39	83	53	88	66
26	82	54	85	63	68	43	35	39	29	8.5	23	10	32	5	38	21	42	25	73	50.5	82	55	79	63
27	85	61	76	66	73	47.5	35.5	30	25.5	8.5	25	3	31	13.5	28	15	41	24.5	61	45	85	60	74	56
28	88	58	76	56	62	43	43	32	2.5	−13	24	14	29	− 3	22	11	40	18	50	35	89	64	78	57
29	87	64	78	52	54	46.5	37	32	− 3.5	−24.5	37	25	8	−13	22.5	0	36	17.5	51	33	83	59	74	55
30	78	60	89	63	50	42	33.5	27	20	− 7	39	32	32.5	0.5	.....	.....	40	19	52	30	84	61	75	53
31	78	55	86	66	.....	.....	34.5	24	.....	.....	37	19	29	− 4	.....	.....	42	24.5	.....	.....	84	67	.....	.....
Range	46°		47°		55°		52°		78°.5		67°		56°		68°		54°		48°.5		58°		53°	
Monthly means	73°.8		66°.6		57°.2		42°.8		25°.2		25°.5		16°.6		17°.4		24°.3		43°.9		59°.2		66.°3	

Maximum, minimum, and mean temperatures—Continued.

STATION, SALT LAKE CITY, UTAH.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min	Max.	Min.	Max.	Min.
1	86	62	94	73	83	60	79	39	68	55	55	37	40	18	41	27	49	29	47	32	65	44	64	42
2	81	60	95	69	72	49	74	58	60	42	47	38	39	23	42	22	56	36	57	35	77	44	67	47
3	75	55	97	73	87	53	77	47	51	40	50	32	48	34	38	19	58	42	61	37	66	48	72	48
4	75	53	96	71	83	68	70	56	47	33	47	31	43	33	44	21	50	30	39	27	56	43	81	50
5	81	54	91	72	86	57	65	47	47	29	33	26	41	26	41	31	40	28	45	26	52	36	85	50
6	85	60	101	70	93	66	69	48	49	32	36	26	43	28	40	25	48	29	55	30	50	38	76	55
7	85	64	94	75	88	67	73	49	48	36	47	34	46	38	46	25	50	41	64	34	60	38	70	47
8	84	60	91	65	86	63	71	49	46	29	48	32	43	33	48	39	45	31	55	39	72	40	84	49
9	88	62	94	65	87	64	74	48	52	39	49	30	38	28	49	33	38	27	50	34	81	46	69	53
10	86	64	94	64	84	63	76	49	59	31	49	35	37	19	42	33	35	23	45	34	74	55	71	49
11	88	62	92	69	77	55	76	53	51	42	50	34	32	17	43	35	35	22	44	29	76	52	72	50
12	88	64	87	73	81	60	74	51	46	35	49	30	32	14	42	30	45	18	46	30	83	58	79	55
13	97	63	88	61	79	61	72	51	50	32	47	29	32	15	41	26	48	31	51	29	70	52	87	55
14	95	67	82	62	73	54	71	53	47	34	37	23	33	17	45	25	34	24	63	39	63	39	89	60
15	86	68	82	61	80	62	71	52	46	30	34	25	33	15	46	34	42	18	68	48	64	36	83	61
16	84	63	91	60	75	56	75	51	48	30	34	26	33	16	40	28	46	33	70	40	73	47	86	63
17	80	59	87	65	79	57	73	49	55	46	32	26	40	20	43	26	55	32	79	45	50	33	88	61
18	81	58	89	66	82	58	71	50	55	36	34	23	35	24	45	28	44	34	68	44	51	35	90	65
19	82	58	88	66	82	58	73	50	45	36	37	21	38	23	45	27	43	33	56	35	66	42	93	65
20	84	60	91	63	73	51	71	51	45	35	42	32	39	33	35	24	53	30	65	38	69	47	94	66
21	85	63	89	70	73	48	73	50	44	36	45	30	38	25	44	27	50	37	77	46	61	33	82	66
22	91	69	91	64	70	46	67	52	43	35	43	32	31	16	48	27	52	40	67	47	62	42	80	55
23	91	66	80	66	74	46	65	51	47	28	47	30	36	14	50	29	(*)	(*)	63	39	77	53	88	55
24	89	63	72	58	74	50	64	47	50	37	44	33	40	25	57	34	.....	.....	71	42	86	54	88	62
25	92	69	73	50	79	56	61	35	47	36	49	35	42	28	57	39	.....	.....	77	48	69	53	81	61
26	89	63	75	51	82	52	64	33	50	31	43	28	38	22	42	25	50	27	71	47	74	47	81	57
27	87	61	69	48	81	59	61	34	44	34	43	35	40	24	38	13	41	25	65	54	86	54	80	59
28	84	61	78	48	78	53	54	36	49	32	45	35	31	16	48	28	53	28	70	46	88	64	86	62
29	86	61	88	58	79	53	54	33	54	34	42	26	29	7	40	33	65	34	68	53	73	54	90	59
30	89	62	75	54	77	51	60	33	55	40	32	18	42	17	.....	.....	51	30	59	47	61	41	81	67
31	91	66	74	51	.....	.....	73	49	.....	.....	29	9	41	32	.....	.....	45	32	.....	.....	58	34	.....	.....
Range	44°		53°		47°		46°		40°		46°		41°		44°		.....		53°		55°		52°	
Monthly means	74°.7		76°.2		68°.8		59°.3		42°.0		35°.5		39°.4		35°.5		37°.9		50°.3		56°.9		69°.9	

* Observer sick.

Maximum, minimum, and mean temperatures—Continued.

STATION, SAN DIEGO, CAL.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min	February. Max	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	75	61	77	63	72	65	71	59	69	56	64	49	56	39	64	46	62	46	66	44	76	53	68	59
2	72	63	80	65	75	59	69	63	67	57	65	56	59	42	62	48	59	47	68	47	70	53	67	57
3	70	62	81	66	70	67	69	61	65	58	67	51	60	48	64	45	60	51	63	53	67	56	67	60
4	73	63	80	66	71	65	71	54	65	53	64	50	57	47	60	43	58	48	64	55	66	58	68	60
5	74	64	82	67	73	66	74	54	65	56	64	50	65	43	57	48	58	43	66	55	67	56	69	59
6	72	63	83	66	73	66	86	59	67	53	67	49	64	52	60	51	60	45	62	53	67	54	67	58
7	72	63	81	67	72	66	82	67	67	55	73	51	62	53	60	46	59	48	62	50	70	55	69	60
8	72	63	77	69	74	65	84	67	74	53	75	56	57	48	61	51	58	51	61	48	70	56	69	60
9	72	63	78	69	74	65	80	67	76	56	73	55	56	44	59	51	55	47	62	45	64	57	71	58
10	72	63	79	69	74	65	79	65	78	57	74	52	56	42	59	46	54	43	58	52	64	58	74	60
11	73	64	76	65	72	58	78	62	69	54	73	55	60	43	56	42	56	41	59	50	65	57	72	59
12	76	64	78	67	71	60	75	63	64	59	71	53	60	44	60	47	59	41	61	43	63	55	72	60
13	75	64	75	67	73	57	82	64	66	59	62	46	60	44	64	48	59	44	64	45	65	54	73	61
14	75	65	74	66	73	64	79	63	65	58	62	47	57	42	69	50	60	52	71	48	64	54	72	61
15	76	64	75	65	88	68	81	60	66	60	59	49	57	41	74	51	61	43	80	53	65	51	70	67
16	79	63	75	64	75	66	88	63	65	54	57	49	58	42	77	52	62	45	74	53	65	57	72	64
17	77	67	77	68	75	66	73	61	65	53	62	44	57	41	68	50	65	49	64	53	66	55	73	64
18	75	68	77	67	72	66	77	57	65	58	60	48	60	51	68	49	64	49	65	55	70	51	72	62
19	72	66	78	67	71	65	76	62	66	58	61	53	62	49	70	50	74	48	65	54	69	53	72	62
20	72	62	77	67	69	62	78	58	68	58	61	50	57	48	66	46	74	49	65	49	67	57	71	63
21	72	63	77	69	71	63	73	59	65	59	69	47	53	47	68	48	64	53	72	52	65	50	71	63
22	74	64	81	67	70	64	71	63	65	53	69	48	53	39	72	52	65	54	67	53	69	53	72	61
23	73	63	80	69	70	62	70	59	64	50	62	50	59	48	73	53	65	50	63	50	68	54	71	63
24	73	64	78	68	70	64	69	59	62	55	64	55	60	49	65	54	63	53	64	49	65	57	71	63
25	74	64	74	66	69	62	70	58	63	55	64	52	56	45	61	55	63	56	69	51	70	53	66	51
26	74	65	76	66	78	62	74	56	63	53	62	50	55	44	57	49	63	56	75	55	73	56	73	58
27	75	65	74	68	73	61	71	56	64	56	62	53	58	47	57	39	73	59	78	57	71	57	78	56
28	75	66	75	67	72	63	70	61	65	50	62	48	56	45	57	48	75	52	87	61	67	60	88	60
29	74	67	75	69	75	63	70	58	65	50	57	49	59	39	58	46	68	53	84	62	68	59	82	59
30	74	67	71	65	75	60	77	53	64	50	55	38	53	41	.....	.....	56	51	69	56	67	60	87	59
31	74	62	73	63	.....	.....	74	57	.....	.....	56	40	59	44	.....	.....	60	43	.....	.....	68	59	.....	.....
Range	18°		21°		31°		35°		28°		37°		26°		35°		34°		44°		26°		37°	
Monthly means	68°.3		71°.3		67°.6		67°.3		60°.2		56°.6		51°.2		55°.3		54°.8		59°.3		61°.5		65°.4	

Maximum, minimum, and mean temperatures—Continued.

STATION, SANDY HOOK, N. J.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	78	70	74	64	79	67	71	46	43	37	22	10	52	40	43	32	34	29	41	35	52	37	72	51
2	79	63	66	57	84	66	59	43	42	34	28	13	61	45	46	14	32	25	48	33	60	43	75	56
3	79	63	73	60	87	69	64	48	43	30	35	19	50	38	28	10	33	19	45	36	50	45	76.5	56
4	79	63	83	68	85	73	70	53	41	36	40	31	40	24	31	21	40	24	45	37	54	42	80	67
5	88	71	81	69	81	65	70	57	41	34	40	32	43	22	33	13	51	31	50	37	66	44	76	61
6	91	72	80	67	82	69	62	56	47	37	39	34	45	31	38	18	56	39	50	39	68	49	71	57.5
7	81	68	81	66	76	64	63	48	50	37	42	36	40	23	44	32	60	46	58	41	79	55	76	56.5
8	79	67	80	69	80	63	63	45	48	40	40	32	47	33	43	32	55	33	49	37	77	55	84	62.5
9	77	66	81	67	83	66	56	46	46	34	42	36	54	42	44	34	43	29	47	31.5	67	53	84	67
10	77	67	82	68	81	56	59	48	48	38	39	31	56	24	48	38	45	30	53	33	64	48	86	67
11	84	71	78	69	65	49	55	45	47	41	41	36	26	20	53.5	37	39	35	61	39.5	64	49	85	63
12	74	65	80	70	67	58	51	42	55	41	44	35	31	20	49	39	39	34	64	44	62	52	67	62
13	85	65	82	70	71	63	47	38	61	42	42	33	24	14	52	37	46	31	54	45	61	48	77	62
14	85	70	82	70	72	64	54	43	56	43	34	25	33	13	41	37	36	20	70	47	63	48	76	63.5
15	86	70	80	72	73	65	55	52	49	37	40	21	41	25	52	37	41	21	57	48	63	51	78	61
16	75	68	82	72	70	62	64	45	54	42	44	32	44	35	40	29	44	29	58	46	62	48	78	61
17	82	67	78	68	68	53	53	41	42	31	43	17	45	37	34	28	43	33	54	43	63	46	78	65
18	82	68	79	70	61	47	63	47	41	28	22	15	57	35	35	30	34	13	52	39	63	46	73	67
19	79	61	83	70	57	48	53	45	53	39	22	7	57	41	49	26.5	30	12	49	38	74	54	82	61.5
20	77	62	82	70	64	50	57	40	49	38	31	4	41	32	40	32	39	20	58	38	66	54	80	63
21	82	63	82	68	59	50	62	48	46	39	46	19	41	28	38	26	50	31	61	45	85	54	77	65
22	81	69	81	68	57	46	67	59	39	27	50	37	34	25	40	36	37	26	60	43	80	62	76	62
23	85	71	72	61	61	49	67	51	53	31	55	40	43	33	37	12	40	29	60	44	63	49	80	64
24	80	69	69	62	64	48	67	51	46	36	46	36	41	31	25.5	10.5	46	31	50	44	72.5	49	85	67
25	85	65	71	63	67	51	65	52	39	31	41	36	41	28	35	12	52	35	46	42	75	57	90	71
26	85	70	72	61	61	53	61	50	54	36	47	36	40	24	36	27	46	39	56	39	67	53	92	71
27	86	71	73	61	68	50	56	45	49	38	54	31	44	27	33.5	22.5	41.5	36	64	40	78	53	92	70
28	81	64	75	63	71	56	53	42	48	33	38	30	45	38	34	29	48	34	71	49	78	59	93	70
29	72	64	79	66	67	58	60	50	48	18	38	33	54	35	34.5	26.5	52	36	58	47	81	61	87	70.5
30	87	64	82	68	75	57	60	45	18	8	42	36	35	21	.....	.....	42	34	56	38	66	52	89	70
31	78	70	81	68	.....	.....	47	37	.....	.....	44	38	36	24	.....	.....	45	34	.....	.....	62	50	.....	.....
Range	30°		26°		41°		34°		53°		51°		48°		43°.5		48°		39°.5		44°		42°	
Monthly means	73°.0		71°.7		64°.0		54°.4		40°.9		34°.3		36°.4		33°.3		36°.7		46°.8		58°.7		71°.7	

Maximum, minimum, and mean temperatures—Continued.

STATION, SAN FRANCISCO, CAL.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	68	54	63	54	64	56	63	53	64	57	65	58	53	49	58	47	59	50	64	52	64	53	60	51
2	71	55	64	54	74	54	64	55	61	56	58	52	54	48	60	46	61	50	58	47	63	53	63	50
3	64	57	68	53	64	57	67	57	61	50	57	50	55	48	60	49	59	50	57	49	62	51	65	49
4	65	55	67	55	64	56	68	57	60	50	59	53	56	47	57	46	54	45	63	50	63	51	60	50
5	64	57	63	55	65	56	72	57	61	51	57	49	58	50	54	46	54	45	65	48	64	51	60	52
6	63	55	65	54	66	57	79	58	63	53	58	49	56	49	54	45	56	49	57	47	70	51	60	50
7	62	53	65	53	65	55	78	55	61	53	62	50	56	49	55	49	55	49	56	49	81	56	59	49
8	64	53	70	56	61	55	76	62	65	52	59	50	52	48	55	49	52	41	53	45	77	60	64	50
9	62	53	60	52	63	54	70	57	68	55	53	48	52	44	54	48	48	42	54	48	65	51	67	52
10	64	55	63	53	60	53	72	55	67	55	55	47	56	47	55	44	59	41	52	44	59	50	69	52
11	62	54	63	53	61	53	78	55	62	56	55	47	55	45	57	48	56	41	61	44	57	49	77	57
12	63	53	62	54	62	53	66	54	60	52	51	45	54	43	55	49	57	48	60	49	60	50	93	62
13	61	52	61	53	61	53	65	53	62	56	49	44	53	42	57	46	55	47	58	48	56	48	77	58
14	62	52	61	53	61	52	65	55	63	55	48	43	54	42	60	47	56	46	63	51	58	46	65	53
15	63	54	60	53	67	52	68	54	58	51	50	42	54	44	66	49	54	45	61	50	57	48	65	53
16	64	54	63	53	63	53	63	53	61	52	51	43	53	44	64	52	58	48	61	49	58	47	74	62
17	62	54	62	53	62	55	76	55	64	58	47	40	56	45	62	48	61	49	58	48	60	47	64	57
18	62	52	60	51	62	53	73	59	65	58	45	39	55	43	60	47	63	50	56	49	64	49	62	55
19	62	53	59	50	73	54	71	54	61	54	53	44	52	45	60	48	67	50	56	45	62	45	65	55
20	62	54	59	51	82	56	66	54	64	51	56	46	52	40	63	51	70	54	58	47	56	45	69	58
21	63	54	65	51	67	56	65	58	60	53	62	48	46	36	66	52	66	52	62	51	62	47	68	56
22	67	53	69	56	66	57	67	57	57	49	61	51	49	39	67	52	70	59	61	53	67	50	68	55
23	64	52	70	54	60	54	67	58	58	53	60	49	53	43	61	48	67	57	62	50	65	54	67	52
24	62	52	64	56	60	52	68	57	61	56	56	49	52	44	61	50	63	51	61	52	60	50	6[illegible]	53
25	64	54	64	54	59	52	68	54	57	53	57	53	52	44	53	44	54	48	64	52	67	50	74	56
26	64	55	64	55	59	52	66	58	55	51	59	51	51	44	53	41	56	45	71	54	69	54	83	62
27	64	55	65	55	64	52	65	57	57	52	58	51	50	44	52	41	66	48	72	57	65	50	74	58
28	63	55	65	57	69	54	61	54	58	52	57	50	49	40	53	46	60	49	75	60	59	50	74	55
29	62	54	65	58	62	53	61	51	61	54	53	45	50	41	58	45	54	47	65	56	64	50	72	57
30	63	53	65	55	60	54	64	53	61	56	53	43	52	46	.....	.....	51	43	64	52	64	49	68	56
31	63	55	66	55	.....	.....	68	56	.....	.....	54	43	55	43	.....	.....	60	45	.....	.....	63	50	.....	.....
Range	19°		20°		22°		28°		19°		26°		22°		26°		29°		31°		36°		44°	
Monthly means	57°.7		57°.9		58°.0		60°.7		57°.3		51°.5		48°.9		52°.7		52°.9		54°.9		56°.3		60°.9	

Maximum, minimum, and mean temperatures—Continued.

STATION, SANTA FÉ, N. MEX.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	85	57.5	82.5	57	81	52.5	67	42	67	34	56	30	34	13	42	24	49	22	40	13	71	41	73	42
2	87.5	59	85	57	73	51	68.5	41	69	38	48	20	36	9	42	24	59	31	51	26	66	33	76	47
3	87	57	87	59	82	54	72.5	43	56	37	44	27	46	15	40	16	60	36	62	28	74	41	70	42
4	78	51	85	61	82.5	55	72	46	52	34	45	23	44	20	42	18	53	36	64	35	68	47	75	42
5	75	48.5	83	60	84	55	73	44	42	31	35	15	46	19	49	23	42	32	44	24	67	41	76	40
6	72	47	80	57	83	53.5	67	39	44	25	29	6	53	27	50	23	46	24	56	26	59	30	79	40
7	70	51	81	56	81	53	72	42.5	46	28	40	19	55	29	51	28	59	29	50	29	43	28	74	44
8	71.5	56	84	58	81	57	74	45	38	29	40	18	45	30	47	35	54	39	64	29	60	25	75	44
9	77	53	85	57	75	54	70	40	42	29	44	23	35	22	46	28	55	35	53	28	70	39	80	51
10	78	55	85	55	71.5	51	74	45	47	25	45	31	40	18	36	26	31	16	60	31	78	44	74	47
11	75	55	85	55	71	50	76	43	52	30	47	26	38	12	40	24	33	5	56	31	76	48	75	46
12	77	56.5	69	55	74	51.5	72.5	39	38	30	52	25	33	21	46	24	40	10	35	23	74	48	71	47
13	78	55.5	78.5	55	65	52.5	72.5	43.5	38	25	52	28	44	23	38	20	50	23	40	13	67	43	79	47
14	82.5	58	81.5	54	72.5	56	68	42	48	33	47	24	41	28	41	23	53	30	50	20	68	41	84	51
15	80	54	81	59	74	49	69	37	52	39	52	28	38	40	46	20	34	17	65	36	70	40	84	57
16	79	56	82	54	75	50	69	40	45	35	49	25	34	21	42	19	50	18	71	38	64	40	82	55
17	72	53.5	72.5	60	70.5	50	71	47	51	29	48	24	31	15	45	17	55	32	70	45	69	41	78	54
18	71.5	57	70.5	55	72	45	71	42	56	29	54	27	28	12	47	20	52	30	73	43	66	38	78	50
19	78	55	76	52	73	48.5	71	45	58	29	45	26	33	5	46	18	38	24	70	35	67	32	75	52
20	76	54	80	49	62	46	71	46	53	30	45	29	43	14	36	23	54	17	72	37	69	35	78	54
21	80	52.5	77	46.5	51	40	71	41	49	31	45	25	44	32	39	13	59	30	75	42	71	40	84	54
22	75	53.5	77	46	53	37	66	37	52	31	47	25	41	25	47	18	60	31	78	41	63	40	83	57
23	75.5	50	81	51	63	35	66	37	48	28	42	24	34	15	54	26	46	31	76	42	71	38	73	55
24	81	49	68	53	59	41	71	44	53	23	42	22	47	18	54	20	52	27	72	42	74	39	70	54
25	79	48	77	51	59	43	60	34	45	31	47	27	48	29	57	26	46	28	75	48	76	52	80	49
26	79	54	80	52	65	38	57	30	46	26	40	24	42	27	43	23	57	30	78	43	73	46	84	54
27	80	53	80	54	71	37	63	31	52	28	36	25	40	20	39	13	37	19	75	42	73	47	88	60
28	81	54	80	46	71	35	65	39	46	29	41	23	33	20	55	24	47	13	76	45	74	47	82	58
29	76	55	80.5	57	73.5	44	55	29	49	25	51	23	29	8	45	29	60	22	73	46	75	51	80	53
30	77	50	78	56	75	44	54	28	56	33	31	19	40	12	.....	.....	54	29	76	51	77	48	74	53
31	78	53	77.5	49	.....	.....	65	35	.....	.....	30	9	41	20	.....	.....	40	19	.....	.....	74	47	.....	.....
Range	40°.5		41°		49°		48°		46°		50°		50°		41°		55°		65°		50°		48°	
Monthly means	65°.2		66°.5		58°.7		53°.5		38°.7		32°.6		29°.0		32°.8		36°.5		50°.2		55°.9		66°.0	

Maximum, minimum, and mean temperatures—Continued.

STATION, SAUGEEN, CANADA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	59	45	71	48.0	88	59.5	49	28.6	35	30.9	18	4.1	51	35.1	44	− 0.1	24	5.9	32	15.0	39	26.6	82	64.3
2	71	40	78	45.2	78	61.3	51	30.1	38	19.0	26	10.1	65	34.6	15	− 5.1	18	1.1	46	10.3	44	24.6	72	49.1
3	80	51	65	52.2	78	61.8	64	41.6	34	18.3	38	15.9	45	11.1	20	− 1.1	33	1.6	44	31.6	47	27.6	66	44.2
4	79.5	65.3	70	56.0	73	57.3	62	45.0	38.5	28.1	40	22.1	20	7.3	20	6.1	38	14.6	41	29.9	47	34.6	58	44.1
5	72	57.3	74	59.3	74	51.3	52	41.3	40	34.0	37	27.1	43	17.1	28.5	− 0.1	59	25.6	40	29.6	49.1	32.1	53	42
6	65	51.4	78	59.3	67	61.3	60	38.1	44	29.6	35	30.1	34	19.1	44	27.1	56.1	40.1	45	30.1	54	36.1	66	36.1
7	64	47.2	63	55.3	71	47.2	54	39.6	44	32.6	35	30.1	35	24.1	40	25.1	59	20.1	42	27.1	61	40.1	65	36.6
8	75	44.7	69	55.3	79	64.3	51	35.0	42	26.1	34	27.0	42	28.1	31	23.0	21	12.1	32	17.1	56	38.1	83	54.3
9	75.1	58.3	73	50.5	79	61.3	49	32.1	37	25.1	27	22.1	63	32.0	32	22.1	34	13.1	35	13.6	43	36.6	75	57.3
10	72	46.1	74	55.3	65	42.2	50	36.1	39	31.1	34	23.6	37	7.3	42	22.0	64	28.1	52	20.1	45	36.1	78	54.3
11	65.0	45.2	81	60.3	65	33.9	42	32.5	48	31.1	37	26.1	17	8.1	56	32.0	59	35.6	60	28.1	62	30.6	85	62.3
12	75.0	45.4	79	57.5	67	46.2	40	29.0	52	35.1	35	22.1	19	10.3	45	30.1	40	20.0	58	39.6	47	36.1	76	67.3
13	72.0	49.1	79	56.3	66	44.2	49	33	41	24.4	38	17.6	22	5.1	44	24.1	21	6.6	55	35.1	42	33.1	85	60.3
14	75.5	42.1	77	59.5	70	46.2	62	34.1	39	25.1	23	9.6	30	18.9	44	30.0	18	− 1.9	63	33.3	52	32.1	75	55.3
15	84.0	59.3	86	59.8	66.2	54.2	57	35.5	41	29.3	32	13.6	49	23.1	37	27.1	27	5.1	46	30.6	46	39.1	77	62.3
16	73.0	57.3	75	60.3	62	44.1	40	31.1	42	26.9	37	20.1	37	31.1	29	19.1	25	16.1	40	29.1	59	40.1	81	61.3
17	70.0	52.3	73	56.1	53	41.6	39	29.9	29	22.1	24	3.1	45	32.1	27	15.1	28.2	6.6	33	28.6	70	49.7	78	64.3
18	68	48.1	70	53.5	53	30.1	40	30.0	35	23.1	16	2.1	49	35.9	36	19.1	15	− 6.1	38	26.1	61	37.1	70	50.2
19	75	44.2	70	51.3	57	38.6	48	30.0	42	32.3	16	− 6.6	47	28.0	39	22.0	23	− 8.1	41	23.1	69	40.3	70	50.2
20	77	53.2	74	52.3	53	43.1	61	39.6	37	31.1	45	− 5.1	29	18.1	24	14.9	22	9.1	50	28.6	82.5	54.3	60	52.5
21	66	53.8	68	55.3	49	30.3	57	39.1	42	21.1	51	37.6	20	10.1	37	14.1	24	15.3	43	30.6	79	55.3	62	48.2
22	82	53.8	63	40.6	52	34.1	70	36.3	27	20.1	65	32.1	31	10.1	24	5.6	29	18.1	53	30.1	69	57	66	47.2
23	62	49.2	68	36.1	61	33.9	72	56.3	40	24.1	53	21.6	35	26.1	11	− 4.6	33	14.6	43	29.2	55	32.1	71	51.3
24	74	42.1	79	45.2	67	42.1	64	44.7	39	25.1	41	21.1	27	18.1	14	− 0.6	45	16.6	49	28.1	70	34.1	81.1	52.3
25	86	59.3	75	47	60	48.5	48	38.1	41	20.6	55	27.1	25	19.1	29	8.6	37	26.3	46	27.1	62	39.1	76	55.3
26	75	57.2	80	52.5	56	45.2	63	38.3	45	30.1	40	22.5	27	14.1	23	16.6	34	28.1	61	27.3	69	34.1	83	50.2
27	73	51.3	82	55.3	63	48.2	60	33.1	35	18.1	38	15.4	39	26.1	20	12.0	29.2	23.6	70	45.1	78	55.8	75	56.1
28	76	54.6	82	57.1	54	36.1	44	31.1	36.5	21.1	30	19.1	49	30.1	23	14.1	27	18.1	58	28.9	70	55.3	81	50.2
29	80	56.3	81	55.6	45	35.6	46	36.1	35.5	− 1.1	42	19.1	54	14.0	26	14.1	27	20.4	46	27.1	62.5	43.1	75	53.3
30	65	48.9	74	52.8	55	35.1	63	32.6	6	− 2.1	48	40.1	26	11.1	.....	.....	30	22.1	38	23.6	65	33.1	65	47.2
31	69	45.2	77.5	45.2	.....	.....	42	24.5	.....	.....	65	38.6	37	24.1	.....	.....	34	23.9	.....	.....	85	44.2	.....	.....
Range	46°		49°.9		57°.9		47°.5		54°.6		71°.6		59°.9		61°.1		72°.1		59°.7		60°.4		48°.9	
Monthly means	.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....	

Maximum, minimum, and mean temperatures—Continued.

STATION, SAVANNAH, GA.

Day of month.	1875. July.		August.		September.		October.		November.		December.		1876. January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	89	72	94	73	88	69	85	67	67	43	53	45	77	61	60	43	74	48	78	51	79	58	80	72
2	91	73	89	73	86	71	70	59	75	50	56	46	77	60	56	29	66	49	63	49	79	57	90	69
3	93	73	85	72	87	69	75	56	77	56	48	40	75	59	55	34	54	38	66	55	67	50	90	74
4	91	74	89	73	90	71	78	67	77	58	52	40	62	49	48	41	60	35	72	51	69	54	90	74
5	88	73	90	70	94	73	80	67	77	51	67	49	72	50	48	38	68	48	80	53	80	59	87	73
6	90	76	91	72	95	74	74	68	56	46	66	53	70	54	54	47	72	54	70	60	86	68	82	67
7	90	75	90	73	91	75	76	64	69	51	65	53	63	44	65	45	75	58	71	56	85	71	83	65
8	89	76	84	72	87	73	73	58	61	48	55	46	68	45	60	53	68	48	66	57	86	70	83	68
9	89	74	90	73	88	70	72	51	60	47	53	40	72	52	67	44	72	48	66	51	78	64	83	65
10	93	74	91	73	89	70	70	55	75	52	55	34	66	47	75	56	75	46	70	58	79	54	84	69
11	98	76	87	72	89	65	71	60	62	47	59	35	51	40	79	57	77	53	81	59	79	64	77	71
12	98	77	88	71	75	63	66	51	64	42	57	45	54	32	77	61	76	62	78	67	82	60	82	71
13	99	76	88	71	82	68	63	48	70	42	66	41	45	31	80	63	69	45	85	66	88	64	80	71
14	99	75	87	73	83	72	57	51	78	59	55	37	47	27	75	60	63	42	85	65	75	65	78	72
15	100	76	91	73	84	70	70	46	81	64	59	36	56	28	65	47	74	51	68	55	77	60	80	72
16	101	78	91	74	90	70	62	48	80	66	67	47	66	39	64	45	74	63	80	55	81	60	81	74
17	98	76	92	73	89	71	63	43	70	40	62	38	72	49	64	43	69	53	73	56	80	62	87	74
18	102	80	88	74	87	72	71	46	59	34	43	25	74	57	59	46	59	41	68	47	82	62	86	71
19	101	82	90	74	81	73	65	48	79	52	56	34	74	59	62	37	53	30	65	46	87	65	90	71
20	95	78	87	72	77	63	62	44	82	51	62	34	59	39	63	43	65	50	72	49	94	70	91	71
21	95	77	87	73	77	60	69	45	79	65	71	47	63	39	74	54	51	37	79	56	92	72	89	69
22	100	78	90	72	74	58	71	51	65	53	73	59	71	47	68	54	55	30	85	60	87	68	91	71
23	100	77	85	72	75	58	78	59	65	50	79	61	75	52	65	48	60	39	85	63	87	67	89	70
24	99	77	83	71	75	56	79	59	70	56	76	59	74	58	55	34	69	50	85	64	76	69	97	74
25	98	78	83	68	75	55	80	58	70	54	77	59	69	56	68	40	80	63	75	63	79	63	99	77
26	95	77	81	67	68	62	80	61	66	49	78	59	65	56	73	46	71	55	66	57	80	65	99	77
27	95	74	83	66	66	61	71	54	66	56	78	64	73	55	77	50	68	49	76	59	82	66	96	77
28	97	76	83	65	78	62	73	49	69	58	78	61	76	59	79	63	79	58	82	64	84	70	97	78
29	96	76	87	68	80	68	80	51	66	56	80	64	78	62	68	52	(*)	.....	79	64	84	70	96	75
30	96	76	90	70	83	63	73	57	61	46	72	57	63	42	.....	.....	72	46	86	62	87	69	95	77
31	95	74	90	74	.....	.....	66	46	.....	.....	74	62	55	39	.....	.....	77	53	.....	.....	83	69	.....	.....
Range	29°		29°		40°		35°		48°		55°		51°		40°		.....		40°		44°		34°	
Monthly means	84°.7		78°.4		74°.7		63°.5		60°.9		56°.0		56°.8		56°.5		58°.7		66°.7		74°.0		80°.6	

* No observation taken.

Maximum, minimum, and mean temperatures—Continued.

STATION, SHREVEPORT, LA.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	101	75	93	73	92	73	71	57.5	77	48	51	40	71.5	48	61	33	76	55	68	54.5	90	69	90.5	75
2	100	74	93	68	93	75	70	49.5	80	52	55	49	63	40	43	24	58	43	70	53.5	73	51	91	72
3	100	75	101	70	92	74	70	49.5	84	57	66	51	64	41	48	37	62.5	37.5	77	51	69	47	85.5	67
4	102	75	97	74	92	74	71	62	79	53.5	58.5	54.5	65	70.5	47.5	33	57	49	84.5	55	75	53	78	61.5
5	101	75	104	73	93	74	72	64	54	47	69	54.5	72	53	50	32	74	55	72	49	87	63	82.5	63
6	103	76	99	78	93	75	76	69	49	45	59	41	64	75	63	41	69	51	61.5	47	87	66	84	65.5
7	103	74	96	74	96	76	74	57	58	46	51	36	66	40	68.5	54	59	39	58.5	53	69.5	59	86	65
8	101	76	100	72	94	75	75	52.5	58.5	45.5	51	36	73	48	73	57	76.5	45	73	51	68	54	91.5	68
9	102	75	93	71	95	75	71	55.5	56	49	59	35	71	48	75	61.5	79.3	60	68	53.5	74	54	89	74
10	100	76	93	69	95	76	78	54	56	45	66	35	48	37	79	64	78	70	76	60	80	54.5	89.5	71.5
11	96	76	89	73	87	76	79.5	56.5	65	37.5	62	41.5	43.5	36	75.5	57.5	78.5	46	82	67.5	83.5	60	90.5	72
12	100	75	96	69	87	73	61	51	74	46	68	39	55	37	79.5	48.5	53	38.5	77	65	81	59	92	73
13	103	76	80	65	86	69	68.5	48.5	73	56	62	41	49.5	39	79	59	59	36	78	57	82	62	83.5	66
14	104	76	82	65	87	68	77	53.4	72.5	45	61	44	50	37.5	60.5	48.5	56	48	63.5	47	85	62	83.5	66
15	102	77	84	71	88	71.5	63	51	82.5	52	64	35.5	60	42	66	39	66	49.5	77	48	82	68	84	65
16	107	78	92.5	70	86	75	67	47	66	45	63	45	62	54	67	44.5	57.5	35	87.5	59	85	67	85	69
17	107	78	90	69	76	56	77	50	54	32.5	50.5	38	67	58	56	44	65	38.5	74	59	86	68.5	87.5	64.5
18	106	76	86	68	68	57	71	52	70.5	46	58.5	29	67	54	63	35	52	34.5	76	54	86	68	85	66
19	104	74	86	66	76	52	64	44	82.5	62	66.5	38	56.5	42	66.5	39.5	48	34	82	57	86	67	80	64
20	101	77	94	67	71	54	68.5	41.5	83.5	64.5	71	53.5	60	36	65	44	36.5	30	89	59.5	89.5	68.5	69	64
21	101	77	86	65	61	52	70	44	67	50	67	59.5	62.5	46	55.5	50.5	49	26	81	59.5	89	63	92.5	64
22	99	77	91	64	70	51	69	46	59	48	64	58	74.5	62	55	35	57.5	37	84	62.5	79.5	69	92.5	69
23	89	73	92	71	73	54	71.5	46.5	79	54	77.5	61	76	57	56	39	59	51	83	61.5	79	64	94.5	75
24	91	71	96	69.5	77	54	76	49	54	48	72	57	57	46	71	42	59	51	85	68	(*)	67	95.5	75
25	93	71	97	71	68	63	84	49	61	49	74	53	56.5	46	70	47	67	43	78.5	64	.....	64	93	74
26	92	71	97	71.5	71	57	73.5	49	69.5	57	77	51.5	67	53	71	58	67	46	69	59	.....	69	93	73
27	99	73	91	71	72	50	85	47	71	57	57	41	76	64	80.5	61	73.5	54.5	83	61.5	.....	67	92.5	73
28	101	73	89	71	76	50	84	66	69	61	60	51	78	57	68.5	45	54.5	41.5	81	67	.....	68	94	74
29	102	76	90.5	76	80	53	85	51	65	42	70.5	53	57	39	61.5	49.5	64.5	37	82.5	63.5	.....	69	92.5	74
30	99	74	92	73	85	57	65	47	47	38	79	62.5	51.5	30	.....	.....	73	47	88.5	68	.....	69.5	91.5	72.5
31	99	74	89	71	.....	.....	70	42	.....	.....	79	68.5	64	43	.....	.....	64	54.5	.....	.....	.....	71	.....	.....
Range	36°		40°		46°		43°.5		52°.5		50°		48°		56°.5		53°.5		41°.5		.....		34°	
Monthly means	85°.1		78°.9		73°.4		62°.7		58°.0		55°.4		53°.6		55°.3		54°.3		67°.5		72°.8		78°.8	

* Maximum thermometer broken.

Maximum, minimum, and mean temperatures—Continued.

STATION, SMITHVILLE, N. C.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	.....	.....	.....	.....	.....	.....	.....	.....	63	36.5	49	35	69	59	59	36	61	45	65	52	68	44	82	55
2	.....	.....	.....	.....	.....	.....	.....	.....	73.5	57	48	43	69	62	60	32	61	34	54	47	57	45	84	69
3	.....	.....	.....	.....	.....	.....	.....	.....	67.5	57	55	44.5	67	50.5	50	29	48	26	63	51.5	55	45	85	73.5
4	.....	.....	.....	.....	.....	.....	.....	.....	71	63	60	49	55	42	46	37	54	30	67	51	68	43	82	75
5	.....	.....	.....	.....	.....	.....	.....	.....	65.5	43	65	51	65	51	47	29	63	37	68	48.5	78	56	77	65
6	.....	.....	.....	.....	.....	.....	.....	.....	55	40.5	57	50	65.5	47	62	38	67	52	64	54	81	66	81	58
7	.....	.....	.....	.....	.....	.....	.....	.....	60	50	58	51	55	35	61	45	66	57	73	51.5	82	67.5	85	63
8	.....	.....	.....	.....	.....	.....	.....	.....	52	47	54	48	62	48	57	46	68	52	59	53	79	68	83	64
9	.....	.....	.....	.....	.....	.....	.....	.....	57	47	54	42	64	55	61	38.5	67	40	64	53	74	64	85	70
10	.....	.....	.....	.....	.....	.....	.....	.....	69	47	50	34	61.5	44	65	52	70	51	70	46	74	55	85	65
11	.....	.....	.....	.....	.....	.....	.....	.....	58	39	55	32.5	45	31	66	53	74	56	74	59	78	60	83	75
12	.....	.....	.....	.....	.....	.....	.....	.....	63.5	38	51	41.5	49	29	67	55.5	73	60	74	61	82	57	81	74.5
13	.....	.....	.....	.....	.....	.....	.....	.....	66.5	47	59	41	38	25	70	53	65	48	72	63	79	64	78	74
14	.....	.....	.....	.....	.....	.....	.....	.....	68	58	52	35	40	19	68	59	59	38	75	63	74	59	86	70
15	.....	.....	.....	.....	.....	.....	*66.5	49	67.5	58	53.5	27.5	51	30	63	48	70	53	69	56	79	57	85	73
16	.....	.....	.....	.....	.....	.....	66	43	68.5	60.5	59	48	59	47	58	45	69	60	71	57	77	62	85	73
17	.....	.....	.....	.....	.....	.....	60	35.5	64	33	58	29	62	50	57	38	67	56	66	52	80	60	80	73
18	.....	.....	.....	.....	.....	.....	67.5	45	55	29	35	18	66	53.5	56	39	57	31	63	41	82	62	87	74
19	.....	.....	.....	.....	.....	.....	57.5	43	67	52	49	29	65	58	59	32	45	21	66	39	82	68.5	87	73
20	.....	.....	.....	.....	.....	.....	60	36	69	61	54	34	62	38	62	38.5	63	40	71	45	84	69	88	75
21	.....	.....	.....	.....	.....	.....	66	39	70	52.5	63	47	55	35	62	47	59	32	72	60	84	71	89	73.5
22	.....	.....	.....	.....	.....	.....	69.5	50.5	54	45	62	54	64	44	62	44	51	25	75	57	80	70.5	90	68.5
23	.....	.....	.....	.....	.....	.....	65	59	71	44	64	53.5	65	54.5	63	36	56	33	76	63	80	67	91	72
24	.....	.....	.....	.....	.....	.....	71.5	56	66	55	63	54	73	52	47	22	63	44	75	64	75	57	89	76
25	.....	.....	.....	.....	.....	.....	73	59	57	45	65	56	54	47	60	45	66	59	66	50.5	80	60	92	76.5
26	.....	.....	.....	.....	.....	.....	72	60.5	68	54	66	56	56	40	68	49	67	51	66	42	77	64	93	79
27	.....	.....	.....	.....	.....	.....	70	53	64	55	66.5	53	63	49	66	52	63	45.5	72	52	84	64	90	79
28	.....	.....	.....	.....	.....	.....	74.5	49	59	52.5	61	51.5	67	54	65	57	65	56	74	63	81	65	91	78.5
29	.....	.....	.....	.....	.....	.....	72	54	68.5	49	66.5	55	66	57	62	46	57	41	74	62	86	64	88	76
30	.....	.....	.....	.....	.....	.....	71	57	59	41	71	59	58	34	.....	.....	62	42	74	62	89	63	90	74
31	.....	.....	.....	.....	.....	.....	63	44	.....	.....	68	58	39	33	.....	.....	69	47	.....	.....	80	68	.....	.....
Range	.....	.....	.....	.....	.....	.....	.....	.....	44°.5		53°		54°		48°		53°		37°		46°		38°	
Monthly means	.....	.....	.....	.....	.....	.....	.....	.....	56°.5		51°.8		51°.7		51°.3		53°.4		61°.3		69°.0		78°.4	

* Station opened October 15, 1875.

Maximum, minimum, and mean temperatures—Continued.

STATION, SPRINGFIELD, MASS.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	75	61.5	74	54	83	57.5	60	47	43	33.5	20	1.5	65	32.5	37	17	36	15.5	40.5	32	47	32.5	77	42
2	76.5	54	64	56	83	55	61	40	39	31	23.5	3.5	58.5	38.5	38	6	33	22.5	50	29	61	43	82	47
3	79.5	51.5	62	55	86.5	61.5	64	35.5	46	26.5	35.5	6	48	34	24	25	30.5	15	39	32.5	56	43	84	61
4	79	54.5	80	58.5	87.5	69	68	51	40	29.5	41	19.5	38	18.5	33	17	41.5	11	40	31	58.5	40	80.5	65.5
5	85	69.5	82.5	67.5	78	62	74	56	45	24.5	36.5	20	38.5	12.5	22	2	46.5	12.5	43.5	31	62	43.5	73	55.5
6	92.5	69.5	81	60.5	80	63.5	56	47	48.5	25.5	40	28	43.5	22.5	39	3.5	53	37.5	52	33.5	69	52	70	56
7	82	70.5	81.5	69.5	73.5	58.5	61	47	51.5	27.5	39.5	26.5	32	16.5	48	35.5	63	42.5	56	33.5	82	53	75	52
8	83	63	81	68	77.5	54.5	63.5	40	47	32.5	38.5	30	44	26.5	46	33.5	54	32	45	31	83	62.5	81	52.5
9	82	65	81.5	64.5	83.5	56	59	38.5	45.5	25.5	39.5	32.5	56.5	37.5	39.5	26.5	42	29	41.5	24.5	66	55	85	65
10	80	64	83	59	78	50	60.5	36.5	43	31.5	39	29	49	22	43	29	42	25	48	29.5	67	52	85	63.5
11	79	65	78	61.5	64.5	43	55	44	45	38.5	36	17	36.5	11.5	48.5	30.5	39	25	57.5	32.5	62	48.5	85	63.5
12	79	55.5	83.5	71.5	66.5	39	48	36	59	32	42.5	28	32	10.5	47	35	46	31	65.5	32.5	51	46	67.5	60.5
13	82.5	56	84.5	72.5	69.5	52	54.5	30	58.5	33	41.5	24.5	19	9.5	57	34.5	39.5	24	60.5	40.5	60	43	75	62
14	82	63	83	69.5	73	53.5	54	25.5	48.5	34.5	35	17	29.5	6.5	42	27.5	28.5	12.5	66	49.5	61	43.5	80.5	65
15	87	56.5	85	67.5	72	54.5	52.5	41	40	31.5	33.5	16.5	38	21.5	48.5	30	35	15	58.5	46	59	47	84.5	64
16	71	63	83	71.5	68.5	57	65	48.5	45	36.5	43.5	28.5	43.5	32.5	43	31.5	34.5	18.5	54.5	38	64	41	82	64
17	81.5	60	75	68.5	64	47.5	54.5	41	41	26	42	17	40.5	32.5	36.5	24	37	27.5	54	36	61	40	80	65.5
18	66	56	73.5	68	59.5	42	63	40.5	43	21.5	22	65	50	33.5	34	23	35	6.5	50	33.5	61.5	48.5	80	68.5
19	72	50	81	67	51	43	56	41.5	51.5	34.5	16	−3	53	41.5	41	21	25	5.5	46.5	36	74	46.5	81.5	69.5
20	76	49.5	84	70	62	45	62	35	46	33	29	−10	43.5	32	37	22	32	2	57	34	74	49	78.5	66.5
21	81	59	82	63.5	59	41.5	66	47	39	26	49	27.5	34	20.5	37	17.5	47.5	27.5	59	42	73	54.5	80	64
22	82.5	59.5	80.5	61.5	58	38.5	68.5	38.5	34	23.5	54.5	40.5	27.5	17.5	35.5	25	38	27	63	39	82	57	75	58
23	71	64	68	60	58	33	69.5	41	36	17.5	61.5	41	42	19.5	30	1	41	25.5	57	42.5	61.5	42.5	79	55
24	78	59	73	53	64.5	33.5	63.5	45.5	44.5	33	47	28	38	21.5	16	−1.5	44	20.5	59	35.5	72	41.5	88	63
25	82	56.5	74	57	68.5	37.5	71	43.5	39.5	25.5	42	26.5	35	20	29	6.5	38	30	50.5	37.5	76.5	51	88	68.5
26	(*)	59.5	76	55	57	46	57	39	52	23	41.5	30	32	17	35.5	15	52.5	36.5	52.5	36.5	69	43	88.5	65.5
27	85	67	78	50.5	68	43	59.5	45.5	51.5	33	44.5	26	41	14.5	28	17.5	43	34	64	32.5	81.5	49	87.5	63.5
28	81.5	60.5	79	51.5	68	52	51.5	40.5	39	22.5	30	16.5	39.5	26.5	28.5	19.5	44	32	56	36	83	58	87.5	71
29	76	59.5	83	54	54	44	46	37.5	47	11	37.5	25	48.5	30.5	37	21	54.5	36	60	42	81.5	58	81.5	68
30	82	59.5	84.5	58.5	72	53.5	54	40	12.5	0.5	41.5	32	32	15.5	.....	.....	47	31.5	56	32.5	67	47	85	63.5
31	76	58.5	86	62.5	.....	.....	47	37	.....	.....	52	33.5	34	7.5	.....	.....	46	32.5	.....	.....	70	42	.....	.....
Range	.....	.....	35°.5		54°.5		44°		58°.5		71°.5		59°.5		58°.5		51°.5		41°.5		50°.5		46°.5	
Monthly means	71°.1		70°.7		59°.8		50°.8		35°.9		31°.0		32°.6		29°.3		33°.8		45°.7		58°.7		72°.6	

* Maximum thermometer out of order.

Maximum, minimum, and mean temperatures—Continued.

STATION, SQUAN BEACH, N. J.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	85	60	75	66	75	65	74	44	45	30	20	11	55	43	43	31	.....	.....	.....	.....	.....	.....	.....	.....
2	72	52	70	58	78	61	61	35	44	26	30	11	70	41	42	6	.....	.....	.....	.....	.....	.....	.....	.....
3	75	53	83	62	81	60	63	37	45	21	33	16	53	33	32	10	.....	.....	.....	.....	.....	.....	.....	.....
4	75	61	81	69	90	69	70	51	41	29	38	31	37	20	32	15	.....	.....	.....	.....	.....	.....	.....	.....
5	79	63	83	68	81	58	70	54	43	26	41	27	43	30	(*)	1	.....	.....	.....	.....	.....	.....	.....	.....
6	79	63	78	63	86	63	65	29	48	26	42	35	49	26	.....	11	.....	.....	.....	.....	.....	.....	.....	.....
7	83	62	76	66	77	52	68	41	51	26	45	35	41	24	.....	33	.....	.....	.....	.....	.....	.....	.....	.....
8	75	65	79	67	81	49	61	34	48	26	44	36	46	26	.....	27	.....	.....	.....	.....	.....	.....	.....	.....
9	75	62	82	60	80	58	55	40	41	34	43	36	58	42	.....	26	.....	.....	.....	.....	.....	.....	.....	.....
10	80	68	84	64	89	55	62	36	54	37	38	24	58	19	.....	37	.....	.....	.....	.....	.....	.....	.....	.....
11	88	65	79	69	61	51	60	43	50	35	40	23	28	16	.....	35	.....	.....	.....	.....	.....	.....	.....	.....
12	88	61	78	68	69	59	52	33	61	32	45	29	33	12	.....	35	.....	.....	.....	.....	.....	.....	.....	.....
13	81	54	79	68	72	62	51	30	61	37	45	29	26	12	52	29	.....	.....	.....	.....	.....	.....	.....	.....
14	83	63	80	68	71	61	58	34	55	44	33	18	30	7	44	39	.....	.....	.....	.....	.....	.....	.....	.....
15	80	64	80	61	74	60	58	54	49	41	38	12	40	15	51	32	.....	.....	.....	.....	.....	.....	.....	.....
16	78	65	77	70	69	58	63	40	53	37	48	26	49	31	39	25	.....	.....	.....	.....	.....	.....	.....	.....
17	87	63	79	67	73	50	53	38	39	26	44	11	51	33	38	21	.....	.....	.....	.....	.....	.....	.....	.....
18	89	62	79	69	63	40	60	43	44	19	25	12	52	35	38	24	.....	.....	.....	.....	.....	.....	.....	.....
19	70	53	79	66	58	50	54	45	56	40	25	7	51	40	44	19	.....	.....	.....	.....	.....	.....	.....	.....
20	75	52	80	66	68	45	60	37	45	34	31	5	45	26	46	26	.....	.....	.....	.....	.....	.....	.....	.....
21	75	63	83	61	63	40	70	43	48	35	50	21	45	27	38	13	.....	.....	.....	.....	.....	.....	.....	.....
22	80	62	79	63	56	39	64	44	36	23	61	41	38	24	42	30	.....	.....	.....	.....	.....	.....	.....	.....
23	87	71	71	62	58	40	68	45	53	35	63	36	42	37	37	10	.....	.....	.....	.....	.....	.....	.....	.....
24	81	62	67	64	63	35	66	47	49	25	51	37	40	23	28	8	.....	.....	.....	.....	.....	.....	.....	.....
25	78	55	70	65	64	42	75	44	40	25	48	40	35	21	37	12	.....	.....	.....	.....	.....	.....	.....	.....
26	80	62	69	64	64	44	62	45	53	27	49	34	50	22	(†)	.....	.....	.....	.....	.....	.....	.....	.....	.....
27	84	66	71	64	70	42	58	35	52	35	56	31	45	27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
28	78	61	70	66	75	50	56	35	46	37	40	34	47	38	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
29	72	57	74	63	70	52	66	50	46	17	42	35	63	35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
30	85	60	79	61	74	51	61	42	20	8	43	38	36	21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
31	75	66	75	64	.....	.....	47	34	.....	.....	47	40	35	27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Range	37°		26°		55°		45°		53°		58°		63°		.....		.....		.....		.....		.....	
Monthly means	71°.4		70°.9		63°.0		49°.9		39°.3		34°.8		36°.5		.....		.....		.....		.....		.....	

* Maximum thermometer broken.

† Station discontinued February 25.

Maximum, minimum, and mean temperatures—Continued.

STATION, SAINT MICHAEL'S, ALASKA.

Day of month.	1875.												1876.											
	July.		August.		September		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min	Max.	Min.	Max.	Min.
1	58	43	53	47	54	44	51	38	24	15	−1	−22	−10	−26	13	2	−11	−28	8	−14	35	14	.....	.....
2	59	39	59	47	51	44	54	45	18	7	−2	−23	−15	−28	4	−12	1	−21	8	−10	27	−2	56	34
3	53	46	57	47	50	40	52	44	16	1	3	−22	−12	−28	5	−6	4	−13	19	−11	33	21	50.5	36
4	61	44	54	46	52	36	53	43	23	6	4	−26	16	−18	2	−18	15	−2	23	9	31.5	10	45	37
5	60	44	47	39	56	43	54	42	21	11	1	−22	27	12	15	−13	15	5	18	−1	33	15	44	31
6	62	47	52	38	52	42	51	45	17	6	5	−19	34	22	4	−7	14	−10	9	1	27	11.5	48.5	35
7	63	52	50	44	52	40	50	34	14	−8	−7	−26	34	23	2	−19	24	6	5	−18	33	18	48.5	33
8	64	49	57	45	49	41	38	29	9	−6	−3	−28	31.5	17	6	−15	34	21	9	−15	37	10	54	37
9	62	48	57	47	47	37	40	29	8	−12	−4	−28	25	15	5	−15	31.5	16	14	−17	37	16	52	36
10	60	53	59	47	46	37	45	36	12	0	−5	−28	19	3	4	−10	19	10	19	−19	(†)	(†)	56	40
11	60	48	55	49	51	40	40	33	5	−11	−8	−27	19	3	2	−24	16	1	21	−3	.....	.....	52	41
12	62	53	56	42	48	40	37	29	2	−19	−1	−28	22	12	6	−28	17	8	21	1	.....	.....	46	36
13	59	46	53	42	51	39	40	33	5	−15	−7	−29	24	7	6	−15	18	−4	23	2	.....	.....	46	33
14	57	45	52	41	52	38	41	34	11	−2	−13	−32	24	12	−8	−32	29	15	22	4	.....	.....	48.5	28
15	60	45	56	40	55	40	40	34	13	2	−13	−28	22	−5	−14	−33	28	21	22	1	.....	.....	53	37
16	63	46	59	38	52.5	43	40	33	17	−2	0	−22	24	−18	−15	−38	22	1	18	2	.....	.....	55	36
17	59	44	58	46	51	38	38	28	17	−2	−1	−13	23	−18	−14	−40	15	5	19.5	0	.....	.....	56	40
18	62	45	57	49	50	39	40	33	16	−3	−4	−27	24	11	−7	−30	16	6	26.5	0	.....	.....	44	34
19	63	40	58	42	54	40	40	31	15	−8	−4	−28	27	21	−8	−31	15	6	26	5	.....	.....	47	38
20	57	46	64	51	47	34	40	27	5	−12	9	−26	23	3	−6	−28	15	8	31	5	.....	.....	54	41
21	54	46	64	46	46	41	39	34	17	3	−13	−19	22	3	−7	−27	16	−5	40	24	.....	.....	52	41
22	60	47	57	47	46	41	39	31	22	13	−4	−26	29	13	−2	−23	19	13	41	32	.....	.....	54	40
23	60	44	58	46	48	41	36	26	22	2	7	−15	23	17	4	−13	18	1	36	19	.....	.....	55	41
24	62	43	56	45	48	39	30	24	(*)	(*)	20	−13	22	−15	17	0	17	−15	34	17	.....	.....	58	42
25	61	44	57	45	48	37	27	20	17	4	29	6	−9	−28	17	−24	6	−18	41	10	.....	.....	67	44
26	66	55	57	44	48	37	26	21	19	3	35	19	17	−18	−18	−38	9	−13	40	31	.....	.....	68	45
27	70	51	57	44	47	38	28	23	14	5	26	9	12	−15	−22	−37	7	−19	39.5	19	.....	.....	66	50
28	70	54	55	49	51	42	29	21	13	−5	19	−1	−8	−19	−17	−35	6	−26	37	19	.....	.....	75	48
29	68	52	51	44	47	38	34	17	9	−6	13	−22	−6	−25	−13	−32	6	−25	38	27	.....	.....	68	54
30	62	56	51	42	47	38	36	27	6	−8	2	−20	4	−12	.....	.....	6	−25	35	11	.....	.....	64	50
31	58	50	53	41	.....	.....	31	19	.....	.....	−6	−21	11	−2	.....	.....	2	−28.5	.....	.....	.....	.....	.....	.....
Range	31°		26°		22°		27°		.....		67°		62°		57°		62°.5		59°		.....		.....	
Monthly means	.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....	

* Observer sick.

† No observations taken.

Maximum, minimum, and mean temperatures—Continued.

STATION, ST. PAUL'S ISLAND, BEHRING SEA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	54	42	51	47	50	48	49	44	45	42	32	25	35	29	36	33	27	17	19	5	31	22	39	32
2	53	44	51	46	49	44	50	44	42	32	30	23	33	27	36	22	41	27	13	6	30	22	42	33
3	46	43	51	47	52	46	50	44	34	30	30	25	37	24	24	17	33	24	12	6	31	23	40	30
4	47	41	51	45	50	48	50	46	38	33	31	23	37	32	24	19	40	24	17	9	32	23	42	31
5	47	42	49	45	51	48	48	43	34	31	25	23	38	33	21	12	38	32	29	9	39	29	41	34
6	51	43	49	44	57	46	47	43	36	29	28	23	39	35	35	19	36	32	26	13	40	33	45	35
7	51	39	50	45	49	44	44	41	34	29	28	21	36	32	35	21	40	33	19	14	39	33	47	36
8	47	43	54	46	49	45	44	39	33	28	30	23	34	31	28	19	36	33	26	10	36	31	45	35
9	51	42	51	46	50	43	43	36	38	32	28	17	35	29	19	16	37	30	29	17	36	31	39	32
10	54	42	54	46	48	45	50	42	37	35	25	17	32	28	19	15	37	33	26	19	42	31	40	32
11	53	44	52	46	48	44	48	44	33	30	25	22	28	24	19	8	36	30	25	18	42	33	43	34
12	54	44	48	43	49	44	45	41	41	32	22	19	34	27	23	18	39	31	35	18	35	24	45	30
13	55	47	51	44	52	43	43	38	39	29	24	21	33	30	18	11	37	28	36	26	39	23	45	33
14	52	44	52	44	48	43	43	37	34	31	24	20	34	23	15	10	38	29	30	16	39	30	45	33
15	53	45	53	46	48	45	45	39	33	31	21	18	30	23	17	9	34	24	31	15	37	24	45	32
16	53	44	52	46	51	44	45	37	38	32	27	20	33	24	16	10	24	15	34	26	38	29	43	33
17	49	42	53	46	49	44	43	37	39	32	27	22	36	31	11	8	18	9	33	30	40	30	47	35
18	46	44	51	47	50	43	42	38	39	34	22	15	37	32	10	4	24	18	39	28	39	33	42	36
19	51	42	51	47	49	41	44	41	37	32	29	19	35	30	10	0	20	13	37	32	38	32	42	35
20	49	41	55	46	47	44	44	39	35	32	33	22	36	29	9	6	15	11	38	33	37	30	40	34
21	48	44	50	46	51	41	46	40	34	32	34	23	36	33	15	7	17	10	37	32	37	31	40	34
22	51	42	50	47	48	41	44	37	36	32	28	22	38	32	31	12	17	9	41	30	41	33	44	36
23	53	43	49	44	47	43	41	41	41	36	30	23	33	29	36	28	28	12	40	31	36	30	47	37
24	53	45	51	44	47	43	42	34	41	40	37	27	29	23	35	32	27	14	37	34	34	30	48	41
25	53	45	49	44	49	43	35	33	41	40	39	29	33	23	34	5	17	8	43	33	37	28	43	35
26	57	46	51	43	47	42	44	35	41	38	30	27	29	25	5	— 8	31	11	41	31	37	28	44	34
27	57	50	52	47	45	43	42	33	38	36	34	28	29	26	2	— 2	24	13	42	32	36	30	44	37
28	55	48	49	47	49	44	42	33	36	38	31	25	34	26	9	— 5	20	12	42	32	37	28	46	36
29	49	47	52	45	46	43	43	40	36	34	34	30	33	29	26	8	14	3	36	31	39	28	46	40
30	49	47	52	45	46	42	42	41	35	32	32	29	37	30	.....	.....	15	6	34	28	40	31	53	39
31	49	46	51	47	.....	.....	44	41	.....	.....	33	29	37	30	.....	.....	15	7	.....	.....	41	32	.....	.....
Range	18°		12°		11°		17°		17°		21°		16°		44°		38°		38°		20°		23°	
Monthly means	47°.03		47°.88		46°		41°.70		34°.86		26°.20		31°.44		16°.53		23°.03		26°.20		32°.69		38°.69	

Maximum, minimum, and mean temperatures—Continued.

STATION, STAYNER, CANADA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	67.1	41.2	(†)	.....	90.1	54.2	45	25.2	34	37.3	12.9	1	46.7	35.3	37.7	0	20.9	6.1	39.7	14.1	49.7	24	85.7	61.3
2	77.1	48.2	76.1	42.2	80.1	54.2	52.1	32.3	33	19.2	22.9	— 4	(†)	.....	2.8	— 6	14.9	— 1	(†)	.....	47.7	31.0	80.7	54.4
3	84.1	56.2	61.1	51.2	80.1	63.2	(†)	.....	34	15.1	31	10.1	52.7	10.1	18.9	— 4	30	— 6	39.7	23.2	54.7	32.0	66.7	46.4
4	(†)	.....	72.1	57.2	70.1	52.2	65.1	45.2	36	23.2	33	13.1	16.9	9.1	18.9	1	38.7	6.1	41.7	25.2	47.7	32.0	(†)	.....
5	84.1	59.2	77.1	59.7	(†	.....	48	41.2	37	29.3	(†)	.....	42.7	14.1	28	—11	(†)	.....	41.7	24.2	47.7	30.0	64.7	41.4
6	66.1	50.2	79.1	60.2	78.1	49.2	54.1	37.2	43	31.3	35	27.3	30.5	18.2	(†)	.....	59.7	20.2	43.7	33.3	50.7	39.0	69.8	38.4
7	74.1	48.2	69.1	58.2	74.1	41.2	51.1	38.2	(†)	.....	33	25.2	34.5	20.2	42.7	22.2	58.7	23.2	42.7	31.3	(†)	.....	69.8	40.4
8	88.1	57.2	(†)	.....	82.1	62.2	47.1	33.3	40.7	26.3	35	25.2	46.7	26.8	31	20.2	25	12.1	35.0	12.1	58.7	40.4	83.7	55.3
9	80.1	61.2	77.1	55.2	76.1	64.2	48.1	33.3	34	25.2	27	22.2	(†)	.....	29	20.2	35	14.1	(†)	.....	51.7	39.4	77.7	64.3
10	80.1	46.2	79.1	55.2	68.1	45.2	(†)	.....	38	31.3	29	23.2	21.9	6.1	33	9.1	44.7	24.2	49.7	11.1	47.7	39.4	80.7	57.3
11	(†)	.....	84.1	56.2	65.1	33.3	50.1	30.3	42.7	30.3	33	23.2	18.9	6.1	48.7	29.3	40.7	31.3	55.7	25.2	57.7	37.4	(†)	.....
12	81.1	46.2	82.1	60.2	(†)	....	(*)	23.2	55.7	38.1	(†)	.....	11.9	7.1	46.7	26.3	(†)	....	44.7	36.2	52.7	42.4	92.7	59.3
13	73.2	47.2	81.1	61.2	70.1	43.2	.....	27.3	40.7	21.2	30	15.1	18.9	1	(†)	.....	37.7	6.1	52.7	37.2	49.7	35.5	84.7	59.3
14	80.8	52.2	75.1	56.2	68.1	46.2	.....	27.3	(†)	.....	15.9	5.1	27.1	16.2	42.7	23.2	13.9	— 1	56.7	37.2	(†)	.....	82.7	58.3
15	87.6	64.2	(†)	.....	68.1	52.2	.....	39.2	41.7	27.3	28	6.1	38.7	20.2	33	25.2	27	10.1	47.7	33.6	54.7	29.5	81.7	64.3
16	75.1	52.2	85.1	55.2	58.1	41.2	.....	29.3	40.7	24.2	30	12.1	(†)	.....	27	19.2	20.9	14.1	(†)	.....	59.7	36.4	81.7	63.3
17	79.1	53.2	76.1	58.2	51.1	39.2	.....	.....	26	19.2	9.9	4.1	42.7	29.3	20.9	13.1	35	2	41.7	27.3	74.8	45.4	75.8	65.3
18	(†)	.....	71.6	52.2	55.1	40.2	35	29.3	31	21.2	14.1	—16	50.7	35.3	35	13.1	5.8	— 9	36.0	27.3	60.0	45.4	(†)	.....
19	76.1	45.2	72.1	57.2	(†)	.....	45.7	29.3	41.7	31.3	(†)	.....	49.7	26.3	37	17.2	(†)	.....	43.7	26.3	73.8	39.4	92.7	59.3
20	81.6	48.2	74.1	53.2	56.1	37.2	59.7	39.2	37	25.2	43.7	7.1	28	18.2	(†)	.....	21.9	0	43.7	24.2	76.8	49.4	84.7	59.3
21	73.1	52.2	70.1	54.2	47.1	35.2	59.7	38.2	(†)	.....	49.7	40.2	20.9	10.1	34	3.1	22.9	14.1	49.7	36.1	(†)	.....	82.7	58.3
22	86.1	50.2	(†)	....	49.1	32.3	67.8	31.3	26	21.1	50.7	32.3	17.9	10.1	22.9	0	29	14.1	53.7	29.3	87.7	37.4	81.7	64.3
23	68.1	49.3	70.3	38.2	61.1	29.3	72.8	51.2	39.7	21.2	49.7	19.2	(†)	.....	5.8	— 6	36	11.1	(†)	.....	58.7	33.5	81.7	63.3
24	75.1	47.2	71.1	40.2	66.1	45.2	(†)	.....	34	25.1	35	17.2	19.9	15.1	9.9	— 6	39.7	9.1	50.7	28.3	75.8	41.4	75.8	65.3
25	(†)	.....	79.1	43.2	58.1	44.2	72.8	36.2	34	15.1	38.7	26.3	27	15.1	25	— 6	36	24.2	52.7	31.3	61.7	38.4	(†)	.....
26	87.1	54.2	81.1	45.2	(†)	....	49.7	35.3	40.7	24.2	(†)	....	26	12.1	18.9	10.1	(†)	.....	64.7	28.3	81.7	32.5	84.7	53.4
27	75.1	52.2	84.1	49.2	65.1	41.2	42.7	35.3	26	16.1	40.7	14.1	39.7	25.2	(†)	.....	35	22.2	64.7	43.2	83.7	60.3	78.7	63.3
28	79.1	52.2	86.1	52.2	50.1	34.3	38	30.3	(†)	.....	29	14.1	35	27.3	19.9	12.1	29	20.2	49.7	31.3	(†)	.....	74.8	56.3
29	81.1	54.2		.....	44	32.3	38	32.3	15.9	— 6	36	12.1	48.3	9.1	22.9	9.1	31	20.2	49.7	29.3	76.8	39.4	78.7	50.4
30	69.1	54.2	84.1	51.2	51.1	35.3	53.7	31.3	0.8	—14	47.7	35.3	(†)	.....	.....	.....	31	20.2	(†)	.....	64.7	34.4	67.8	50.4
31	70.1	48.2	82.1	44.2	.....	.....	(†)	.....	.....	.....	62.7	40.2	40.7	6.1	.....	.....	33	27.3	.....	.....	85.7	40.4	.....	.....
Range	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Monthly means	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* Maximum thermometer broken. † No observations taken Sundays.

Maximum, minimum, and mean temperatures—Continued.

STATION, SYDNEY, CANADA.

Day of month.	1875. July Max.	July Min.	August Max.	August Min.	September Max.	September Min.	October Max.	October Min.	November Max.	November Min.	December Max.	December Min.	1876. January Max.	January Min.	February Max.	February Min.	March Max.	March Min.	April Max.	April Min.	May Max.	May Min.	June Max.	June Min.
1	80.2	53.4	67.7	52	73.7	39.4	66.0	55.5	43.9	41	21.8	11	39.4	19.4	29.7	6.6	26.9	16.4	33	28	38.4	30.0	69.9	38
2	61	41.3	66.6	46.6	74.8	49.4	65.0	42.8	43.2	33.2	23	13.9	39.4	19.4	44.5	21	24	13.9	34.7	23	41.0	31.5	78	52
3	70.5	37.4	74.6	43.4	76.3	57.3	51.0	37.2	39.8	33.4	27	21.4	37.6	16.3	32	5.8	24.4	11.6	32.8	21	41.0	30.0	78.7	55.4
4	76.2	39.6	65.7	52.1	67.7	53.3	60.2	38	38.9	32.7	28	19.3	42.7	31	40.4	7	27.7	3.8	34.1	17	40.7	29.7	61.3	43
5	61.5	55	77.7	62.2	70	60.4	65.2	48	37	31.6	28.2	19	36.2	9.3	23.4	−12.3	34.9	− 6.9	33.3	21	49.4	30.4	63.5	43
6	68.3	53.5	77.9	61	73.5	58	48	33	38.4	31.5	30.4	22.9	11.5	5.9	27.8	−11.8	41.2	22.4	34	28.7	59.9	28.9	72	54
7	60.3	55.4	77.2	61.5	74.1	56.2	50.3	33	40.1	33.8	39.3	23	35.3	7.6	44	27.7	40.2	23.2	39.9	27.8	46.0	36.0	56.3	44.7
8	74	50.5	78.2	60.5	66	49	64.5	50.3	41.9	35.4	39.5	24.3	26	13.7	27.7	4.4	42.8	30.1	39.4	27	38.4	33.6	64	39
9	76	45.5	79.5	64.4	65.8	51	52.2	41.7	43.7	30	39.5	17.8	29.9	14	15.3	0.2	48.3	24.4	38	31.6	49.8	35.2	56.6	35.4
10	75.9	52.5	77.2	63	73.3	51	62	42.4	41.4	28	36.4	13.5	34.6	28.5	11.2	3.3	31	23.6	41.1	31.2	66.0	39.0	49.4	43.3
11	71.2	50.5	74	61.6	54.2	43.2	62.4	50	43.1	30.3	34	15	34.8	1.4	22.4	− 6.8	33	24.8	36.4	28.3	54.1	40.0	51	42.3
12	77	55.5	77	62	61.9	34.5	55.0	44.6	40.9	34.2	35.8	28.6	16.5	− 1	40.8	22.4	35.1	23.8	39.5	26.0	48.9	34.5	72.7	46
13	77.5	52.7	67	62.6	64.5	45.5	46.9	35	42.9	34.8	34.3	31.5	14.9	−12	33	19.6	40	28	46.4	28.2	43.2	35.0	78.8	57.6
14	76	56.4	65.3	59.8	66.2	44.5	51	33	41.1	22.3	34.5	26.7	15.8	−14	23.3	9.4	38.3	30	40.4	33.7	42.3	33.4	76.7	59.8
15	77.2	56.3	73.7	61.3	66	42.5	52.8	32	34.7	28.6	28	23	24.7	−10.1	28.3	10	31	12.8	39.6	33.4	47.6	31.8	78.4	58.8
16	78.2	52	74	59.6	66.8	39.5	64	49.4	36.7	23.8	26.2	20.4	31	3.4	41.6	26.6	27.4	18.4	50.8	34.3	50.7	30.0	66	54
17	69	57	70.9	58.6	60.4	50	62.8	46.6	44.4	31.4	31	15.5	30	9.2	36.2	19.1	29.9	13	52.9	34.7	45.0	28.0	80.9	54.2
18	68	57	72.5	62	60.5	51.5	55.2	36.4	33.2	28.8	32	19.4	33.6	10.3	32.1	8.1	36.6	15.8	45.0	34.5	63.9	27.4	81	61.3
19	68	52.5	77	64	57.4	49	56.1	35	38.2	26	21	6	42.5	33.6	34.3	10.2	22.1	8.6	51.9	29.4	51.9	39.3	82.8	63.4
20	67.8	51	83.2	68.2	54.4	45.8	52.9	34.4	38.8	31.8	11	7	46	25.2	34.7	10	16.3	3.2	44.6	29.3	41.0	37.7	81.7	64.4
21	74	54	77.9	67.5	62	40	48.7	38	37.2	24.8	33.6	3.5	27.8	6.4	30	18.8	26.8	− 5	46.8	29.4	55.0	36.8	74.7	63
22	68	54.1	79.7	65.7	60.5	37	40.3	32.1	36	19.6	41.3	24	7.1	1	36	5.3	34.4	24.6	44.8	26.5	56.6	34.0	73.7	54.3
23	67.1	57.2	70.9	50.1	57.2	39	42	32.5	25.9	18	40.7	20.6	24.9	− 4.1	32.8	− 4.7	37.2	28.4	45.0	29.0	54.3	39.6	74.1	53
24	60.4	57	69.5	48.3	60	31	50.1	29	39	21.3	28.8	10.7	25.4	2.6	8.4	−13	36.2	15.8	37.3	28.4	61.1	35.3	73	54
25	62.6	56.7	73.3	45.3	67.3	46.9	46.2	35.8	31.9	22.7	33.7	12	11.7	− 6.8	18	−11.7	39.8	9.7	40.4	27.0	67.0	35.0	63.6	56
26	65.3	54.6	75	52.5	64.2	47	45.8	37	27.1	21.3	35.7	11.5	15.8	−15	22.8	13.6	36.6	24.2	39.5	25.5	49.0	40.8	72.9	53.5
27	61	53	81	53.5	56.3	47	47.6	32.5	44.3	24.6	44.8	21	17.7	0.3	31.9	2.4	33.6	27.2	33.9	28.8	66.8	43.0	73.9	55.5
28	65.6	55	81.4	54.3	54.4	44.4	51.1	37.5	30.6	17.8	22.8	15	31	4.1	28.8	− 8	39.8	26.2	39.0	31.4	78.5	44	75.2	54.2
29	75	55.4	72	47.6	51.1	34.1	43.6	35.5	37.4	15.8	27.6	16.5	37.9	7.6	27.6	7.6	46.2	24.5	48.7	31.0	74.4	44	76.4	50.8
30	69.8	53.2	65	39.4	56	38	41.7	38.5	26.9	18.5	37.7	24.2	38.9	1.8	.....	.....	47.5	30.9	52.8	29.8	44	32.4	65.9	49
31	67.7	56	6..3	45.4	.....	.....	45.7	30.3	.....	.....	40.2	35.2	17.6	− 2.5	.....	.....	40.1	29.4	.....	.....	58.9	32	.....	.....
Range	42°.8		43°.8		45°.3		37°.6		28°.6		38°.8		60°		57°.5		55°.2		35°.9		51°.1		47°.4	
Monthly means	.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....	

Maximum, minimum, and mean temperatures—Continued.

STATION, THATCHER'S ISLAND, MASS.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1													60	40	35	19	32	21	39	34	47	38	65	45
2													52	37	41	6	30	25	50	31	59	40	64	47
3													53	34	27	2	29	19	46	32	47	38	68	49
4													35	11	33	17	36	18	38	32	51	37	61	49
5													36	14	20	7	44	25	41	31	50	41	59	48
6													40	23	38	12	45	35	46	32	50	42	61	53
7													24	18	46	35	49	36	48	34	60	43	72	54
8													40	22	40	32	45	37	40	29	55	44	67	53
9													40	38	38	32	40	34	40	26	53	44	74	57
10													43	20	37	26	35	29	44	32	58	46	73	56
11													21	12	46	32	34	29	56	35	58	46	68	53
12													24	17	46	35	40	31	58	37	56	48	56	53
13													21	9	54	35	38	27	53	38	50	43	75	53
14													24	7	40	32	29	17	54	42	57	43	73	59
15													35	22	46	35	31	13	58	41	52	43	77	57
16													42	33	39	30	36	18	52	39	58	42	76	60
17													39	32	34	25	34	26	52	38	59	42	76	60
18													45	33	32	18	30	11	49	34	55	45	74	60
19													46	40	36	21	24	9	47	37	67	50	75	61
20													44	30	39	23	36	16	55	34	65	48	76	61
21													32	17	31	19	45	29	53	40	60	49	72	59
22													30	16	35	23	38	27	54	37	65	49	74	54
23													37	26	27	− 1	41	24	48	40	60	42	78	56
24													35	17	8	− 5	38	28	52	38	62	43	84	61
25													31	10	24	5	40	30	44	36	71	49	82	58
26											*40	*31	33	15	28	15	48	39	43	36	60	45	79	57
27											48	29	40	18	30	18	45	35	58	39	65	47	74	61
28											35	26	41	34	32	23	45	31	49	39	67	49	86	59
29											37	32	45	34	30	25	53	36	61	39	68	49	77	63
30											41	36	34	12			42	29	55	40	60	47	78	62
31											45	33	30	16			46	29			61	44		
Range													53°		59°		44°		35°		34°		41°	
Monthly means													30°.4		27°.9		32°.6		41°.7		50°.0		62°.7	

*Observations commenced December 26, 1875.

Maximum, minimum, and mean temperatures—Continued.

STATION, TOLEDO, OHIO.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	71	62	67	59	87	68	54	41	44	32	35	23	66	50	43	15	31	19	35	26	51	30	80	67
2	70	62	62	58	87	72	61	40	39	28	37	29	59	42	18	7	28	12	37	27	52	38	77	69
3	80	63	65	58	87	73	66	45	45	32	41	31	44	31	24	11	37	17	48	36	60	39	76	62
4	86	71	73	57	75	65	66	55	46	32	46	36	35	20	25	15	43	19	46	36	63	49	66	56
5	88	72	78	63	80	58	55	50	46	29	44	36	50	31	34	9	50	30	48	37	59	46	66	52
6	84	67	74	62	78	64	64	46	56	33	42	37	42	32	44	29	64	46	55	35	58	48	76	52
7	75	61	71	60	77	54	58	45	47	33	45	36	47	28	46	35	60	33	51	41	74	51	74	58
8	77	60	75	54	84	64	58	43	45	35	40	33	57	40	39	30	38	29	53	36	68	50	85	64
9	77	62	79	59	83	72	55	35	47	38	38	30	57	30	53	34	43	32	47	35	60	45	79	69
10	83	67	79	64	74	48	49	38	45	36	37	29	30	13	60	34	55	34	45	34	56	43	86	66
11	74	55	75	66	61	46	44	33	53	33	38	32	29	14	61	38	62	46	54	38	62	44	86	69
12	82	64	79	62	70	53	42	26	58	42	37	27	27	18	52	32	53	26	70	48	61	45	85	69
13	85	66	80	67	71	53	51	29	52	33	37	28	28	16	51	41	32	19	70	57	59	45	84	72
14	83	64	81	63	73	54	61	29	38	31	33	17	36	12	54	35	33	20	66	44	65	47	80	69
15	85	70	84	66	75	62	56	38	43	35	45	22	44	23	38	26	30	25	57	41	78	48	81	68
16	89	72	79	67	72	56	41	33	40	27	39	18	43	30	29	23	53	29	50	39	57	47	81	69
17	80	70	76	65	57	44	62	33	33	22	23	6	48	35	36	25	35	15	46	35	77	52	76	62
18	74	65	74	60	54	40	48	32	46	29	20	4	54	46	40	23	20	9	50	33	68	60	67	55
19	74	57	71	59	57	47	50	27	52	38	24	12	51	29	42	23	25	9	49	35	75	60	68	52
20	77	63	74	57	58	42	63	37	44	35	51	12	34	25	42	30	27	15	73	35	85	59	65	53
21	78	62	78	60	52	38	70	47	41	21	52	45	31	22	47	28	29	16	63	47	85	67	71	56
22	80	67	63	49	54	42	74	54	39	15	58	43	50	25	45	16	37	20	68	51	67	47	76	63
23	74	63	65	51	60	42	70	52	44	35	55	34	49	33	20	7	42	30	55	42	57	40	81	64
24	82	60	69	49	66	44	72	52	40	27	55	31	33	28	29	14	36	31	52	35	70	46	82	66
25	83	67	74	54	61	46	54	46	45	23	55	34	37	24	35	21	43	33	56	37	75	54	87	68
26	83	70	76	61	63	40	62	41	53	36	58	31	37	19	32	26	38	33	65	43	79	52	86	72
27	77	61	80	64	72	51	51	37	39	30	38	24	54	37	30	24	37	27	67	54	81	60	82	67
28	72	63	81	65	61	54	62	38	39	32	40	27	57	40	37	28	31	20	60	50	82	61	75	65
29	80	66	82	66	77	50	65	56	38	[illegible]	47	32	55	20	32	24	35	20	52	42	84	59	77	61
30	76	64	78	66	66	48	65	36	27	8	58	46	34	15	.....	.....	38	25	42	30	59	55	75	61
31	70	61	82	64	.....	.....	39	32	.....	.....	66	55	45	25	.....	.....	36	29	.....	.....	83	57	.....	.....
Range	34°		35°		49°		48°		50°		62°		54°		54°		55°		47°		55°		35°	
Monthly means	72°.8		68°.2		62°.1		49°		36°.6		36°.9		37°.2		32°.5		32°.9		47°.2		60°.3		71°.2	

Maximum, minimum, and mean temperatures—Continued.

STATION, TORONTO, CANADA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	71.2	54.4	64	53	81.8	56	51.8	32.8	35.4	28	15.1	− 1.5	58	37.5	40.8	15	26.4	12.5	34.2	22.2	48.8	30.4	70.1	49.9
2	72.5	47.8	68.2	52.4	84.5	67.5	54.2	34	34.5	25	26.2	7.2	47.8	36.5	15.1	− 1.3	21.1	10	38	17	51.0	34.3	76.9	56.7
3	73.2	59.4	63	56.5	75.8	64.4	59	37.4	31	20	32	16	43.2	15.8	20.4	1.1	32.7	7.2	41.1	33.1	56.5	35.2	68.0	56.0
4	86	60	70.5	56.2	72	52	61.8	47.5	39	26.5	32.4	22	22.4	12.2	19.5	− 2.5	40.4	13.4	42.3	31.9	55.0	39.2	68.3	50.9
5	75.2	62	73.8	59.5	79.8	48	48.5	44	44	24.8	36	29.2	41	22	28.6	− 3.9	44	21.6	43.5	27.5	46.1	38.0	60.0	46.2
6	74	59.7	68.4	62.5	75.8	55.8	60	38	43.2	32.4	37.2	28.5	40	23.5	40.7	16	50.5	36.9	44.5	33.0	59.6	41.8	63.8	44.2
7	76	58	65.8	59.6	70	55.2	53.2	41.6	48.5	36	33.8	27.3	36	25.4	40.4	26.8	48.1	36.2	40.4	30.2	62.8	42.8	64.0	46.2
8	76.5	58.6	75.2	57	80.5	54.5	53	34.5	36.5	27.4	32.5	28.6	41.2	27.5	37.5	26.4	36.1	19.6	35.2	23.5	60.4	45.8	73.6	52.5
9	79.2	55.6	75	54.3	79.2	59	50	33.6	39	31.8	28.2	24.8	49	39	32.2	24	30.2	19	39.6	21	52.1	42.0	76.2	61.2
10	82.4	56	79.2	55.4	69	46.3	52.8	35	40	36	30.8	22.5	49	12	33.3	22	33.4	26.4	44.8	23.4	49.8	39.8	77.3	58.4
11	74.5	46.4	79.8	63	58	40.5	45.5	32.5	45	30	35	25.4	20.2	9.2	44.1	32.1	41.2	31	47.3	29.4	58.2	39.2	77.1	57.9
12	73.2	48	78	63.9	67	46.6	39.2	27.6	51	34.5	32.2	22.5	18.3	11.3	41.9	28.3	41.2	33	41.9	37.5	53.6	42.5	77.2	59.4
13	77.4	57.5	80	60.7	68	45.4	46.2	29	44	32	33	20	20.3	5.1	42	30.2	31.8	11	41.8	38	55.5	40.0	78.2	58.7
14	75.8	50.4	79.9	57	68	50	56	30.5	36	24.6	19	5.9	28.2	17.4	40.1	29.3	22.5	7.1	55	38.4	55.2	34.1	79.3	58.7
15	79.4	54	78	56.5	70.2	50.4	50.7	42.4	38.8	26.8	33.3	13.6	40.2	24.9	35.5	28.7	24.7	8.2	49.9	35.5	48.6	41.2	74.7	64.5
16	79.8	62	80	62	60	41.2	45.8	31.5	40	26.8	31.8	20	42.1	29.2	29	22.1	29.2	20.6	45.4	30.8	51.2	42.0	77.2	60.7
17	73.8	61.2	81.8	57	57	42	42.4	31	29.5	21.4	24.2	− 1.8	43	32.8	25.2	18.3	39	12	41.1	31.1	60.2	43.0	71.1	61.2
18	72.2	56.2	75.4	59.9	55	40	42.3	31.8	39.8	24.4	14	− 7.5	47.9	35.6	36.5	18.8	12.2	− 2.9	40.7	29.1	70.6	59.5	72.5	59.8
19	75	53	75.2	59.6	54.2	42	44.2	29	44	34.5	0.8	−13.2	47.6	31.6	41.2	26	24	1.1	45.5	29.8	68.8	49.2	71.3	51.7
20	77.5	52	76.5	58	55.5	41.6	59	37.5	41	31.4	39.8	− 4.9	33	24	28.2	18.1	25.5	14.8	43.4	26.6	66.0	49.6	69.9	57.5
21	78.5	56	75	57	51	38.2	58.5	43.2	37	19	44	35.4	25	13	36.5	16.3	28.1	15.8	48.4	36.1	75.1	49.4	67.8	57.5
22	80	52.5	66.2	52.4	53.8	32.2	58.5	38	32	13.2	46.3	34.5	32.2	12.8	29	6	31.6	16	49.8	30.8	65.0	41.0	72.5	51.7
23	77.2	56.2	66	48	59.8	32	63	41	42	30.4	47.7	28.5	41	30.2	9	− 1.9	40.5	19.3	49.3	34.5	55.0	33.6	78.1	53.7
24	75.5	52	67.2	49.4	63.5	37	63	41	35	27.5	41.4	24.8	30.4	21.8	17.2	3.3	37	17.9	51.6	35.6	73.1	39.2	86	62
25	82	55.5	70.8	51.4	64	42.5	50.5	40	38	20	46.1	29.4	30	18.6	22.2	6.1	33.6	29.2	51.4	40.0	62.5	47.0	86.1	65.6
26	88	65.4	74.2	54	59	42	49	40.5	45	34.4	42	26.8	30.8	15	22.4	17.2	40.8	30	57.2	37.4	62.0	41.0	77.9	56.9
27	79	60.2	77.8	56.5	75.2	47.8	44	33	34.2	27.5	42.4	20.8	42.1	30.1	19.8	14.1	32.2	36	51.5	39.2	81.9	46.4	87.2	61.8
28	81	61.5	80.2	57	52.8	40	40	30	36.8	26	31.2	24.4	38	34.6	21.6	15	31	25.6	56.4	34.6	80.4	52.5	75.5	58.9
29	78	56.8	81.9	54.2	49	39.3	42.7	36.5	35.5	− 2	39.5	22.8	42	12.8	26.2	14.8	31.8	20	53.5	28.6	67.2	46.0	77.1	53.2
30	79	55	79	62.5	54	36.8	55.8	36	4.8	− 5.0	47.2	35	26.8	13	.....	.....	35	20.6	40.1	29.4	50.9	40.5	76.8	55.4
31	71.8	54.2	80.2	53	.....	.....	38	29	.....	.....	61	36.3	40.6	22.6	.....	.....	41.1	26.2	.....	.....	69.9	40.0	.....	.....
Range	41°.6		33°.9		52°.5		35°.4		56°		74°.2		52°.9		48°		53°.4		40°.2		51°.5		43°	
Monthly means	.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....	

Maximum, minimum, and mean temperatures—Continued.

STATION, TYBEE ISLAND, GA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min	Max.	Min	Max.	Min	Max.	Min	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	88	73	96	71	87	73	85	68	65	48	55	48	70	58	61	47	69	54	77	54	70	60	80	71
2	90	73	86	72	89	74	68	63	75	49	56	46	74	60	56	30	66	49	62	54	75	57	87	70
3	92	78	87	73	86	72	73	64	76	54	48	42	75	59	52	41	50	38	64	53	65	50	90	73
4	90	75	88	73	92	71	78	70	78	58	57	41	59	52	59	41	58	37	71	51	68	58	89	75
5	85	75	92	71	96	73	79	70	75	51	69	49	65	55	50	38	66	54	72	54	79	64	89	73
6	88	75	93	73	95	74	73	69	56	47	65	53	68	55	53	47	72	56	66	57	84	68	83	71
7	86	74	94	72	88	77	76	65	69	55	64	51	63	51	59	43	72	59	66	58	82	70	85	71
8	88	76	88	72	88	78	71	62	65	49	55	42	70	45	56	51	66	49	63	56	84	69	83	71
9	88	76	87	72	85	75	71	60	64	49	55	38	69	50	63	48	70	49	64	54	76	60	85	72
10	92	75	87	74	82	73	70	63	73	51	52	34	61	46	74	51	70	49	69	58	80	54	83	74
11	94	76	86	72	87	67	70	62	65	48	56	34	50	41	74	56	75	57	75	59	76	64	77	71
12	98	77	85	70	80	66	65	55	62	52	55	43	53	34	76	56	75	60	75	64	81	65	74	69
13	96	76	86	71	80	69	63	52	67	45	65	40	46	35	73	57	66	44	78	64	89	64	77	68
14	96	75	87	73	82	75	57	51	72	57	54	36	44	27	72	56	63	51	79	60	73	68	80	70
15	98	74	87	73	85	74	71	50	76	63	56	30	53	28	62	46	73	58	68	54	80	68	78	72
16	98	78	93	72	88	71	65	50	81	64	64	43	61	40	63	41	70	61	82	50	80	64	81	74
17	95	75	93	71	90	70	60	47	88	51	59	37	70	48	65	40	70	53	71	56	78	67	82	73
18	100	77	80	74	88	75	70	46	60	44	40	25	72	55	58	41	57	40	68	54	82	68	86	71
19	99	77	83	73	82	72	63	49	73	57	52	29	70	57	60	41	53	32	63	53	85	67	92	70
20	97	76	86	73	79	65	61	50	81	64	55	39	59	41	59	47	64	50	73	54	92	68	92	70
21	98	78	88	74	80	65	69	52	78	64	64	49	57	48	72	55	51	38	78	57	90	70	88	70
22	100	78	85	72	73	61	66	52	86	54	74	53	64	51	66	54	48	31	83	58	88	69	91	71
23	95	75	86	71	74	67	74	52	65	53	77	58	74	55	65	48	58	36	87	62	84	68	88	70
24	94	76	83	69	75	63	75	58	69	56	72	54	74	56	52	39	67	53	85	59	75	70	95	73
25	99	77	83	73	77	62	79	57	61	54	75	56	65	54	65	40	73	59	71	62	78	69	97	76
26	95	76	81	71	66	62	81	56	66	55	73	55	65	51	70	45	71	54	66	60	81	68	96	76
27	90	72	83	70	68	64	73	56	62	55	74	58	70	50	70	53	65	51	74	60	82	70	97	75
28	96	74	83	70	79	65	73	49	64	59	70	56	75	57	80	61	75	52	80	63	85	72	94	77
29	100	76	87	70	82	68	80	59	65	56	72	60	72	60	67	52	58	43	75	61	85	73	96	78
30	98	75	90	70	80	63	71	55	61	49	66	57	61	43	.....	.....	71	39	85	59	85	72	94	76
31	96	76	90	73	.....	.....	66	49	.....	.....	65	58	51	40	.....	.....	75	50	.....	.....	83	74	.....	.....
Range	28°		27°		35°		39°		44°		52°		48°		50°		44°		37°		42°		29°	
Monthly means	82°.6		77°.9		73°.4		63°.2		60°.2		53°.0		54°.9		54°.8		59°.5		63°.8		71°.3		78°.3	

Maximum, minimum, and mean temperature—Continued.

STATION, VICKSBURG, MISS.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	90	72	89	72	92	70	72	59	74	48	59	45	73	55	66	36	74	59	66	60	84	69	90	73
2	91.5	73.5	84.5	67	92	71	69	51	78	56	59	53	63	47	40	24	62	43	73	58	75	52	88	69
3	96	76.5	87	67	93	74	71	55	79	62	68	55	62	43	47	34	59	36	75	53	69	49	88	68.5
4	93	74	89	68.5	92.5	72	66.5	63	79	59	60	53	67	46	46	33	53	48	79	53	79	50	83	70
5	92	75	90	68.5	93.5	72	70	64	60	47	66	56	69	47	50	28	71	50	78	57	84	62	81	63
6	94	73	77	69	92	73	78	67	55	43	67	48	65	49	65	43	74.5	60	63	49	84	71	83	65
7	96	75	83	69	94	75.5	71.5	57	64	49	50	42	65	44	63	51	62.5	47	63	53	77	61	87	63
8	92.5	74.5	90	71	94	78	73	53	65	48	49	36	71	49	71	52	70	43	62.5	54	64	56	89.5	66
9	92	76	87	69	92	74.5	75	54	55	49	55	33	72	59	65	57	76	52	60	55	74	52	91	73
10	91	72	89.5	72	93.5	73	77	56	60	47	60	34	59	38	76	64	81	65	74	56	78	53	91	70
11	92	72.5	90.5	68	84	71	78.5	54	63	37	61	51	42	36	75	66	80	62	69	64	82	60	89	70
12	92	72.5	83.5	65	79	70	62	44	65	45	63	42	54	35	77	60	61	40	77	68.5	85	63	94	73
13	92	76	85	65.5	80.5	66	65	50	73	58	61	45	47	35	76	63	55	35	75	65	86	65	82	70
14	92	78	76	69	86	67	72.5	47.5	72	57	59	44	49	29	66	45	58	44	68	51	88.5	67	88	64
15	92.5	78	81	72.5	87.5	71	67	55	80	67	65	40	61	37	61	40	70	54	71	47	79.5	66	88	68
16	95	79.5	87	71	88.5	74	65	*44	69	49	65	50	73	53	62	46	60	45	77	66	85	65	86	67
17	96	80	85	72	75.5	61.5	70	45	52	33	51	33	72	62	55	43	64	42	70	56.5	87	68	84	66
18	91	68.5	85	70	62	56	69	51	67	41	50	25	69	58	59	36	53	36	71	52	88.5	67	82	67
19	89	70	86	66	72	51	61	41	80	66	61	35	60	45	64	40	45	30	79	53	88	68	81	66
20	84	71.5	84	68	70	54	67	39.5	81	66	70	46	59	36	67	44	41	33	77	56	89.5	72	79	64
21	90	73	87	66	68	52	70	47	72	51	74	61	67	43	57	51	47	27	80	56	85	71	90	68
22	91	70	87.5	70.5	69	50	72.5	49	61	45	72	59	75	62	58	42	55	30	80	60	89	67	92	71
23	86	76	86	66.5	73	52	73.5	54	78	58	75	65	77	64	60	44	62	46	81	60	89	68	95	75
24	89	70	89	67	78	54.5	73	57	58	46	71	63	70	46	66	38	68	57	85	65	86	68	97	74
25	92.5	74	88.5	68	69	63	79	60.5	71	50	77	65	62	44	71	47	67	47	77	59	86	68	94	75
26	91	72.5	88.5	73	72	60	71	55	72	61	76	60	73	50	72	54	67	47	79.5	57	86	67	92	73
27	92	71.5	88	70	75	50	74	49	68	55	60	49	77	62	76	63	60	51	79	64	86	66	95	73
28	92	77	88	69	80	58	80	54	69	56	61	49	79	62	68	49	56	45	77	61	86	68	95	73
29	92	77	92	72	79.5	57	83	69	63	40	65	55	62	39	66	46	60	40	81.5	60	85	70	97	77
30	92.5	74	91	71.5	79.5	62	75	50	59	40	79	61	48	28	.....	.....	68	47	84	65	85	67	91.5	76
31	89.5	74	89	71	.....	.....	69	46	.....	.....	78	66	65	35	.....	.....	67	59	.....	.....	84	69	.....	.....
Range	27°.5		27°		41°		43°.5		48°		54°		51°		53°		54°		38°		40°.5		34°	
Monthly means	83°.5		78°.3		73°.4		62°		59°.7		56°.8		56°.1		55°.4		54°.2		66°		72°.8		79°.4	

Maximum, minimum, and mean temperatures—Continued.

STATION, VIRGINIA CITY, MONT.

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	71	44	82	48	54	47	73	42	46	33	43	33	28	16	40	5	38	12	44	16	59	28	45	28
2	66	41	78	52	63	42	64	46	39	29	40	29	20	4	35	17	43	20	48	28	64	35	48	27
3	58	29	88	56	72	39	66	39	35	23	40	29	37	12	33	17	45	28	44	22	50	29	64	32
4	59	40	85	59	71	41	60	39	35	23	40	13	32	17	39	27	41	26	32	10	45	28	75	43
5	72	38	77	58	79	45	55	35	42	30	23	9	35	13	32	21	31	8	45	14	41	27	80	48
6	80	48	86	52	83	50	62	43	39	27	37	15	36	14	26	13	40	17	48	20	49	28	63	41
7	80	49	85	54	82	51	70	43	36	25	38	28	40	20	35	12	44	30	52	31	57	24	62	35
8	75	51	82	53	70	48	68	43	37	21	46	32	34	17	42	27	36	— 8	41	20	71	32	66	40
9	64	52	84	53	67	43	74	41	48	27	44	34	24	9	40	25	— 1	—14	36	14	74	41	54	38
10	74	44	86	56	68	41	73	43	49	37	43	31	26	7	30	20	6	—19	32	13	61	40	55	33
11	78	51	76	57	62	41	69	42	43	26	49	27	26	9	38	22	21	— 2	30	20	62	38	61	42
12	77	52	78	60	65	42	68	39	38	16	43	27	30	12	32	20	35	4	39	11	62	43	74	39
13	83	51	74	55	63	43	68	46	40	28	47	34	28	10	30	16	29	15	45	22	61	39	81	49
14	88	51	66	56	70	41	65	35	32	— 2	48	25	32	10	44	27	26	11	49	34	52	33	77	54
15	81	51	69	49	71	50	70	42	2	— 8	41	27	36	19	35	24	26	10	53	30	50	30	75	47
16	76	50	72	50	70	46	69	45	28	—10	38	18	44	22	37	14	29	11	57	30	60	37	79	50
17	77	48	73	51	75	45	67	42	42	28	36	19	41	14	38	20	41	8	65	34	53	39	76	55
18	82	51	76	54	75	53	67	43	35	23	44	20	25	8	37	18	32	16	57	30	45	28	83	51
19	86	53	77	49	69	48	67	39	32	21	39	25	27	5	35	21	36	— 1	42	23	44	31	82	56
20	83	56	80	51	53	41	71	42	24	10	36	20	10	—12	27	10	46	28	48	27	50	27	88	54
21	86	55	77	51	63	35	64	38	31	5	48	29	— 4	—17	43	26	38	29	57	31	54	33	72	48
22	86	57	82	48	73	41	56	47	28	15	50	40	8	—10	48	32	41	22	53	33	64	39	68	38
23	81	52	66	48	71	46	56	35	25	5	41	29	6	— 9	50	27	43	29	53	27	72	41	80	43
24	72	52	53	46	65	43	38	31	34	8	29	15	22	4	50	30	36	26	61	31	78	48	72	53
25	73	46	62	44	73	41	39	25	29	9	23	15	26	5	44	20	36	17	65	39	70	46	66	48
26	76	47	57	44	75	46	49	33	23	3	21	5	28	20	26	16	30	16	59	37	72	42	64	49
27	86	52	45	39	74	45	47	33	27	2	36	18	23	11	27	9	32	9	54	31	76	46	69	47
28	78	58	54	33	70	49	39	23	34	1	39	26	12	— 8	31	9	47	26	60	33	80	49	77	48
29	83	50	50	38	70	41	36	17	46	32	28	11	31	3	33	18	52	27	61	43	65	42	77	53
30	80	57	57	37	66	47	47	26	50	38	22	10	33	20	.....	....	40	24	46	33	53	31	65	46
31	78	47	63	41	.....	.....	53	38	....	....	25	4	29	8	....	....	32	18	.....	.....	36	30	.....	.....
Range	59°		55°		48°		57°		60°		46°		61°		45°		71°		55°		56°		61°	
Monthly means	63°.8		60°.8		55°.9		47°.7		25°.9		30°.5		17°.1		28°.1		24°.7		37°.9		46°.4		57°.1	

Maximum, minimum, and mean temperatures—Continued.

STATION, WASHINGTON, D. C.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	87	71.5	71	63	84.5	67	73.5	50	48	34	32	14.5	62.5	51	41	25	37	29.5	48	32	59	33.5	79	50
2	74	65	66.5	61	88	64.5	62	43	48	34	32	23	71	51.5	40.5	17	33	27.5	47	30	59	39.5	90	56.5
3	81	64	76	59.5	93	72.5	66	41	39	29	31.5	24	55.5	36.5	27.5	13.5	38.5	20	43	38.5	58	46	91	68
4	86	67	83	69	89	72.5	68	50.5	43	37	41	30.5	48	31.5	32	21	46	25	51	40	66	41	82	67.5
5	94.5	73	85.5	67	83	63.5	78	51	41	31	40	37	48	25.5	26	8.5	58	30	60	35.5	73	51	75	61
6	96	75	87	68.5	87	64	72	55.5	52	28.5	40	35.5	48.5	36	32	12	69.5	41	58	41.5	84	61	73.5	56
7	86	74.5	83.5	68	79	60.5	67.5	48.5	49	34	42	36	40	26.5	52	31	70	51.5	68.5	34.5	85	64	82	56
8	85	68.5	85	66	82.5	57	67	43	51	40	45	38.5	53	27	53.5	30.5	61.5	36	55	34.5	82	69	86	65
9	89.5	69	85.5	63.5	84.5	65	63.5	46	49	31.5	45	39	58	49	51.5	37	53.5	32	53	33	71	58	86.5	67
10	89	72	87.5	66	83.5	55	69.5	50	45	40.5	39	32.5	61.5	22	64	45	59	33.5	58	31	70	52	88.5	67
11	88	71.5	83	70	62.5	47	57	46	52	41	40	30	30	17	67	41	53.5	40	69	34.5	69.5	48.5	89	66.5
12	75	65.5	83.5	71	70	50	52.5	37.5	62	31	42	32	36	18	57.5	39	44.5	37	78	51	83	53	89	71
13	90.5	61	82	70.5	74	61	55	33.5	64	35	42	29	26.5	18	54	34.5	45.5	33	75	53.5	64.5	51	85.5	71
14	86.5	69.5	82.5	66.5	78	63	54.5	31.5	62	50	36	24.5	33.5	15.5	64	50	45	27	75.5	58.5	70	44.5	87	68
15	90.5	70	81	67.5	80	58	65.5	49	57.5	41	34	21	44	17	52	32	42.5	30	65.5	47	81	52.5	87.5	67
16	93	72	86	71	70	63	56.5	43	54	39	45.5	26	49	38.5	35	27.5	54	34	66	50	64	51	84.5	66
17	84	74	90	69.5	73	53	56	37	39	30	39.5	16	51.5	39.5	37	24	46.5	31.5	56	43	56	51	80.5	72
18	95	73	83	69.5	56.5	46.5	62	42	41	24.5	22	12.5	62.5	45	44	26	31.5	18	51	39	77	53	78	69.5
19	80	64	82.5	67	58.5	45	50	38	64	39	28	17	60	44	54	24.5	33	12	58.5	34	83	58.5	85.5	66
20	72	67	82	66.5	67	47	59	35	53	41	38	14	46.5	33.5	53	37	47	24	62	34	86	68	84	67
21	85	68	84.5	61.5	62	44	76	39.5	46	40	54	23	53.5	33.5	44	31	43	27	70	54	87	66.5	78	64
22	88	68.5	80.5	64.5	60	47	77	47	40	29	66	44.5	39.5	30.5	49	33.5	38	25	65	41	84	66.5	84.5	59
23	88.5	73	70	61.5	61	45.5	74.5	47.5	46	32	71	43	50.5	33	44	15	45.5	28	67	45.5	66.5	53	83.5	64
24	84	69.5	63.5	61	66.5	40	77	49	51	34	58.5	40	50.5	33	33.5	14	44	29	52	44.5	75	46	88	70
25	83	66	73.5	60.5	69.5	47.5	79	48	40	27	56.5	40	38	29	44	20.5	54.5	36	46.5	38	81	55	91	71
26	92.5	71	75.5	56.5	63	49.5	78	48	46.5	32	45	41.5	39	28.5	54	29	47	38	60	36	77	61	93.5	70
27	87.5	70.5	74	56.5	71.5	45	60	41	47	34.5	58	34	56	31.5	39	33.5	56	36	68	38.5	81.5	58	96	73.5
28	76	64.5	70	63	78	46.5	64	35	46.5	32.5	36.5	30	71	42	40	34	58	36	74.5	53	79.5	59.5	95	73
29	81.5	66.5	71	66	76	54.5	72	46	29.5	24	41	36	62	31	38.5	33	43	35	69	49.5	89.5	61	91.5	70.5
30	85	67.5	84	65.5	77	58.5	67	47.5	24	16	47	40	34	22	.....	.....	43	32.5	66	36	73.5	59	87.5	72
31	75.5	68.5	86	66	.....	.....	48	37	.....	.....	52	45	38.5	19	.....	.....	49	33.5	.....	.....	69	55	.....	.....
Range	35°		33°.5		53°		47°.5		48°		58°.5		55°.5		58°.5		58°		48°		56°		46°	
Monthly means	76°.9		72°.0		64°.9		54°.1		41°.4		37°.1		40°.7		37°.2		39°.3		51°.4		63°.3		75°.9	

Maximum, minimum, and mean temperatures—Continued.

STATION, WILMINGTON, N. C.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	88	74	92	75	82	69	80	65	66	36	52	30	74	56	59	37	62	35	60	50	68	38	81	53
2	91	71	87	75	69	68	68	53	73	52	43	38	76	64	59	32	62	33	52	44	54	42	87	65
3	82	70	86	70	93	69	73	50	65	44	52	40	66	51	52	27	47	26	64	48	54	44	86	70
4	86	71	82	73	95	71	77	58	77	61	57	47	59	42	44	37	53	30	70	49	64	42	81	73
5	90	73	91	72	88	73	83	60	65	41	64	49	64	42	48	27	62	33	65	45	77	51	75	64
6	90	74	87	74	93	68	74	61	54	39	54	48	64	49	56	34	69	47	64	53	82	65	80	58
7	90	75	86	76	89	69	75	61	55	47	56	50	60	36	62	42	70	56	71	48	80	67	81	62
8	89	75	81	72	84	65	68	50	51	46	52	46	67	41	58	45	66	49	59	50	79	66	80	63
9	87	73	80	68	85	67	68	51	57	47	53	42	70	55	64	38	66	37	64	46	75	62	80	63
10	92	73	83	70	91	72	72	50	75	48	49	35	65	44	74	55	74	44	66	43	76	55	82	65
11	95	75	83	69	77	60	72	61	57	39	54	33	44	32	74	52	75	52	76	54	75	58	82	67
12	95	73	83	70	79	61	64	46	63	38	47	29	52	28	68	53	75	59	87	64	77	56	79	72
13	92	73	84	74	77	68	58	40	71	42	57	36	38	26	76	52	66	48	78	64	87	61	79	72
14	93	74	84	72	80	67	55	48	69	51	54	33	38	20	74	59	59	37	77	63	69	55	79	70
15	97	73	87	75	81	64	69	48	74	59	53	29	54	28	60	47	67	48	68	54	75	55	82	70
16	95	75	88	73	88	66	65	46	77	60	62	45	65	40	60	41	73	59	78	52	80	58	80	72
17	98	77	88	75	86	70	59	37	60	36	59	29	73	51	59	38	68	56	65	52	77	62	78	73
18	102	78	86	72	79	62	69	44	54	28	34	18	71	54	53	41	56	30	62	42	81	62	84	70
19	86	76	85	71	80	65	55	45	68	49	52	27	73	62	61	30	42	22	63	39	89	64	87	70
20	89	68	88	71	76	58	59	36	79	62	61	32	62	38	66	36	64	33	68	43	93	68	89	70
21	92	76	87	71	72	54	70	39	66	53	70	38	59	31	64	45	58	33	78	54	86	69	90	72
22	88	77	87	73	71	50	78	48	54	44	70	56	60	38	66	44	47	27	73	58	85	68	90	69
23	98	78	88	71	71	52	67	56	75	43	77	56	75	56	59	35	53	32	85	62	81	64	93	70
24	98	77	80	69	69	50	81	56	68	53	74	56	72	48	50	24	60	43	86	63	72	54	95	73
25	97	76	79	68	77	56	81	56	57	40	72	58	52	43	68	38	68	59	63	49	75	54	96	75
26	97	77	76	67	68	58	80	58	71	46	72	58	60	39	74	48	66	50	63	41	75	62	98	76
27	97	74	79	66	76	50	71	51	67	52	77	54	73	43	75	57	64	42	70	49	81	63	97	77
28	97	75	76	66	77	62	74	49	59	44	62	52	76	55	77	57	67	54	75	60	79	67	99	75
29	94	76	84	65	77	67	78	51	69	48	70	55	75	56	64	42	56	39	71	59	85	64	96	73
30	92	77	83	66	82	65	73	57	57	36	72	60	56	33	.....	.....	64	38	79	56	86	64	91	73
31	93	74	88	68	.....	.....	61	44	.....	.....	68	58	38	32	.....	.....	64	44	.....	.....	77	64	.....	.....
Range	34°		27°		45°		47°		51°		59°		56°		53°		53°		48°		55°		46°	
Monthly means	81°.9		76°.6		71°.5		60°.0		55°.5		51°.8		51°.9		51°.1		52°.6		60°.8		67°.5		76°.6	

Maximum, minimum, and mean temperatures—Continued.

STATION, WOOD'S HOLE, MASS.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	79	64.25	74	61.50	75	61.75	68	53	43	35.75	19	3.75	52	39.50	39	27.75	41	23.25	44	34	48	36.75	64	45.75
2	75	60.75	66	57	77	62.75	59	44.25	41	32	25	10.50	52	40	45	13	35	26.75	47	31.75	61	42.25	71	52.25
3	76	59.75	72	56.50	84	65	60	47.75	46	29.75	36	14.75	48	36	30	7.75	33	21.50	43	36	49	36	69	55.25
4	71	60.75	76	67	77	63.75	66	57.75	42	35	43	29	37	20	35	21	37	19.25	41	37.50	54	35.5	67	56.75
5	74	66	74	65	80	64.25	69	57	46	31.75	41	27	39	16.25	24	10.75	43	31.25	40	35	56	41.75	61	56
6	73	65.75	81	64.25	78	65	61	50.75	48	33	43	32	46	26	45	18.75	48	37	46	34.25	54	47	67	55.5
7	79	63	77	67.50	77	62.75	64	54	54	35.25	44	31	30	18.75	47	37	51	38.75	50	37.50	65	45	74	55.5
8	73	61.25	76	68.50	72	57.75	59	45.75	48	38.75	41	33	46	29.25	45	31	49	39	47	35	57	49.5	67	56.75
9	74	62.50	77	66.75	77	66.75	60	45.75	48	37.50	42	32	48	38.75	47	31.75	41	34.50	45	27.75	57	49.25	65	59
10	72	63.25	77	66	75	55	65	45.50	53	36.50	41	30	51	22	46	32	37	30	52	33	59	48	66	58.75
11	80	67.75	79	67.75	64	48.25	62	44	52	39	39	28.25	26	18	47	32	36	29	60	37.25	61	47	69	58.75
12	74	60.75	80	69.75	64	51.50	49	39	54	36.50	46	34	33	21	50	37.25	40	31.75	58	39.75	53	47.5	64	57.25
13	77	62.50	80	72.75	75	61.25	48	36.75	59	47	43	31.50	29	14.25	51	37.25	43	27	58	41	65	47.25	73	59.75
14	79	66	79	69.50	71	60.75	53	40	48	42.75	36	20	28	11.75	46	36.75	32	21.25	57	44.75	66	45.25	72	57.75
15	82	65.50	78	69.75	70	60	62	50.50	47	38	33	18.25	41	26	53	38	36	17.50	53	44	54	46	72	58.75
16	70	62	74	69.75	70	62	61	51.75	52	38	43	31.50	44	36.25	40	32	45	22	52	43	59	43.25	74	60
17	81	60.75	74	66.75	73	50	58	45.75	42	29	43	23	42	36.75	34	28	44	32	58	41.75	58	42.75	75	63.50
18	72	59	78	68.75	61	46.75	60	49.25	43	22.75	28	10	49	35.25	36	23.25	37	12	55	39	56	44.75	74	65
19	72	57.75	79	70.75	52	45.75	58	47.75	49	40.75	20	2	49	42.25	40	23.50	29	11	48	39.25	65	49.75	76	64.75
20	74	60.75	77	69	63	48.50	60	45	50	37	38	−5.75	46	33	40	27	33	17	55	38	64	50.75	75	63.75
21	73	62.25	79	70.25	63	49.75	59	52	44	34.25	47	36.75	37	25	37	21	48	30.75	60	41.75	60	50.5	76	65
22	78	65.25	77	68.75	56	44	63	45.50	40	25.50	50	38.50	29	19.25	39	29	40	29.75	58	39.75	63	51	70	61.75
23	76	65	72	58.50	58	42	64	49	51	24	51	40	44	25.25	36	6	41	27.50	52	41.50	58	47	73	62.25
24	78	64.50	71	54.75	67	43.50	57	51	52	35	43	29	40	25	14	1.75	49	31	54	39.75	62	44.75	73	63.25
25	80	62	71	55.75	65	51.25	65	50.75	37	27.75	45	28.50	34	16.25	28	10.25	46	31.75	46	36	68	50.5	82	62.75
26	77	65	73	57	63	51	61	44.75	52	31	43	31.50	36	19.75	33	19.75	48	40.25	40	34.50	59	44.75	81	63.75
27	79	68.75	72	58.50	64	50.50	58	46	53	33	51	29	44	20	35	23.25	48	35	60	37.50	61	49	78	62.75
28	75	65	74	58	67	53	52	43.25	44	28.75	38	25.75	41	35.75	35	27.75	43	33.25	55	40.75	64	52.25	85	66.25
29	75	62	76	63	62	50	52	44.75	52	16	42	32	49	36	35	26	49	34	61	45	62	53.5	74	67
30	76	61.50	75	62	66	57.50	59	44.50	16	4.75	46	34	38	18	.....	....	46	34.75	51	41	61	47	76	66.75
31	77	65	81	63.75	.....	.....	54	39	.....	.....	43	37.75	35	16.75	.....	.....	49	33.25	.....	.....	58	45.25	.....	.....
Range	24°.25		26°.25		42°		32°.25		54°.25		56°.75		40°.25		51°.25		40°		33°.25		32°.5		39.25	
Monthly means	68°.9		69°.4		61°.7		52°.9		39°.5		33°.4		33°.6		31°.3		34°.7		43°.6		52°.2		65°.2	

Maximum, minimum, and mean temperatures—Continued.

STATION, WYTHEVILLE, VA.

Day of month.	1875.												1876.											
	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	85	56	79	62	82	60	62	43	57	32	54	33	63	38	41	22	45	24	55.5	32	57	32	75	60
2	80	58	77	65	85	58	60	35	64	47	42	29	61	51	23	9	44	21	43	33	46	40	78	60
3	80	63	79	63	83	55	64	32	64	39	41	30	51	36	33	16	43	18	50.3	32	62	39	84	63
4	82	66	77	62	81	60	72	40	58	43	53	36	52	27	31	16	55	19	56	39	71	31	74	58
5	88	62	80	56	85	55	74	51	44	39	53	48	55	29	39	8	64	24	68	32	70	44	69	48
6	86	65	83	56	80	54	67	47	48	40	55	42	49	34	45	24	62	37	56.5	32	84	46	71	45
7	82	66	78	61	80	54	57	40	46	39	50	44	53	29	50	39	60	44	63	25	84	61	81.5	44
8	81	64	79	52	82	48	64	32	44	38	45	35	55	28	54	39	52	30	61	35	72	58	80	49
9	83	65	79	51	85	54	64	37	44	39	36	31	62	47	57	39	65	33	68	26	60	42	84	52.5
10	79	67	78	56	77	60	67	37	45	35	33	28	55	18	62	47	73	41	70.5	30	66	39.5	84	57
11	75	65	79	60	63	52	57	37	51	30	45	28	29	13	70	42	73	46	75	39	74	37	84	55
12	74	64	77	60	59	49	51	28	60	28	38	27	30	15	60	41	69	50	79	52	78	41	76	65
13	81	63	79	62	71	55	56	25	62	27	37	27	20	12	57	40	51	30	72	52	67	45	73	62
14	77	64	73	60	77	58	56	26	57	42	33	25	32	9	57	39	59	23	68.5	43	75	35	77	62
15	84	65	75	61	75	52	57	36	57	38	45	22	46	24	40	28	49	40	58	36	81	43	75	63
16	87	63	78	64	77	54	44	33	56	31	49	29	47	33	37	26	62	41	60	40.5	78	56	68	62
17	89	69	81	62	69	53	58	29	32	19	35	6	53	40	39	22	50	19	47	36	79	56	74	61
18	86	68	76	63	53	45	53	40	46	18	22	2	62	45	41	21	20	13	44	31	75	57	76	52
19	82	63	75	57	64	43	40	32	55	36	37	17	58	31	51	21	40	9	61	24	80	60	74	47
20	76	60	73	56	60	40	63	25	62	49	49	17	40	26	57	27	35	20	73.5	32	85.5	57	76	48
21	70	62	76	48	55	35	70	32	53	42	58	23	47	21	45	36	36	18	67	47	83	56	75	52
22	81	64	71	58	60	32	73	37	48	30	56	45	51	32	47	31	37	12	58	36	76	55	77	51
23	77	66	75	55	63	34	73	44	63	33	61	51	58	50	39	16	42	24	70	51.5	71	49	81.5	61
24	83	64	76	60	66	35	71	44	53	28	64	50	51	31	40	14	44	36	59	46	72	44	84	61.5
25	85	60	74	60	65	37	70	40	47	22	60	42	44	27	58	34	60	42	51	36	64	52	82	65
26	84	63	78	53	58	38	72	39	52	37	64	40	52	31	62	32	43	33	62	30	72	55	83	64
27	83	66	76	56	70	31	60	44	57	38	61	43	64	42	64	37	55	31	74	33	74	56	86.5	66
28	80	64	70	56	70	34	70	34	54	38	45	37	69	43	61	43	55	32	70	47	74	55	86	66
29	83	62	78	52	72	50	67	38	53	31	51	43	59	24	45	31	36	22	69	41	82	48.5	83	63
30	84	65	81	55	69	53	62	41	49	25	65	42	41	15	.....	.....	49	29	65	45	86	56	83	63
31	82	65	85	55	.....	.....	42	32	.....	.....	64	38	46	14	.....	.....	59	27	.....	.....	79	61	.....	.....
Range	33°		37°		54°		49°		46°		63°		60°		62°		64°		55°		55°		42°.5	
Monthly means	71°.2		66°.1		58°.9		47°.4		43°.0		40°.3		40°.1		38°.8		40°.1		49°.7		60°.6		67°.5	

Maximum, minimum, and mean temperatures—Continued.

STATION, YANKTON, DAK

Day of month.	1875. July. Max.	July. Min.	August. Max.	August. Min.	September. Max.	September. Min.	October. Max.	October. Min.	November. Max.	November. Min.	December. Max.	December. Min.	1876. January. Max.	January. Min.	February. Max.	February. Min.	March. Max.	March. Min.	April. Max.	April. Min.	May. Max.	May. Min.	June. Max.	June. Min.
1	63	58	76	59	80	65	56	33	57	26	49	22	34	18	−8	−18	22	4	34	27	43	37	71	57
2	83	61	80	61	81	66	75	40	54	28	51	24	39	11	30	−8	29	−16	36	28	64	36	61	41
3	78	62	85	63	78	59	52	41	57	26	37	23	23	10	3	−9	35	17	40	21	56	34	55	40
4	72	62	86	62	89	61	68	32	41	22	50	21	30	10	41	−11	41	20	42	30	47	36	77	38
5	74	55	82	62	80	61	50	40	55	21	39	17	42	12	53	24	43	11	46	26	54	38	86	44
6	79	52	77	55	84	63	65	35	61	24	19	12	53	14	30	11	11	1	61	32	46	38	89	59
7	81	58	82	50	89	72	70	48	56	39	27	12	59	14	32	7	32	−2	57	28	51	36	83	62
8	72	63	87	63	89	69	50	40	43	23	25	7	55	12	33	11	45	29	67	31	66	37	76	59
9	83	63	86	67	60	49	68	38	46	15	41	8	14	5	39	29	33	11	57	42	73	50	86	57
10	84	67	79	59	64	45	45	35	65	27	37	13	19	−10	56	19	11	2	63	33	75	38	79	62
11	83	64	79	56	69	45	43	19	59	32	42	15	34	16	54	11	8	−2	52	40	73	53	80	56
12	89	68	79	52	76	52	63	29	52	19	50	26	19	3	57	25	14	−4	44	33	68	40	69	52
13	86	62	81	48	65	61	76	32	42	13	42	24	45	2	31	8	40	14	42	31	74	51	76	48
14	89	65	84	61	77	62	55	34	47	22	50	15	54	12	21	3	33	24	58	33	82	61	80	49
15	93	73	80	55	80	60	60	33	22	8	47	25	46	20	21	−3	24	18	58	43	81	64	76	55
16	86	69	75	52	60	50	79	36	22	10	25	−8	56	19	28	5	18	12	57	37	77	52	73	50
17	80	64	75	48	55	47	56	34	42	8	16	−15	47	31	51	4	12	−3	54	29	79	52	67	47
18	78	52	77	48	65	48	63	22	49	19	22	0	36	18	45	19	18	−16	66	37	79	62	68	43
19	86	55	82	45	53	34	75	44	25	16	45	5	22	5	46	10	21	−4	77	49	84	62	69	48
20	85	61	83	51	54	31	81	34	25	−3	45	15	17	4	49	14	12	−10	67	40	81	56	80	46
21	86	59	74	47	63	35	87	42	3	−9	53	29	11	0	40	−2	29	−9	72	49	75	53	89	56
22	81	59	79	45	67	39	82	44	31	−1	62	36	11	−4	24	6	33	19	73	42	69	52	97	72
23	86	59	76	59	72	44	69	48	18	−1	41	25	0	−13	33	−3	36	27	53	44	70	43	90	62
24	85	66	81	66	63	44	69	39	45	1	31	15	13	−17	68	17	37	33	59	43	71	46	90	67
25	79	61	78	64	66	34	50	36	41	15	32	6	22	−8	45	15	36	31	70	47	80	54	92	64
26	82	51	83	63	80	40	38	31	24	6	27	7	45	18	27	4	38	31	80	47	81	48	81	61
27	81	65	77	65	85	45	52	31	35	19	30	13	40	11	22	11	33	24	70	43	87	57	69	53
28	86	62	70	57	86	43	61	33	20	−12	42	6	32	−5	18	6	27	13	60	35	86	65	86	47
29	90	63	77	51	70	44	46	27	5	−15	55	35	32	−12	20	3	31	15	62	36	85	63	78	48
30	70	59	84	68	57	45	31	23	51	3	47	25	47	26	.....	.....	39	16	58	36	84	62	70	56
31	80	64	80	65	.....	.....	47	18	.....	.....	32	16	32	−16	.....	.....	45	24	.....	.....	83	64	.....	.....
Range	42°		42°		58°		69°		80°		77°		76°		86°		61°		59°		53°		59°	
Monthly means	71°.8		68°.3		60°.6		47°.2		2°.9		27°.3		18°.9		20°.8		20°.4		46°.7		61°.6		65°.7	

STATION STATISTICS.

PAPER 18.

Statement showing how many times the wind was observed blowing from the eight cardinal points of the compass during each month and season of the year ending June 30, 1876, compiled from the local observations taken at the several stations of observations at 7 a. m., 2 p. m., and 9 p. m., (local time.)

Station.	Wind.	July, 1875.	August.	September.	October.	November.	December.	January, '76.	February.	March.	April.	May.	June.	Spring.	Summer.	Autumn.	Winter.
Albany, N. Y.	N.	8	9	6	8	9	2	2	3	3	1	1	0	5	17	23	7
	N. W.	16	5	20	19	38	21	18	25	20	27	18	12	65	33	77	04
	W.	4	2	1	3	7	6	12	13	21	11	5	4	37	10	11	31
	S. W.	0	0	1	0	1	1	2	1	1	0	0	13	1	13	2	4
	S.	23	32	21	19	12	18	21	8	11	5	24	15	40	70	52	47
	S. E.	3	3	0	3	5	9	9	7	11	4	4	1	19	7	8	25
	E.	0	0	1	1	0	0	0	0	1	3	1	0	5	0	2	0
	N. E.	0	0	2	1	1	0	0	0	0	1	0	0	1	0	4	0
	Calm.	39	42	38	39	17	36	29	30	25	38	40	45	103	126	94	95
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alpena, Mich.	N.	11	5	9	8	4	5	0	1	6	4	5	3	15	19	21	6
	N. W.	19	8	19	25	20	22	25	22	42	29	18	13	89	40	64	69
	W.	5	18	15	17	14	5	21	19	1	12	7	7	20	30	46	45
	S. W.	12	5	15	16	11	20	12	8	5	4	3	7	12	24	42	40
	S.	7	10	6	8	12	7	12	5	5	3	4	8	12	25	26	24
	S. E.	17	22	11	6	11	17	10	10	19	26	27	27	72	66	28	37
	E.	3	10	8	8	4	5	5	13	5	7	13	9	25	22	20	23
	N. E.	3	3	3	3	5	3	2	5	8	2	6	2	16	8	11	10
	Calm.	16	12	4	2	9	9	6	4	2	3	10	14	15	42	15	19
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atlantic City, N. J.	N.	9	2	10	7	18	11	3	5	5	10	5	2	20	13	35	19
	N. W.	7	2	7	17	12	4	13	10	12	17	6	5	35	14	36	27
	W.	8	2	18	21	17	23	25	23	29	11	6	10	46	20	56	71
	S. W.	12	15	15	13	12	14	26	5	8	13	16	23	37	50	40	45
	S.	31	38	16	22	9	6	12	16	12	22	33	35	67	104	47	34
	S. E.	5	0	3	4	5	2	1	4	7	4	2	8	13	13	12	7
	E.	7	1	5	3	6	2	4	5	11	4	13	0	28	8	14	11
	N. E.	6	27	11	4	7	17	4	8	0	4	6	1	10	34	22	29
	Calm.	8	6	5	2	4	14	5	11	9	5	6	6	20	20	11	30
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Augusta, Ga.	N.	3	5	9	10	9	6	4	7	4	2	3	2	9	10	29	17
	N. W.	7	7	7	17	14	18	18	24	20	19	11	19	50	33	38	60
	W.	20	6	4	11	8	14	3	12	13	7	5	6	25	32	23	29
	S. W.	5	6	8	6	11	5	13	7	4	10	1	3	15	14	25	25
	S.	16	20	8	3	7	9	10	3	9	10	6	14	25	50	18	22
	S. E.	7	3	6	1	3	6	5	5	23	9	26	17	58	27	10	16
	E.	4	4	9	3	12	1	2	7	3	1	10	7	14	15	24	10
	N. E.	1	10	16	8	12	7	7	4	4	14	12	7	30	18	36	18
	Calm.	30	32	23	34	14	27	31	18	13	18	19	15	50	77	71	76
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Baltimore, Md.	N.	12	10	13	14	12	9	5	3	5	8	5	2	18	24	39	17
	N. W.	11	4	17	20	16	15	20	26	38	31	15	14	84	29	53	61
	W.	16	10	8	13	12	10	15	11	10	5	8	11	23	37	33	36
	S. W.	11	14	19	7	7	12	30	8	6	11	19	14	36	39	33	50
	S.	16	16	9	7	6	3	4	3	3	2	9	13	14	45	22	10
	S. E.	11	9	5	11	7	3	5	16	15	19	16	28	50	48	23	24
	E.	11	4	3	2	6	12	1	9	7	2	9	1	18	16	11	22
	N. E.	3	20	7	5	13	19	7	6	7	10	10	2	27	25	25	32
	Calm.	2	6	9	14	11	10	6	5	2	2	2	5	6	13	34	21
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barnegat, N. J.	N.	7	3	8	7	10	13	7	10	6	16	2	4	24	14	25	30
	N. W.	15	1	12	10	23	11	20	25	28	21	9	4	58	20	45	56
	W.	10	8	12	29	15	25	22	14	19	7	9	10	35	28	56	61
	S. W.	12	11	15	13	13	10	18	6	8	17	27	31	52	54	41	34
	S.	23	29	14	17	11	5	15	11	9	15	18	28	42	80	42	31
	S. E.	10	7	5	4	3	2	2	5	13	6	7	7	26	24	12	9
	E.	4	4	6	6	5	10	5	6	5	7	12	1	24	9	17	21
	N. E.	6	23	9	5	10	10	3	5	3	1	5	2	9	31	24	18
	Calm.	6	7	9	2	0	7	1	5	2	0	4	3	6	16	11	13
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Statement showing how many times the wind was observed blowing, &c.—Continued.

Station.	Wind.	July, 1875.	August.	September.	October.	November.	December.	January, '76.	February.	March.	April.	May.	June.	Spring.	Summer.	Autumn.	Winter.
Benton, Mont.	N.	7	10	9	7	1	3	1	4	7	3	12	6	22	23	17	8
	N. W.	5	6	8	6	4	0	10	4	10	3	14	8	27	19	18	14
	W.	17	16	11	11	11	7	9	6	7	17	9	13	33	46	33	22
	S. W.	15	18	13	20	30	59	30	23	22	31	18	23	71	56	63	112
	S.	4	2	5	3	1	0	5	0	0	0	6	2	6	8	9	5
	S. E.	4	4	0	0	0	1	4	0	4	5	15	7	24	15	0	5
	E.	14	11	12	8	9	2	3	8	3	8	6	14	17	39	29	13
	N. E.	9	12	7	8	7	6	20	28	19	16	3	5	38	26	22	54
	Calm.	18	14	25	30	27	15	11	14	21	7	10	12	38	44	82	40
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bismarck, Dak	N.	14	16	21	14	9	5	5	15	16	17	17	18	50	48	44	25
	N. W.	14	21	22	21	33	37	39	27	17	25	15	28	57	63	76	103
	W.	8	6	4	4	1	4	8	0	1	6	3	5	10	19	9	12
	S. W.	9	4	6	6	2	5	3	1	3	1	2	5	6	18	14	9
	S.	11	15	10	12	15	8	4	4	2	10	8	6	20	32	37	16
	S. E.	10	10	5	7	5	12	7	7	12	9	23	8	44	28	17	26
	E.	6	6	9	11	10	9	9	14	19	10	11	6	40	18	30	32
	N. E.	21	14	11	16	12	10	10	18	19	11	14	10	44	45	39	38
	Calm.	0	1	2	2	3	3	8	1	4	1	0	4	5	5	7	12
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boston, Mass.	N.	3	5	2	4	5	8	1	5	2	8	4	1	14	9	11	14
	N. W.	34	10	18	13	38	19	17	10	12	6	11	6	29	50	69	46
	W.	14	11	26	24	21	26	26	20	36	36	17	14	89	39	71	72
	S. W.	15	16	16	16	9	19	32	30	14	8	16	13	38	44	41	81
	S.	13	13	5	5	1	2	6	5	9	10	12	21	31	47	11	13
	S. E.	1	10	5	9	3	6	3	4	7	8	7	15	22	26	17	13
	E.	10	19	12	12	8	8	2	6	7	7	16	15	30	44	32	16
	N. E.	3	7	3	10	4	5	6	7	6	7	7	5	20	15	17	13
	Calm.	0	2	3	0	1	0	0	0	0	0	3	0	3	2	4	0
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Breckinridge, Minn.	N.	22	23	12	27	1	6	9	18	38	22	14	15	74	60	40	33
	N. W.	12	13	20	9	37	38	25	25	15	12	9	19	36	44	66	88
	W.	2	1	1	5	3	1	20	10	7	11	8	17	26	20	9	31
	S. W.	9	7	7	12	4	5	5	1	0	6	4	5	10	21	23	11
	S.	13	8	11	15	5	5	4	0	7	8	6	5	21	26	31	9
	S. E.	12	30	19	6	29	31	21	15	15	18	24	17	57	59	54	67
	E.	2	1	1	0	0	1	3	9	2	5	16	5	23	8	1	13
	N. E.	12	6	9	13	6	3	3	5	6	6	12	6	24	24	28	11
	Calm.	9	4	10	6	5	3	3	4	3	2	0	1	5	14	21	10
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buffalo, N. Y	N.	2	3	7	5	5	3	2	0	3	3	3	1	9	6	17	5
	N. W.	5	1	8	12	6	5	11	6	13	6	3	1	22	7	26	22
	W.	20	8	12	18	26	26	19	26	24	16	19	23	59	51	56	71
	S. W.	39	36	31	33	15	16	31	17	18	36	41	41	95	116	79	64
	S.	7	11	11	7	6	7	10	11	9	5	3	10	17	28	24	28
	S. E.	2	2	2	3	1	1	1	0	2	4	2	6	8	10	6	2
	E.	2	17	9	11	17	26	10	16	17	8	13	3	38	22	37	52
	N. E.	8	5	5	2	12	6	2	6	6	6	5	4	17	17	19	14
	Calm.	8	10	5	2	2	3	1	5	1	6	4	1	11	19	9	9
	Blank.	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	6
Burlington, Vt	N.	25	13	31	30	33	25	20	33	34	31	24	21	89	59	94	78
	N. W.	1	4	1	4	12	0	4	4	5	5	9	1	19	6	17	17
	W.	2	8	9	6	5	2	13	9	4	11	7	5	22	15	20	24
	S. W.	3	1	3	3	0	2	1	1	14	7	4	1	25	5	6	4
	S.	46	40	31	36	27	40	40	22	23	15	32	50	70	136	94	102
	S. E.	0	3	1	4	3	3	2	1	2	3	3	2	8	5	8	6
	E.	1	4	2	1	1	6	3	2	1	1	3	1	5	6	4	11
	N. E.	2	2	2	4	5	6	5	6	1	2	4	1	7	5	11	17
	Calm.	13	18	10	5	4	0	5	9	9	15	7	8	31	39	19	14
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cairo, Ill	N.	3	16	18	11	32	7	13	10	8	17	11	4	36	23	61	30
	N. W.	1	9	6	13	8	10	9	13	17	2	5	3	24	13	27	32
	W.	9	3	4	7	3	11	5	10	15	10	6	12	31	24	14	26
	S. W.	24	4	6	6	4	4	9	2	0	5	6	11	11	39	16	15
	S.	29	16	14	30	18	31	34	33	20	23	32	31	75	76	62	98
	S. E.	7	12	4	2	6	6	6	5	15	5	8	10	28	29	12	17
	E.	6	15	9	3	0	7	2	4	10	14	4	8	28	29	12	13
	N. E.	6	4	10	9	9	5	3	1	4	6	7	2	17	12	28	9
	Calm.	8	14	19	12	10	12	12	9	4	8	14	9	26	31	41	33
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Statement showing how many times the wind was observed blowing, &c.—Continued.

Station.	Wind.	July, 1875.	August.	September.	October.	November.	December.	January, '76.	February.	March.	April.	May.	June.	Spring.	Summer.	Autumn.	Winter.
Cape Hatteras, N. C.	N.	1	9	1	7	5	9	6	3	6	5	1	0	12	10	13	18
	N. W.	1	0	4	9	4	9	4	4	6	2	2	2	10	3	17	17
	W.	16	3	6	17	11	20	12	20	15	10	5	8	30	27	34	52
	S. W.	46	25	15	15	12	15	27	10	3	20	13	22	36	93	42	52
	S.	14	31	3	6	2	4	4	6	12	8	21	17	41	62	11	14
	S. E.	5	8	2	4	7	5	5	7	9	4	9	24	22	37	13	17
	E.	4	0	7	4	4	2	1	1	9	8	10	9	27	13	15	4
	N. E.	6	13	50	29	43	25	28	34	26	34	31	8	90	27	122	87
	Calm.	0	4	2	2	2	4	6	2	7	0	1	0	8	4	6	12
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cape Henry, Va	N.	4	9	16	12	17	12	13	9	12	10	6	6	28	19	45	34
	N. W.	9	7	13	13	14	18	16	14	19	13	8	7	40	23	40	48
	W.	11	2	5	11	7	12	12	8	9	7	3	8	19	21	23	32
	S. W.	24	22	11	18	13	18	23	12	8	16	13	14	37	60	42	53
	S.	8	18	4	11	5	10	13	5	6	9	12	10	27	36	20	28
	S. E.	18	7	7	12	9	4	10	9	20	12	23	30	55	55	28	23
	E.	7	6	8	5	5	7	1	8	13	10	5	5	28	18	18	16
	N. E.	5	13	20	7	19	8	4	7	4	11	16	4	31	22	46	19
	Calm.	7	9	6	4	1	4	1	15	2	2	7	6	11	22	11	20
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cape May, N. J	N.	6	9	9	8	18	16	10	13	7	4	5	0	16	15	35	39
	N. W.	8	2	13	18	25	12	24	18	31	16	12	9	59	19	56	54
	W.	11	8	17	19	13	24	16	17	14	21	1	11	36	30	49	57
	S. W.	4	3	9	9	7	9	11	3	6	4	4	7	14	14	25	23
	S.	35	40	15	22	9	8	23	11	15	24	32	33	70	108	46	42
	S. E.	6	8	8	5	6	1	1	9	6	10	17	27	33	41	19	11
	E.	15	5	6	4	4	7	3	9	12	7	11	1	30	21	14	19
	N. E.	2	16	11	7	6	15	5	7	1	4	10	1	15	19	24	27
	Calm.	6	2	2	1	2	1	0	0	1	1	1	1	3	9	5	1
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cape Lookout, N. C.*	N.	...	...	...	...	...	...	...	...	...	...	11	0	...	...	...	...
	N. W.	...	...	...	...	...	...	...	...	...	...	0	1	...	...	...	...
	W.	...	...	...	...	...	...	...	...	...	...	5	9	...	...	...	...
	S. W.	...	...	...	...	...	...	...	...	...	...	17	28	...	...	...	...
	S.	...	...	...	...	...	...	...	...	...	...	15	20	...	...	...	...
	S. E.	...	...	...	...	...	...	...	...	...	...	7	23	...	...	...	...
	E.	...	...	...	...	...	...	...	...	...	...	16	2	...	...	...	...
	N. E.	...	...	...	...	...	...	...	...	...	...	21	6	...	...	...	...
	Calm.	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...
	Blank.	...	...	...	...	...	...	...	...	...	...	0	0	...	...	...	...
Charleston, S. C.	N.	0	9	25	19	16	10	13	15	10	7	7	5	24	14	60	38
	N. W.	1	9	5	11	17	11	13	8	6	3	4	5	13	15	33	32
	W.	10	1	4	13	6	15	10	6	15	10	4	8	29	19	23	31
	S. W.	24	13	8	11	12	17	9	19	12	15	22	31	49	68	31	45
	S.	52	45	20	18	20	28	30	12	8	24	7	8	39	105	58	70
	S. E.	2	4	3	1	1	3	4	8	8	6	17	25	31	31	5	15
	E.	2	6	11	6	6	4	7	5	15	9	22	7	46	15	23	16
	N. E.	2	1	13	7	12	5	7	11	7	12	8	1	27	4	32	23
	Calm.	0	5	1	7	0	0	0	3	2	4	2	0	8	5	8	3
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cheyenne, Wash	N.	15	11	11	9	3	6	7	5	18	8	13	17	39	43	23	18
	N. W.	21	23	27	39	14	37	26	25	26	25	17	16	68	60	80	88
	W.	10	12	6	23	31	28	28	36	16	26	15	18	57	40	60	92
	S. W.	6	13	9	11	21	13	13	10	12	10	10	11	32	30	43	36
	S.	18	17	14	6	10	6	15	7	7	12	14	10	33	45	30	28
	S. E.	11	10	11	1	1	1	2	4	4	3	14	8	21	29	13	7
	E.	6	0	6	1	4	0	0	0	5	3	5	5	13	11	11	0
	N. E.	4	7	3	3	4	2	2	0	4	3	4	5	11	16	10	4
	Calm.	2	0	3	0	0	0	0	0	1	0	1	0	2	2	3	0
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chicago, Ill	N.	19	11	14	8	10	8	3	1	9	9	15	10	33	40	32	12
	N. W.	2	9	9	21	15	12	10	13	9	4	1	1	14	12	45	35
	W.	6	6	3	8	7	12	17	19	16	12	8	10	36	22	18	52
	S. W.	11	18	27	29	13	16	30	16	17	19	24	29	60	58	69	62
	S.	7	19	15	14	13	13	20	17	13	7	12	15	32	41	42	50
	S. E.	11	9	7	5	15	19	7	13	9	12	13	13	34	33	27	39
	E.	15	10	4	1	4	2	3	2	7	12	8	3	27	28	9	7
	N. E.	18	10	9	6	13	4	1	6	12	15	12	7	39	35	28	11
	Calm.	4	1	2	1	0	3	2	0	1	0	0	2	1	7	3	5
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* Station opened April 16, 1876.

Statement showing how many times the wind was observed blowing, &c.—Continued.

Station.	Wind.	July, 1875.	August.	September.	October.	November.	December.	January, '76.	February.	March.	April.	May.	June.	Spring.	Summer.	Autumn.	Winter.
Cincinnati, Ohio	N.	0	7	6	7	6	1	2	4	6	9	2	1	17	8	19	1
	N. W.	6	14	20	20	13	13	17	17	19	15	7	11	41	31	53	47
	W.	13	8	12	14	4	17	13	16	11	8	7	17	26	38	30	46
	S. W.	20	11	10	14	8	19	24	16	10	19	17	21	46	52	32	59
	S.	7	10	6	12	9	11	17	11	8	6	12	13	26	30	27	39
	S. E.	18	12	11	18	11	11	15	16	19	11	19	21	49	51	40	42
	E.	10	16	11	1	20	17	3	6	12	11	8	1	31	27	32	26
	N. E.	15	10	11	6	19	3	1	1	8	9	14	2	31	27	36	5
	Calm.	4	15	3	1	0	1	1	0	0	2	6	3	8	22	4	2
	Blank.	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
Cleveland, Ohio	N.	22	18	11	9	14	7	3	7	7	14	14	4	35	44	34	17
	N. W.	6	4	9	10	5	6	5	3	11	8	8	7	27	17	24	14
	W.	6	8	10	18	12	16	16	24	19	14	16	18	49	32	40	56
	S. W.	11	9	10	13	7	12	21	15	13	17	5	17	35	37	30	48
	S.	13	16	18	20	12	20	25	10	10	6	10	14	26	43	50	55
	S. E.	11	15	14	19	17	15	19	20	14	10	15	22	39	48	50	54
	E.	13	12	7	2	10	5	3	0	10	11	11	2	32	27	19	8
	N. E.	7	9	10	1	10	8	1	6	8	9	10	2	27	18	21	15
	Calm.	4	2	1	1	3	4	0	2	1	1	4	4	6	10	5	6
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colorado Springs, Colo	N.	22	27	39	39	16	36	28	23	27	20	20	22	67	71	94	87
	N. W.	14	18	9	11	9	16	13	11	13	15	13	11	41	43	29	40
	W.	5	6	1	2	7	1	1	4	1	4	8	0	13	9	10	6
	S. W.	5	2	4	1	4	7	7	7	4	2	8	3	14	10	9	21
	S.	9	10	8	10	9	3	5	8	12	12	3	9	27	28	27	16
	S. E.	29	15	20	21	33	13	20	9	18	17	26	21	61	65	74	42
	E.	2	3	2	1	4	2	0	2	3	3	5	4	11	9	7	4
	N. E.	3	5	2	8	7	14	13	15	7	6	5	17	18	25	17	42
	Calm.	6	7	5	0	1	1	6	8	8	11	5	3	24	16	6	15
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corsicana, Tex	N.	1	13	13	16	25	17	23	12	14	11	12	10	37	24	54	52
	N. W.	3	3	4	6	9	11	7	8	17	8	2	14	27	20	19	26
	W.	1	2	0	3	2	6	6	6	5	2	0	1	7	4	5	18
	S. W.	5	7	1	2	10	12	2	5	2	3	3	0	8	12	13	19
	S.	56	20	18	22	26	23	32	36	18	34	30	34	82	110	66	91
	S. E.	19	23	17	22	7	11	14	10	27	14	30	25	71	67	46	35
	E.	5	16	12	10	4	11	5	5	5	11	15	4	31	25	26	21
	N. E.	2	9	25	7	7	1	3	4	4	7	1	2	12	13	39	8
	Calm.	1	0	0	5	0	1	1	1	1	0	0	0	1	1	5	3
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Davenport, Iowa	N.	8	8	7	11	7	1	3	3	6	2	4	4	12	20	25	7
	N. W.	4	11	14	15	20	22	23	27	24	17	9	13	50	28	49	72
	W.	8	8	9	12	6	18	14	11	11	9	3	13	23	29	27	43
	S. W.	17	11	23	27	12	9	26	11	4	16	24	20	44	48	62	46
	S.	6	18	10	10	7	9	6	7	11	7	7	16	25	40	27	22
	S. E.	7	6	4	0	12	11	4	9	9	12	7	2	28	15	16	24
	E.	15	5	14	9	11	16	6	12	14	12	14	6	40	26	34	34
	N. E.	10	7	8	7	11	3	5	5	11	11	10	10	32	27	26	13
	Calm.	18	19	1	2	4	4	6	2	3	4	15	6	22	43	7	12
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Denver, Colo	N.	10	24	14	7	12	8	9	7	18	10	19	16	47	50	33	24
	N. W.	14	9	14	8	9	17	14	13	11	9	9	10	29	33	31	44
	W.	6	3	3	2	1	8	7	8	6	7	2	4	15	13	6	23
	S. W.	8	1	4	0	8	12	24	9	5	7	4	4	16	13	12	45
	S.	25	22	20	33	15	27	9	16	24	31	24	21	79	68	68	52
	S. E.	9	11	14	14	14	4	6	12	4	8	8	5	20	25	42	22
	E.	7	8	6	14	6	3	4	3	6	5	4	9	15	24	26	10
	N. E.	12	14	13	11	11	8	7	12	13	6	10	13	29	39	35	27
	Calm.	2	1	2	4	14	6	13	7	6	7	13	8	26	11	20	26
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Detroit, Mich	N.	11	5	7	6	4	3	4	0	3	9	7	1	19	17	17	7
	N. W.	4	8	19	16	19	19	13	18	25	12	6	1	43	13	54	50
	W.	6	18	10	22	12	13	28	22	14	22	13	19	49	43	44	63
	S. W.	26	21	26	28	13	22	22	16	12	8	23	33	43	80	67	60
	S.	8	13	10	8	8	6	16	8	8	6	10	14	24	35	26	30
	S. E.	6	7	3	2	6	4	2	3	1	8	2	8	11	21	11	9
	E.	17	9	8	6	12	16	6	16	21	13	21	8	55	34	26	38
	N. E.	15	9	7	5	15	8	2	4	9	12	11	5	32	29	27	14
	Calm.	0	3	0	0	1	2	0	0	0	0	0	1	0	4	1	2
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Statement showing how many times the wind was observed blowing, &c.—Continued.

Station.	Wind.	July, 1875.	August.	September.	October.	November.	December.	January, '76.	February.	March.	April.	May.	June.	Spring.	Summer.	Autumn.	Winter.
Dodge City, Kans	N.	17	1	19	19	33	10	16	12	20	17	15	13	52	31	71	38
	N. W.	0	0	4	10	10	9	9	10	15	9	10	14	34	14	24	28
	W.	2	1	0	17	7	32	14	21	15	16	5	11	36	14	24	67
	S. W.	12	1	8	12	4	3	6	5	4	5	2	6	11	19	24	14
	S.	19	38	39	17	9	18	19	9	8	12	9	6	29	63	65	46
	S. E.	9	23	1	9	12	5	16	17	10	13	18	22	41	54	22	38
	E.	7	14	7	6	12	8	3	11	14	12	22	14	48	35	25	22
	N. E.	27	15	12	2	1	2	2	1	4	6	11	4	21	46	15	5
	Calm.	0	0	0	1	2	6	8	1	3	0	1	0	4	0	3	15
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dubuque, Iowa	N.	8	9	7	12	15	3	13	5	5	6	4	4	15	21	34	21
	N. W.	10	15	17	14	19	15	12	28	31	16	12	14	59	39	50	55
	W.	10	13	10	19	6	19	26	11	9	10	3	15	22	38	35	56
	S. W.	9	9	6	9	2	9	9	5	8	14	22	22	44	40	17	23
	S.	10	14	17	15	21	13	21	11	6	7	10	13	23	37	53	45
	S. E.	7	10	7	6	10	17	4	16	12	17	14	9	43	26	23	37
	E.	13	5	8	2	7	5	4	3	10	7	11	4	28	22	17	12
	N. E.	9	2	6	5	4	1	2	7	12	10	10	6	32	17	15	10
	Calm.	17	16	12	11	6	11	2	1	0	3	7	3	10	36	29	14
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Duluth, Minn	N.	4	8	7	11	2	7	4	1	4	1	3	7	8	19	20	12
	N. W.	14	19	14	22	17	26	19	19	14	16	10	14	40	47	53	64
	W.	9	5	8	6	11	2	11	11	2	10	3	10	15	24	25	24
	S. W.	19	13	17	21	20	25	33	11	6	7	5	5	18	37	58	60
	S.	1	1	1	0	1	3	1	3	0	0	0	0	0	2	2	7
	S. E.	3	1	1	5	7	4	1	0	0	1	1	0	2	4	13	5
	E.	1	0	1	3	6	5	3	2	0	0	0	0	0	1	10	10
	N. E.	29	34	24	17	9	6	9	32	46	31	45	26	122	89	50	47
	Calm.	13	12	17	8	17	15	12	8	21	24	26	28	71	53	42	35
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastport, Me	N.	9	5	15	17	18	26	16	8	11	12	12	3	35	17	50	50
	N. W.	12	6	18	16	40	32	34	36	22	17	17	5	56	23	74	102
	W.	6	6	6	9	3	6	8	4	8	7	3	3	18	15	18	18
	S. W.	13	9	10	6	5	7	8	8	9	11	9	6	29	28	21	23
	S.	33	44	27	15	4	4	8	5	17	17	37	46	71	123	46	17
	S. E.	2	2	2	4	6	5	8	5	2	3	0	3	5	7	12	18
	E.	0	6	4	9	5	1	1	8	14	8	4	2	26	8	18	10
	N. E.	5	3	4	10	7	9	6	9	9	13	4	6	26	14	21	24
	Calm.	13	12	4	7	2	3	4	4	1	2	7	16	10	41	13	11
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erie, Pa	N.	14	11	12	2	7	1	5	0	4	4	5	1	13	26	21	6
	N. W.	11	1	11	18	11	11	9	6	12	4	2	7	18	19	40	26
	W.	14	13	13	17	13	9	20	29	23	24	23	18	70	45	43	58
	S. W.	9	7	11	8	11	20	29	12	12	16	15	18	43	34	30	61
	S.	18	20	18	21	11	15	19	15	13	16	19	25	48	63	50	49
	S. E.	11	20	14	20	19	12	8	8	9	5	10	8	24	39	53	28
	E.	4	10	4	3	4	11	0	2	8	7	4	2	19	16	11	13
	N. E.	10	6	6	3	13	10	3	12	10	10	8	2	28	18	22	25
	Calm.	2	5	1	1	1	4	0	3	2	4	7	9	13	16	3	7
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Escanaba, Mich	N.	22	15	21	18	5	14	10	12	38	26	25	10	89	47	44	36
	N. W.	8	11	17	24	23	24	22	15	12	12	5	10	29	29	64	61
	W.	4	7	4	6	18	8	18	15	2	8	2	8	12	19	28	41
	S. W.	15	5	12	17	14	17	14	3	6	3	4	1	13	21	43	34
	S.	28	37	18	13	12	13	9	9	14	13	24	34	51	99	43	31
	S. E.	6	8	0	0	9	5	5	5	2	11	9	11	22	25	9	15
	E.	5	1	6	5	6	2	2	4	6	5	8	4	19	10	17	8
	N. E.	4	4	9	7	2	3	9	15	10	5	9	5	24	13	18	27
	Calm.	1	5	3	3	1	7	4	9	3	7	7	7	17	13	7	20
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Evanston, Ill*	N.	....	....	9	17	3	10	11	10	15	21	16	17	53	....	29	31
	N. W.	....	....	8	12	15	23	27	14	16	10	5	4	31	....	35	64
	W.	....	....	4	13	11	13	13	24	17	19	13	19	49	....	28	50
	S. W.	....	....	36	24	11	16	30	12	3	6	16	19	25	....	71	58
	S.	....	....	6	13	11	7	3	8	12	4	10	14	26	....	30	18
	S. E.	....	....	10	1	10	16	3	10	7	11	11	11	29	....	21	29
	E.	....	....	5	4	11	4	3	7	16	10	9	3	35	....	20	14
	N. E.	....	....	12	9	18	4	3	2	7	9	12	3	28	....	39	9
	Calm.	....	....	0	0	0	0	0	0	0	0	1	0	1	....	0	0
	Blank.	....	....	0	0	0	0	0	0	0	0	0	0	0	....	0	0

* Station opened September 1, 1875.

Statement showing how many times the wind was observed blowing, &c.—Continued.

Station.	Wind.	July, 1875.	August.	September.	October.	November.	December.	January, '76.	February.	March.	April.	May.	June.	Spring.	Summer.	Autumn.	Winter.
Fort Gibson, Ind. T.	N.	7	12	11	9	26	14	16	16	16	14	5	4	35	23	46	46
	N. W.	2	12	6	13	10	7	10	9	12	2	9	4	23	18	29	26
	W.	6	2	4	4	4	10	6	4	10	5	4	18	19	26	12	20
	S. W.	12	4	3	1	2	3	4	9	3	3	2	14	8	30	6	16
	S.	23	8	7	17	11	17	23	15	7	15	19	16	41	47	35	55
	S. E.	29	32	10	27	23	24	22	19	23	27	39	15	89	76	60	65
	E.	8	10	15	6	9	16	8	10	16	14	13	10	43	28	30	34
	N. E.	0	3	2	4	0	2	3	2	4	8	0	3	12	6	6	7
	Calm.	6	10	9	12	5	0	1	3	2	2	2	6	6	22	26	4
	Blank.	0	0	23	0	0	0	0	0	0	0	0	0	0	0	23	0
Fort Sully, Dak*	N.	9	17	19	18	4	11	13	16	17	....	10	20	....	46	41	40
	N. W.	10	14	22	24	32	26	20	25	20	...	23	35	....	59	78	71
	W.	15	11	2	8	9	7	20	4	1	...	5	3	....	29	19	31
	S. W.	0	1	2	0	3	3	2	0	2	....	1	0	....	1	5	5
	S.	7	2	5	5	6	4	7	5	4	....	18	8	....	17	16	16
	S. E.	26	26	25	17	13	20	11	10	22	....	24	18	...	70	55	41
	E.	13	9	4	16	13	12	11	15	11	...	3	0	....	22	33	38
	N. E.	2	2	1	1	3	2	7	10	6	....	6	2	....	6	5	19
	Calm.	11	11	10	3	7	8	2	2	10	....	3	4	....	26	20	12
	Blank.	0	0	0	1	0	0	0	0	0	....	0	0	...	0	1	0
Galveston, Tex	N.	0	3	14	11	12	8	12	12	17	8	7	7	32	10	37	32
	N. W.	2	4	8	2	6	13	4	6	9	1	2	5	12	11	16	23
	W.	4	6	1	0	0	4	2	1	1	2	1	2	4	12	1	7
	S. W.	12	15	1	10	12	12	0	3	4	6	2	3	12	30	23	15
	S.	38	19	8	14	22	13	4	9	4	20	13	14	37	71	44	26
	S. E.	32	33	14	9	8	21	30	22	37	37	61	49	135	114	31	73
	E.	3	7	20	28	13	12	21	24	16	9	4	4	29	14	61	57
	N. E.	1	4	23	19	17	8	20	10	5	7	3	5	15	10	59	38
	Calm.	1	2	1	0	0	2	0	0	0	0	0	1	0	4	1	2
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Haven, Mich.	N.	7	3	12	14	13	9	2	5	16	3	3	0	22	10	39	16
	N. W.	13	10	12	13	13	16	22	14	18	11	11	0	40	23	38	52
	W.	19	14	13	10	4	11	20	17	13	26	14	26	53	59	27	48
	S. W.	10	25	17	15	11	10	11	8	2	9	19	22	30	57	43	29
	S.	11	15	12	17	4	9	18	8	12	11	9	22	32	48	33	35
	S. E.	7	6	6	9	12	10	4	8	2	15	10	10	27	23	27	22
	E.	11	10	7	7	26	23	10	22	19	12	17	7	48	28	40	55
	N. E.	6	5	10	8	6	5	2	3	9	3	5	2	17	13	24	10
	Calm.	9	5	1	0	1	0	4	2	2	0	5	1	7	15	2	6
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Indianapolis, Ind	N.	10	8	7	5	17	4	1	2	9	8	7	3	24	21	29	7
	N. W.	5	6	11	17	14	12	16	16	15	16	8	6	39	17	42	44
	W.	7	10	14	21	6	20	15	20	20	16	8	10	44	27	41	55
	S. W.	19	9	13	14	7	9	17	9	4	9	11	24	24	52	34	35
	S.	17	13	15	19	11	15	21	16	1	5	20	17	26	45	45	52
	S. E.	5	10	3	10	12	14	11	19	19	16	11	20	46	35	25	44
	E.	4	7	8	3	8	11	3	1	14	4	7	2	25	13	19	15
	N. E.	8	7	6	2	14	4	1	2	8	10	9	0	27	15	22	7
	Calm.	20	23	13	2	1	4	8	2	3	6	12	8	21	51	16	14
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Indianola, Tex	N.	1	1	20	13	20	10	12	17	16	13	5	6	34	8	53	39
	N. W.	0	1	2	3	5	12	2	4	8	3	0	5	11	6	10	18
	W.	0	2	0	1	1	4	0	2	1	1	0	1	2	3	2	6
	S. W.	0	4	1	3	4	13	3	0	4	3	1	0	8	4	8	16
	S.	68	56	16	27	33	25	21	18	15	19	21	23	55	147	76	64
	S. E.	17	16	17	11	4	11	20	15	28	39	54	44	121	77	32	46
	E.	2	6	11	17	11	11	11	18	13	5	6	3	24	11	39	40
	N. E.	5	4	19	16	11	6	24	13	8	6	4	6	18	15	46	43
	Calm.	0	3	3	2	1	1	0	0	0	1	2	2	3	5	6	1
	Blank.	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Jacksonville, Fla	N.	1	4	8	15	17	7	20	12	7	6	1	2	14	7	40	39
	N. W.	0	1	3	15	12	8	9	12	10	9	7	3	26	4	30	29
	W.	4	4	2	4	3	19	7	5	6	11	2	4	19	12	9	31
	S. W.	18	16	11	14	15	12	7	7	16	9	8	12	33	46	40	26
	S.	20	27	13	5	17	17	13	12	7	9	6	18	22	65	35	42
	S. E.	26	16	5	2	1	3	11	6	10	18	16	18	44	60	8	20
	E.	17	6	12	4	3	7	3	4	9	8	11	17	28	40	19	14
	N. E.	1	12	26	27	16	8	11	16	16	17	40	15	73	28	69	35
	Calm.	6	7	10	7	6	12	12	13	12	3	2	1	17	14	23	37
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* Station closed during April, 1876.

Statement showing how many times the wind was observed blowing, &c.—Continued.

Station.	Wind.	July, 1875.	August.	September.	October.	November.	December.	January, '76.	February.	March.	April.	May.	June.	Spring.	Summer.	Autumn.	Winter.
Keokuk, Iowa	N.	4	5	11	13	19	9	10	10	13	7	4	10	24	19	43	29
	N. W.	5	17	10	16	14	20	21	23	23	16	11	14	50	36	40	64
	W.	3	8	6	11	2	12	9	8	2	13	11	13	26	24	19	29
	S. W.	22	9	14	14	5	8	20	4	0	5	11	13	16	44	33	32
	S.	6	15	16	17	10	8	16	18	10	8	17	15	35	36	43	42
	S. E.	7	11	5	7	18	13	5	14	17	18	11	4	46	22	30	32
	E.	9	5	5	1	3	11	5	5	12	10	8	4	30	18	9	21
	N. E.	13	7	9	3	10	3	3	3	9	10	14	14	33	34	22	9
	Calm.	24	16	14	11	9	9	4	2	7	3	6	3	16	43	34	15
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Key West, Fla.	N.	1	0	0	16	5	6	3	8	7	11	5	5	23	6	21	17
	N. W.	1	3	2	13	0	11	0	3	7	2	3	7	12	11	15	14
	W.	1	1	1	2	1	2	1	2	6	4	1	2	11	4	4	5
	S. W.	4	4	3	2	4	8	1	3	2	3	5	5	10	13	9	12
	S.	1	8	7	1	7	3	15	3	9	4	7	7	20	16	15	21
	S. E.	22	28	29	2	13	10	13	15	18	28	17	27	63	77	44	38
	E.	61	37	27	27	32	33	33	32	30	17	46	24	93	122	86	98
	N. E.	1	11	19	27	20	16	27	14	11	13	7	5	31	17	66	57
	Calm.	1	1	2	3	8	4	0	7	3	8	2	8	13	10	13	11
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kitty-hawk, N. C	N.	1	6	4	8	7	17	12	16	15	12	3	3	30	10	19	45
	N. W.	10	8	5	9	9	12	14	16	13	4	2	5	19	23	23	42
	W.	28	10	13	15	9	21	22	7	8	6	4	14	18	52	37	50
	S. W.	22	29	7	20	12	13	25	16	17	17	22	23	56	74	39	54
	S.	5	9	4	6	8	4	3	1	3	6	13	14	22	28	18	8
	S. E.	8	5	8	2	7	2	2	7	13	7	8	16	28	29	17	11
	E.	8	4	9	8	13	10	3	9	11	11	14	8	36	20	30	22
	N. E	8	14	38	21	24	12	12	10	10	24	22	5	56	27	83	34
	Calm.	3	8	2	4	1	2	0	5	3	3	5	2	11	13	7	7
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Knoxville, Tenn	N.	3	2	13	2	7	5	14	8	3	6	4	5	13	10	22	27
	N. W.	7	3	6	6	4	3	7	6	12	4	5	3	21	13	16	16
	W.	5	6	1	5	5	9	4	9	12	5	4	4	21	15	11	22
	S. W.	44	15	18	23	19	38	37	33	19	27	39	35	85	94	60	108
	S.	3	4	2	0	0	2	4	1	6	0	4	5	10	12	2	7
	S. E.	3	0	1	0	2	1	2	1	0	2	3	2	5	5	3	4
	E.	3	5	1	9	4	4	4	6	5	0	6	9	11	17	14	14
	N. E.	5	7	22	6	26	12	10	15	18	7	22	17	47	29	54	37
	Calm.	20	51	26	42	23	19	11	8	18	39	6	10	63	81	91	38
	Blank.	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0
La Crosse, Wis	N.	13	14	21	22	1	2	11	14	24	13	14	12	51	39	44	27
	N. W.	8	9	4	12	6	3	18	18	14	15	7	12	36	29	22	39
	W.	19	13	10	10	19	12	14	14	12	12	9	13	33	45	39	40
	S. W.	13	1	5	9	9	19	8	1	4	11	10	14	25	28	23	28
	S.	18	36	30	25	6	6	26	24	14	15	28	27	57	81	61	56
	S. E.	10	8	9	4	4	3	2	5	6	10	9	7	25	25	17	10
	E.	2	2	3	1	34	36	3	6	7	7	5	2	19	6	38	45
	N. E.	6	6	5	7	5	3	5	2	11	5	9	2	25	14	17	10
	Calm.	4	4	3	3	6	9	6	3	1	2	2	1	5	9	12	18
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leavenworth, Kans	N.	9	12	13	12	26	13	12	11	15	14	7	14	36	35	51	36
	N. W.	3	11	8	24	7	15	19	22	29	17	6	13	52	27	39	56
	W.	1	0	1	1	0	2	3	4	0	5	5	3	10	4	2	9
	S. W.	12	4	4	4	3	4	8	4	1	10	7	12	18	28	11	16
	S.	22	20	34	30	23	25	32	32	17	19	30	25	66	67	87	89
	S. E.	10	11	7	7	7	11	4	5	15	6	14	4	35	25	21	20
	E.	5	2	3	1	2	2	5	2	8	8	6	2	22	9	6	9
	N. E.	14	2	6	3	12	2	2	5	7	6	11	4	24	20	21	9
	Calm.	17	31	14	11	10	19	8	2	1	5	7	13	13	61	35	29
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lexington, Ky	N.	6	6	9	10	13	1	2	1	6	10	11	3	27	15	32	4
	N. W.	2	5	12	11	11	4	8	10	5	6	2	5	13	12	34	22
	W.	9	16	9	13	8	20	19	17	23	17	7	7	47	32	30	56
	S. W.	38	11	14	17	8	18	8	13	13	12	14	20	39	69	39	39
	S.	21	17	19	30	19	24	41	27	12	24	30	32	66	70	68	92
	S. E.	9	12	10	7	6	11	10	11	15	6	15	15	36	36	23	32
	E.	1	8	2	2	10	9	4	5	9	5	6	4	20	13	14	18
	N. E.	5	10	14	3	14	4	1	3	9	10	8	1	27	16	31	8
	Calm	2	8	1	0	1	2	0	0	1	0	0	3	1	13	2	2
	Blank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Statement showing how many times the wind was observed blowing, &c.—Continued.

Station.	Wind.	July, 1875.	August.	September.	October.	November.	December.	January, '76.	February.	March.	April.	May.	June.	Spring.	Summer.	Autumn.	Winter.
Louisville, Ky	N.	7	5	11	2	14	3	3	3	4	6	8	5	18	17	27	9
	N. W.	7	11	13	11	20	2	13	6	4	9	5	3	18	21	44	21
	W.	7	11	10	14	9	9	9	19	25	13	10	8	48	26	33	37
	S. W.	9	11	4	10	4	19	12	7	10	15	14	15	39	35	18	38
	S	19	7	11	18	9	16	34	28	18	18	33	33	69	59	38	78
	S. E.	9	7	15	20	17	23	16	5	10	8	4	12	22	28	52	44
	E.	3	1	2	1	2	5	1	4	9	1	2	3	12	7	5	10
	N. E.	1	4	4	2	7	7	1	2	7	12	12	1	31	6	13	10
	Calm.	31	36	20	15	8	9	4	13	6	8	5	10	19	77	43	26
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Branch, N. J.	N.	8	4	7	6	7	5	1	3	4	1	4	3	9	15	20	9
	N. W.	25	7	21	23	34	29	27	36	29	39	12	10	70	42	78	92
	W.	4	5	3	10	7	14	16	9	20	6	8	12	34	21	20	39
	S. W.	21	24	28	28	18	18	31	10	5	10	11	15	26	60	74	59
	S.	19	16	4	7	4	2	8	11	13	14	24	25	61	60	15	21
	S. E	8	9	10	7	3	1	1	6	16	12	20	19	48	36	20	8
	E.	3	5	3	7	3	4	5	2	3	4	2	0	9	8	13	11
	N. E.	4	19	12	5	10	17	3	8	3	4	11	3	18	26	27	28
	Calm.	1	4	2	0	4	3	1	2	0	0	1	3	1	8	6	6
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lynchburgh, Va.	N.	1	9	3	3	3	1	5	2	1	1	5	1	7	11	9	8
	N. W.	6	4	9	12	14	10	13	18	17	14	9	11	40	21	35	41
	W.	9	4	8	15	6	11	16	15	18	15	11	14	41	27	29	42
	S. W.	20	8	9	9	13	15	25	12	5	12	6	13	23	41	31	52
	S.	11	13	10	17	11	11	11	12	13	15	22	18	50	42	38	34
	S. E.	3	4	1	3	2	1	1	2	1	9	9	8	19	15	6	4
	E.	4	4	7	2	4	8	1	5	5	2	6	6	13	14	13	14
	N. E.	8	15	11	5	19	13	2	2	17	10	12	0	39	23	35	17
	Calm.	31	32	32	27	18	23	19	19	16	12	13	19	41	82	77	61
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malone, N. Y.*	N.	...	...	8	3	1	7	4	5	2	5	4	6	11	...	12	16
	N. W.	...	...	13	7	17	9	14	9	11	18	21	5	50	..	37	32
	W.	..	...	15	18	15	18	20	21	28	12	8	15	48	..	48	59
	S. W.	..	...	23	25	17	21	27	18	18	20	27	26	65	...	65	66
	S.	..	...	12	13	10	8	8	10	8	12	11	20	31	...	35	26
	S. E.	...	...	8	10	2	9	2	0	4	7	5	4	16	...	20	11
	E.	...	..	0	0	0	0	1	2	2	1	1	1	4	...	0	3
	N. E.	.	...	7	8	8	12	5	13	12	9	11	10	32	...	23	20
	Calm.	..	..	4	9	20	9	12	9	8	6	5	3	19	..	33	30
	Blank.	..	...	0	0	0	0	0	0	0	0	0	0	0	...	0	0
Manhattan, Kans.†	N.	..	...	...	..	..	..	0	3	1	8	4	3	13	...	...	...
	N. W.	..	...	...	..	...	...	23	35	42	12	11	13	65	...	...	...
	W.	...	...	...	..	...	...	9	0	0	6	3	0	9	...	...	...
	S. W.	...	...	..	...	...	...	33	36	22	41	41	3	104	...	...	...
	S.	...	...	...	..	...	...	9	1	3	13	7	17	23	...	...	...
	S. E.	...	...	...	...	...	...	7	4	9	2	5	3	16	...	...	...
	E.	...	...	...	...	...	...	0	0	4	1	1	0	6	...	...	...
	N. E.	..	...	..	...	...	...	6	5	9	7	7	2	23	..	...	...
	Calm.	..	...	...	..	...	...	6	3	3	0	2	5	5	...	...	...
	Blank.	...	...	...	...	...	...	0	0	0	0	12	44	12	..	...	...
Marquette, Mich.	N.	7	6	10	12	0	8	0	5	8	7	5	3	20	16	22	13
	N. W.	25	21	17	21	5	9	18	12	37	19	26	14	82	60	43	39
	W.	11	10	11	15	39	21	30	27	10	22	7	7	39	28	65	78
	S. W.	12	8	9	7	1	10	9	5	1	4	5	5	10	25	17	24
	S.	6	15	12	14	15	15	13	5	5	2	5	8	12	29	41	33
	S. E.	4	15	7	5	18	13	8	8	7	7	6	12	20	31	30	29
	E.	11	5	7	8	0	3	4	11	10	9	11	14	30	30	15	18
	N. E.	6	6	8	3	1	0	1	8	10	10	8	8	28	20	12	9
	Calm.	11	7	9	8	11	14	10	6	5	10	20	19	35	37	28	30
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Memphis, Tenn.	N.	0	6	12	3	12	3	4	3	10	6	5	2	21	8	27	10
	N. W.	8	22	16	18	10	17	14	16	13	15	11	7	39	37	44	47
	W.	5	4	5	3	3	8	4	4	14	4	6	8	24	17	11	16
	S. W.	43	9	10	15	10	16	17	10	3	19	19	30	41	82	35	43
	S.	16	5	6	14	14	12	16	18	13	11	14	21	38	42	34	46
	S. E.	3	14	2	8	8	21	12	9	15	14	8	11	37	28	18	42
	E.	1	1	3	2	0	4	4	2	10	5	5	0	20	2	5	10
	N. E.	6	14	22	13	29	8	7	6	5	15	10	6	30	26	64	21
	Calm.	11	18	14	17	4	4	15	19	10	1	15	5	26	34	35	38
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* Station opened August 14, 1875.

† Station opened January 1, 1876.

Statement showing how many times the wind was observed blowing, &c.—Continued.

Station.	Wind.	July, 1875.	August.	September.	October.	November	December.	January, '76.	February.	March.	April.	May.	June.	Spring.	Summer.	Autumn.	Winter.
Milwaukee, Wis.	N.	6	6	5	8	6	5	4	3	12	4	6	5	22	17	19	12
	N. W.	2	11	16	23	22	18	21	25	23	18	7	3	48	16	61	64
	W.	15	20	16	13	12	20	22	17	10	17	14	24	41	59	41	59
	S. W.	7	11	18	27	13	16	26	14	5	7	11	16	23	34	58	56
	S.	4	4	3	2	8	4	7	4	5	4	3	3	12	11	13	15
	S. E.	18	19	10	5	18	19	7	8	9	17	18	21	44	58	33	34
	E.	19	5	8	6	5	5	2	6	15	6	15	6	36	30	19	13
	N. E.	18	15	13	9	5	6	4	7	12	17	18	12	47	45	27	17
	Calm.	4	2	1	0	1	0	0	3	2	0	1	0	3	6	2	3
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mobile, Ala	N.	1	11	24	57	23	12	32	33	16	20	12	15	48	27	104	77
	N. W.	1	10	2	5	3	10	0	2	15	8	5	5	28	16	10	12
	W.	7	7	2	0	0	2	0	2	3	1	1	8	5	22	2	4
	S. W.	18	20	6	0	11	3	0	4	3	5	6	13	14	51	17	7
	S.	33	19	17	15	26	32	32	19	19	39	42	35	100	87	58	83
	S. E.	9	7	14	2	4	9	4	2	12	4	14	7	30	23	20	15
	E.	2	4	3	1	7	7	2	3	4	2	3	4	9	10	11	12
	N. E.	4	4	15	5	11	2	6	5	6	6	9	3	21	11	31	13
	Calm.	18	11	7	8	5	16	17	17	15	5	1	0	21	29	20	50
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Montgomery, Ala	N.	4	1	5	14	11	3	24	17	13	11	4	10	28	15	30	44
	N. W.	4	7	13	17	6	15	6	12	10	7	9	8	26	19	36	33
	W.	17	11	3	4	4	16	4	11	13	11	10	14	34	42	11	31
	S. W.	25	12	8	3	5	5	7	4	9	16	12	11	37	48	16	16
	S.	21	10	7	3	14	19	21	17	12	17	11	10	40	41	24	57
	S. E.	9	4	4	2	7	15	15	9	19	7	21	17	47	30	13	39
	E.	4	14	17	8	17	12	10	8	6	9	10	7	25	25	42	30
	N. E.	4	3	15	4	7	0	3	5	6	8	10	5	24	12	26	8
	Calm.	5	31	18	38	19	8	3	4	5	4	6	8	15	44	75	15
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Morgantown, W. Va.	N.	10	6	7	7	17	6	5	2	9	10	7	3	26	19	31	13
	N. W.	5	2	8	6	11	6	8	8	8	8	11	1	27	8	25	22
	W.	10	8	6	18	6	13	10	18	11	16	8	7	35	25	30	41
	S. W.	19	9	14	15	13	25	25	24	25	22	14	22	61	50	42	74
	S.	23	14	17	18	17	15	25	15	9	11	14	20	34	57	52	55
	S. E.	2	7	3	2	4	4	5	2	11	2	4	4	17	13	9	11
	E.	3	5	0	0	1	1	0	1	3	1	2	1	6	9	1	2
	N. E.	4	5	4	0	11	10	2	0	3	7	3	1	13	10	15	12
	Calm.	17	37	31	27	10	13	13	17	14	13	30	31	57	85	68	43
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mt. Washington, N.H	N.	7	4	4	6	6	19	20	11	10	12	6	7	28	18	16	50
	N. W.	61	35	70	59	58	54	55	54	51	43	64	41	158	137	187	163
	W.	10	19	4	10	5	9	9	8	4	7	9	10	20	39	19	26
	S. W.	9	14	8	6	7	5	6	4	13	6	6	14	25	39	21	15
	S.	1	7	1	9	0	0	0	0	0	1	0	6	1	14	10	0
	S. E.	1	2	2	2	5	1	1	2	8	6	1	4	15	7	9	4
	E.	0	1	0	0	1	1	1	0	0	2	0	1	2	2	1	2
	E. E.	2	6	0	0	6	3	0	4	3	9	1	1	13	9	6	7
	Calm.	2	5	1	1	2	1	1	4	4	4	6	6	14	13	4	6
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nashville, Tenn	N.	3	2	17	13	20	1	7	8	3	7	9	2	19	7	50	16
	N. W.	9	19	17	15	11	12	16	16	14	13	11	8	38	36	43	44
	W.	14	14	5	8	4	16	6	8	16	7	6	9	20	37	17	30
	S. W.	25	4	4	12	4	11	8	5	3	7	9	9	19	38	20	24
	S.	10	4	6	13	15	18	20	18	10	14	16	19	40	33	34	56
	S. E.	10	6	7	5	13	22	16	11	13	11	16	13	40	29	25	49
	E.	3	6	2	4	8	3	0	9	15	2	1	12	18	21	14	12
	N. E.	4	5	8	5	7	5	6	0	8	11	7	3	26	12	20	11
	Calm.	15	33	24	18	8	5	14	12	11	18	18	15	47	63	50	31
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Haven, Conn.	N.	16	5	11	16	20	18	14	16	13	20	12	4	45	25	47	48
	N. W.	18	0	20	11	21	9	16	27	29	22	14	14	65	32	52	52
	W.	7	3	9	14	8	18	12	10	9	3	4	5	16	15	31	40
	S. W.	13	15	22	16	12	10	21	7	10	12	14	11	36	39	50	38
	S.	27	30	11	9	1	4	12	12	12	10	23	31	45	82	21	28
	S. E.	4	6	2	3	1	1	2	5	4	5	11	13	20	23	6	8
	E.	0	8	0	4	1	3	1	0	9	3	1	3	13	11	5	4
	N. E.	4	17	13	15	21	18	6	5	5	10	10	3	25	24	49	29
	Calm.	4	9	2	5	5	12	9	5	2	5	4	6	11	19	12	26
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Statement showing how many times the wind was observed blowing, &c.—Continued.

Station.	Wind.	July, 1875.	August.	September.	October.	November.	December.	January, '76.	February.	March.	April.	May.	June.	Spring.	Summer.	Autumn.	Winter.
New London, Conn	N.	6	12	17	16	26	20	6	16	9	9	12	6	30	24	59	42
	N. W.	12	2	17	19	34	23	29	30	23	23	11	8	57	22	70	82
	W.	13	5	10	16	4	24	17	11	20	10	11	9	41	27	30	52
	S. W.	19	16	17	16	11	10	21	8	16	20	22	12	58	47	44	39
	S.	12	24	9	4	3	1	7	9	2	3	14	25	19	61	16	17
	S. E.	12	9	5	4	2	1	6	4	6	8	11	11	25	32	11	11
	E.	0	10	3	5	5	4	1	2	9	3	1	4	13	14	13	7
	N. E.	3	10	6	7	3	5	5	3	4	6	4	1	14	14	16	13
	Calm.	16	5	6	6	2	5	1	4	4	8	7	14	19	35	14	10
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Orleans, La	N.	2	7	10	24	12	11	25	13	13	14	8	6	35	15	46	49
	N. W.	5	11	12	13	8	8	2	8	15	5	3	6	23	22	33	18
	W.	11	13	4	4	2	7	5	2	3	11	3	12	17	36	10	14
	S. W.	12	15	6	7	15	15	5	9	7	14	8	8	29	35	22	29
	S.	18	7	6	8	13	14	18	12	13	14	19	13	46	38	27	44
	S. E.	29	13	12	1	9	16	7	14	25	17	32	25	74	67	22	37
	E.	13	16	18	12	16	17	19	16	13	10	10	11	33	40	46	52
	N. E.	3	4	19	18	11	3	12	12	3	2	7	7	12	14	48	27
	Calm.	0	7	3	6	4	2	0	1	1	3	3	2	7	9	13	3
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Newport, R. I.*	N.	....	7	10	14	15	13	5	10	7	7	7	6	21	....	39	28
	N. W.	....	3	6	10	23	19	15	17	16	17	5	3	38	....	39	51
	W.	....	2	15	14	17	21	27	28	27	14	11	5	52	....	46	76
	S. W.	....	33	24	18	12	18	20	10	15	19	26	17	60	...	54	48
	S.	....	15	8	12	3	0	12	6	8	11	19	24	38	...	23	18
	S. E.	....	7	6	6	4	2	3	4	6	6	14	14	26	...	16	9
	E.	....	8	5	6	4	6	4	2	5	8	5	3	18	...	15	12
	N. E.	....	14	5	8	7	6	4	4	6	5	3	1	14	....	20	14
	Calm.	....	4	11	5	5	8	3	6	3	3	3	17	9	....	21	17
	Blank.	..	0	0	0	0	0	0	0	0	0	0	0	0	...	0	0
New York, N. Y	N.	5	5	4	1	5	5	2	3	2	1	3	0	6	10	10	10
	N. W	18	6	13	20	27	16	18	26	38	32	15	7	85	31	60	60
	W.	8	7	18	17	16	15	22	14	10	11	8	13	29	28	51	51
	S. W.	22	15	24	22	14	18	25	13	15	10	21	18	46	55	60	56
	S.	18	26	6	12	3	3	8	6	5	8	14	15	27	59	21	17
	S. E.	12	7	6	2	2	2	9	5	5	4	15	23	24	42	10	16
	E.	4	9	7	9	11	2	0	3	5	3	4	7	12	20	27	5
	N. E.	6	15	5	8	9	24	7	14	13	11	13	6	37	27	22	45
	Calm.	0	3	7	2	3	8	2	3	0	10	0	1	10	4	12	13
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Norfolk, Va	N.	2	3	18	15	13	6	11	15	18	18	6	3	42	8	46	32
	N. W.	9	11	10	8	6	16	9	5	16	3	3	11	22	31	24	30
	W.	9	3	8	8	3	4	6	6	7	4	0	6	11	18	19	16
	S. W.	33	35	10	17	17	26	33	17	7	20	22	16	49	84	44	76
	S.	8	11	11	17	11	8	15	9	14	12	25	31	51	50	39	34
	S. E.	19	11	2	8	3	7	5	9	15	10	8	14	33	44	13	21
	E.	6	2	9	3	7	6	0	6	8	9	12	2	29	10	19	12
	N. E.	6	17	21	12	26	18	12	17	5	13	15	7	33	30	59	47
	Calm.	1	0	1	5	4	2	2	3	3	1	2	0	6	1	10	7
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Platte, Nebr	N.	2	5	9	6	13	4	3	8	16	11	10	20	37	27	28	15
	N. W.	7	5	3	24	9	25	6	18	10	12	8	15	30	27	36	49
	W.	2	2	7	8	3	13	19	13	4	10	5	7	19	11	18	45
	S. W.	8	1	4	7	8	8	21	10	2	8	8	4	18	13	19	39
	S.	7	3	5	4	6	2	6	7	4	8	9	7	21	17	15	15
	S. E.	14	25	14	15	17	12	6	13	24	16	30	14	70	53	46	31
	E.	2	7	10	0	0	0	0	6	2	4	3	3	9	12	10	6
	N. E.	16	17	12	8	12	6	8	1	17	9	13	6	39	39	32	15
	Calm.	35	28	26	19	22	23	24	11	14	12	7	14	33	77	67	58
	Blank.	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0
Omaha, Nebr	N.	16	18	15	20	27	11	16	19	22	15	14	22	51	56	62	46
	N. W.	9	10	13	20	13	26	21	27	26	8	8	15	42	34	46	74
	W.	2	3	3	1	5	4	5	9	0	7	3	3	10	8	9	18
	S. W.	9	8	9	10	2	10	12	6	2	9	7	5	18	22	21	28
	S.	11	23	26	28	23	13	26	13	11	14	29	23	54	57	77	52
	S. E.	17	14	13	4	10	12	3	5	15	14	10	9	39	40	27	20
	E.	2	7	4	1	5	3	2	6	4	7	7	0	18	9	10	11
	N. E.	8	3	2	5	0	1	4	1	6	8	11	4	25	15	7	6
	Calm	19	7	5	4	5	13	4	1	7	8	4	9	19	35	14	18
	Blank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Station opened August 1, 1875.

Statement showing how many times the wind was observed blowing, &c.—Continued.

Station.	Wind.	July, 1875.	August.	September.	October.	November.	December.	January, '76.	February.	March.	April.	May.	June.	Spring.	Summer.	Autumn.	Winter.
Oswego, N. Y.	N.	22	20	12	16	16	9	4	4	11	5	10	3	26	45	44	17
	N. W.	9	8	15	8	18	17	28	22	16	15	11	10	42	27	41	67
	W.	28	13	23	27	5	6	16	12	17	34	23	20	74	61	55	34
	S. W.	4	3	4	5	4	7	6	8	15	11	12	19	38	26	13	21
	S.	24	27	24	28	21	21	9	2	1	4	9	5	14	56	73	32
	S. E.	0	6	4	2	12	22	28	24	27	15	17	28	59	34	18	74
	E.	1	4	3	6	8	10	1	5	2	3	0	1	5	6	17	16
	N. E.	0	0	1	1	5	1	1	9	2	3	4	3	9	3	7	11
	Calm.	5	12	4	0	1	0	0	1	2	0	7	1	9	18	5	1
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rock's Beach, N. J.*	N.	5	1	11	11	11	7	9	....	....	....	....	....	....	....	33	....
	N. W.	10	0	9	16	21	21	27	....	....	....	....	....	....	....	46	....
	W.	8	8	16	21	12	13	16	....	....	....	....	....	....	....	49	....
	S. W.	9	11	16	15	10	12	21	....	....	....	....	....	....	....	41	....
	S.	18	31	9	11	6	2	8	....	....	....	....	....	....	....	26	....
	S. E.	15	4	4	6	8	2	1	....	....	....	....	....	....	....	18	....
	E.	12	14	9	6	7	7	4	....	....	....	....	....	....	....	22	....
	N. E.	11	19	15	6	13	24	5	....	....	....	....	....	....	....	34	....
	Calm.	5	5	1	1	2	5	2	....	....	....	....	....	....	....	4	....
	Blank.	0	0	0	0	0	0	0	....	....	....	....	....	....	....	0	....
Pembina, Dak.	N.	14	13	13	13	4	2	4	4	10	0	11	12	21	39	30	10
	N. W.	16	18	14	20	25	30	32	37	41	30	15	21	86	55	59	99
	W.	8	5	12	8	9	6	10	9	3	13	7	7	23	20	29	25
	S. W.	11	7	5	3	0	5	6	2	1	9	4	8	14	26	8	13
	S.	18	9	11	13	11	7	14	7	11	11	9	7	31	34	35	28
	S. E.	10	19	9	11	19	27	12	11	9	15	13	12	37	41	39	50
	E.	2	4	5	3	5	2	2	4	2	4	7	1	13	7	13	8
	N. E.	5	6	6	7	3	0	2	5	5	2	9	12	16	23	16	7
	Calm.	9	12	15	15	14	14	11	8	11	6	18	10	35	31	44	33
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Philadelphia, Pa.	N.	11	2	10	13	15	7	6	5	15	20	8	5	43	18	38	18
	N. W.	12	5	14	18	17	23	21	27	28	21	9	16	58	33	49	71
	W.	17	12	18	17	11	17	17	8	14	14	22	20	59	49	46	42
	S. W.	16	27	14	19	14	10	32	11	11	12	23	26	46	69	47	53
	S.	16	12	5	6	2	1	0	5	5	6	8	15	19	43	13	6
	S. E.	6	3	3	2	3	0	2	2	7	2	5	3	14	12	8	4
	E.	6	20	9	11	14	23	6	16	10	7	14	3	31	29	34	45
	N. E.	9	11	17	6	14	12	9	13	3	8	4	0	15	20	37	34
	Calm.	0	1	0	1	0	0	0	0	0	0	0	2	0	3	1	0
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pike's Peak, Colo.	N.	22	26	10	17	10	18	7	11	8	3	7	15	18	63	37	36
	N. W.	17	21	15	19	17	25	10	16	17	27	15	22	59	60	51	51
	W.	22	7	15	31	25	21	34	26	26	19	27	22	72	51	71	81
	S. W.	12	23	19	12	27	7	33	29	29	37	24	16	90	51	58	69
	S.	3	0	2	0	6	0	1	0	0	1	2	3	3	6	8	1
	S. E.	2	1	1	1	1	0	1	0	1	1	2	2	4	5	3	1
	E.	0	1	0	1	0	0	0	0	0	0	2	1	2	2	1	0
	N. E.	14	14	21	9	3	17	4	3	12	2	14	7	28	35	33	24
	Calm.	1	0	7	3	1	5	3	2	0	0	0	2	0	3	11	10
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pittsburgh, Pa.	N.	14	4	11	7	12	6	2	3	6	15	15	3	36	21	30	11
	N. W.	16	13	12	22	19	18	23	20	27	20	15	13	62	42	53	61
	W.	10	8	16	12	9	17	18	23	16	18	10	14	44	32	37	58
	S. W.	12	11	11	19	9	13	26	8	5	8	10	23	23	46	39	47
	S.	15	13	11	11	4	10	11	7	8	6	10	24	24	52	26	28
	S. E.	1	5	2	4	6	1	3	4	9	3	7	5	19	11	12	8
	E.	5	13	5	4	10	9	3	7	12	6	8	3	26	21	19	19
	N. E.	10	12	9	4	17	8	3	9	6	9	6	2	21	24	30	20
	Calm.	10	14	13	10	4	11	4	6	4	5	12	3	21	27	27	21
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Port Huron, Mich.	N.	13	10	10	5	4	2	3	2	13	17	16	8	46	31	19	7
	N. W.	5	3	13	13	14	15	6	10	13	8	2	2	23	10	40	31
	W.	5	10	10	18	16	13	30	24	15	13	10	14	38	29	44	67
	S. W.	9	13	15	15	9	14	13	9	8	10	9	11	27	33	39	36
	S.	23	27	20	26	13	18	26	16	15	12	20	27	47	77	59	60
	S. E.	5	7	4	8	9	9	7	12	6	8	6	7	20	19	21	22
	E.	2	8	4	2	9	10	1	5	12	2	7	4	21	14	15	16
	N. E.	20	12	8	6	13	8	3	7	10	16	19	13	45	45	27	18
	Calm.	11	3	6	0	3	4	4	2	1	4	4	4	9	12	9	10
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* Station discontinued February 26, 1876.

Statement showing how many times the wind was observed blowing, &c.—Continued.

Station.	Wind.	July, 1875.	August.	September.	October.	November.	December.	January, '76.	February.	March.	April.	May.	June.	Spring.	Summer.	Autumn.	Winter.
Portland, Me	N.	2	5	7	12	21	13	14	16	14	10	11	2	35	9	40	43
	N. W.	17	2	12	11	21	25	19	17	16	17	15	4	48	23	44	61
	W.	12	5	14	10	12	18	18	23	12	13	3	7	28	24	36	59
	S. W.	17	21	19	19	8	19	19	10	14	6	8	12	28	50	46	48
	S.	18	19	14	6	4	0	3	5	7	8	9	24	24	61	24	8
	S. E.	5	8	4	9	5	1	5	2	9	7	13	13	29	26	18	8
	E.	4	8	3	5	2	0	1	1	7	5	7	9	19	21	10	2
	N. E.	9	2	5	13	11	13	5	8	3	14	9	3	26	14	29	26
	Calm.	9	23	12	8	6	4	9	5	11	10	18	16	39	48	26	18
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portland, Oreg	N.	40	25	28	13	7	7	6	6	4	12	20	26	36	91	48	19
	N. W.	26	16	13	10	2	7	4	2	7	3	11	10	21	52	25	13
	W.	0	2	2	3	4	1	3	6	2	1	1	1	4	3	9	10
	S. W.	1	5	2	9	9	18	12	10	6	13	6	5	25	11	20	40
	S.	6	14	10	27	33	35	19	32	27	23	20	21	70	41	70	86
	S. E.	2	2	2	2	6	5	11	3	6	4	0	1	10	5	10	19
	E.	3	3	1	0	2	2	15	2	1	0	1	1	2	7	3	19
	N. E.	2	1	4	0	2	0	5	0	4	2	0	1	6	4	6	5
	Calm.	13	25	28	29	25	18	18	26	36	32	34	24	102	62	82	62
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Punta Rassa, Fla	N.	1	4	3	26	8	7	14	8	6	5	8	4	19	9	37	29
	N. W.	1	2	3	9	5	10	6	9	12	12	8	3	32	6	17	25
	W.	8	3	4	8	4	10	1	5	10	18	5	9	33	20	16	16
	S. W.	9	12	6	4	13	5	1	2	10	6	6	9	22	30	23	8
	S.	13	12	18	3	17	13	8	12	13	13	9	11	35	36	38	33
	S. E.	10	10	8	1	8	8	10	7	12	6	3	9	21	29	17	25
	E.	27	35	20	10	9	17	17	15	16	14	29	31	59	92	39	49
	N. E.	23	13	28	31	23	21	34	28	13	15	25	11	53	47	82	83
	Calm.	1	2	0	1	3	2	2	1	1	1	0	3	2	6	4	5
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rochester, N. Y	N.	13	6	7	5	2	2	2	2	3	0	6	5	9	24	14	6
	N. W.	5	6	9	3	12	6	11	6	14	20	13	7	47	18	24	23
	W.	29	16	25	35	28	10	37	35	32	34	29	33	95	78	88	82
	S. W.	15	22	17	22	11	24	12	7	12	6	10	17	28	54	50	43
	S.	15	12	12	7	9	16	12	10	5	11	8	9	24	36	28	38
	S. E.	5	12	7	11	11	15	13	11	11	7	9	12	27	29	29	39
	E.	4	12	8	7	7	12	4	10	9	5	9	2	23	18	22	26
	N. E.	6	6	5	3	9	6	1	6	4	3	6	5	13	17	17	13
	Calm.	1	1	0	0	1	2	1	0	3	4	3	0	10	2	1	3
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salt Lake City, Utah	N.	24	17	12	16	17	11	9	10	23	20	8	13	51	54	45	30
	N. W.	14	16	15	19	12	10	15	9	11	13	19	9	43	39	46	34
	W.	2	2	3	0	1	4	2	4	3	1	2	2	6	6	4	10
	S. W.	8	6	7	5	11	13	11	9	11	7	10	1	28	15	23	33
	S.	7	12	12	9	11	3	24	7	11	6	5	2	22	21	32	34
	S. E.	12	4	9	14	9	2	6	8	6	6	11	4	23	20	32	16
	E.	6	4	7	8	11	7	5	4	3	12	2	19	17	29	26	16
	N. E.	16	27	18	12	6	1	3	6	4	8	9	19	21	62	36	10
	Calm.	4	5	7	10	12	42	18	30	13	17	27	21	57	30	29	90
	Blank.	0	0	0	0	0	0	0	0	8	0	0	0	8	0	0	0
Sandy Hook, N. J	N.	12	5	5	10	9	13	2	6	7	6	2	2	15	19	24	21
	N. W.	17	2	17	15	21	15	20	22	29	30	14	9	73	28	53	57
	W.	13	10	19	22	20	26	32	20	20	13	10	15	43	38	61	78
	S. W.	12	13	13	12	7	7	13	5	5	10	13	12	28	37	32	25
	S.	16	17	9	11	6	2	8	8	10	5	16	18	31	51	26	18
	S. E.	18	17	11	8	7	1	4	9	12	17	22	29	51	64	26	14
	E.	0	6	4	3	4	7	6	6	4	4	2	2	10	8	11	19
	N. E.	4	23	11	9	15	21	6	10	6	5	12	3	23	30	35	37
	Calm.	1	0	1	3	1	1	2	1	0	0	2	0	2	1	5	4
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Diego, Cal	N.	10	8	8	20	10	16	13	16	12	12	8	11	32	29	38	45
	N. W.	24	10	19	17	20	24	17	15	18	25	12	14	55	48	56	56
	W.	21	27	17	12	14	3	8	3	18	16	15	19	49	67	43	14
	S. W.	13	16	6	11	6	4	1	8	5	8	12	13	25	42	23	13
	S.	11	5	4	2	4	5	9	9	8	2	26	13	36	29	10	23
	S. E.	0	3	2	2	4	3	4	3	1	1	3	2	5	5	8	10
	E.	0	0	1	1	4	7	20	11	8	2	1	0	11	0	6	38
	N. E.	1	3	5	9	11	18	11	12	10	9	2	1	21	5	25	41
	Calm.	13	21	28	19	17	13	10	10	13	15	14	17	42	51	64	33
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Statement showing how many times the wind was observed blowing, &c.—Continued.

Station.	Wind.	July, 1875.	August.	September.	October.	November.	December.	January, '76.	February.	March.	April.	May.	June.	Spring.	Summer.	Autumn.	Winter.
San Francisco, Cal	N.	0	0	0	0	10	32	16	8	4	5	2	0	11	0	10	56
	N. W.	0	0	1	4	5	20	14	21	23	11	7	5	41	5	10	55
	W.	22	20	22	29	15	17	12	16	24	42	46	47	112	89	66	45
	S. W.	70	69	56	45	25	4	6	17	14	13	21	26	48	165	126	27
	S.	0	0	6	2	7	9	15	2	13	11	4	2	28	2	15	26
	S. E.	0	0	0	1	12	5	18	13	10	2	4	6	16	6	13	36
	E.	0	0	0	0	3	1	3	0	0	1	4	1	5	1	3	4
	N. E.	0	0	0	0	2	2	6	5	1	0	0	1	1	1	2	13
	Calm.	1	4	5	12	11	3	3	5	4	5	5	2	14	7	28	11
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santa Fé, N. Mex	N.	17	6	13	9	9	25	13	14	9	9	6	4	24	27	31	52
	N. W.	6	10	7	12	15	19	16	16	17	18	10	8	45	24	34	51
	W.	5	3	4	4	8	2	7	7	5	7	5	5	17	13	16	16
	S. W.	14	16	17	15	17	4	11	11	18	17	20	19	55	49	49	26
	S.	13	12	9	7	8	6	5	6	6	3	8	5	17	30	24	17
	S. E.	11	11	21	5	9	3	11	7	12	11	16	10	39	32	35	21
	E.	9	19	7	29	9	13	9	13	8	10	12	12	30	40	45	35
	N. E.	7	11	7	9	9	18	14	11	10	7	10	10	27	28	25	43
	Calm.	11	5	5	3	6	3	7	2	8	8	6	17	22	33	14	12
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Savannah, Ga	N.	0	5	14	10	22	8	14	10	4	5	6	3	15	8	46	32
	N. W.	2	7	13	26	14	14	9	11	20	7	5	4	32	13	53	34
	W.	4	2	6	9	5	22	6	13	2	11	4	8	17	14	20	41
	S. W.	31	23	10	18	19	29	22	12	22	26	15	30	63	84	47	63
	S.	33	30	8	7	10	5	16	6	4	6	10	5	20	68	25	27
	S. E.	21	16	6	5	1	6	6	0	18	8	19	16	45	53	12	12
	E.	1	3	9	5	2	3	5	5	4	5	14	7	23	11	16	13
	N. E.	0	4	20	11	13	5	10	16	4	14	1	6	19	10	44	31
	Calm.	1	3	4	2	4	1	5	14	15	8	19	11	42	15	10	20
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shreveport, La	N.	8	14	19	15	18	8	13	12	8	14	7	6	29	28	52	33
	N. W.	1	10	1	6	4	4	3	4	17	5	5	6	27	17	11	11
	W.	5	8	1	5	2	10	10	9	8	5	5	10	18	23	8	29
	S. W.	11	3	9	3	6	6	3	8	3	8	16	9	27	23	18	17
	S.	28	13	6	20	26	23	27	23	16	24	30	28	70	69	52	73
	S. E.	22	16	4	8	8	5	10	10	21	15	11	19	47	57	20	25
	E.	8	15	9	3	7	12	7	8	10	8	6	3	24	26	19	27
	N. E.	5	3	22	7	7	6	5	6	7	5	2	4	14	12	36	17
	Calm.	5	11	19	26	12	19	15	7	3	6	11	5	20	21	57	41
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Saint Louis, Mo	N.	6	12	11	11	24	8	10	11	14	7	8	5	29	23	46	29
	N. W.	9	10	10	12	10	20	14	17	15	10	5	10	30	29	32	51
	W.	14	9	5	11	2	6	12	5	8	6	6	12	20	35	18	23
	S. W.	22	15	21	25	7	15	19	14	5	14	22	26	41	63	53	48
	S.	13	24	14	23	17	22	30	26	25	18	19	17	62	54	54	78
	S. E.	8	5	7	1	10	7	3	6	10	7	6	7	23	20	18	16
	E.	6	4	5	3	3	8	0	2	11	4	15	7	30	17	11	10
	N. E.	10	11	17	6	13	6	4	4	5	12	8	5	25	26	36	14
	Calm.	5	3	0	1	4	1	1	2	0	12	4	1	16	9	5	4
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Saint Mark's, Fla	N.	2	6	10	28	11	10	29	35	15	9	9	5	33	13	49	74
	N. W.	4	4	9	9	3	14	4	6	13	7	4	6	24	14	21	24
	W.	11	9	4	4	3	4	3	5	9	4	4	5	17	25	11	12
	S. W.	25	22	5	5	5	11	3	5	5	6	7	11	18	58	15	19
	S.	26	20	15	7	19	18	20	12	17	25	22	25	64	71	41	50
	S. E.	5	3	3	2	3	8	8	9	11	8	13	7	32	15	8	25
	E.	8	7	17	4	11	6	4	1	6	3	11	9	20	24	32	11
	N. E.	1	8	8	12	19	4	7	5	4	4	6	4	14	13	39	16
	Calm.	11	14	5	22	16	18	15	9	13	24	17	18	54	43	43	42
	Blank.	0	0	14	0	0	0	0	0	0	0	0	0	0	0	14	0
Saint Paul, Minn	N.	11	9	16	12	1	2	6	6	15	9	16	8	40	28	29	14
	N. W.	18	17	14	30	28	23	26	20	25	25	13	22	63	57	72	69
	W.	7	5	6	3	4	11	10	12	4	10	5	11	19	23	13	33
	S. W.	14	6	5	4	3	8	8	6	8	7	10	15	25	35	12	22
	S.	15	10	10	8	4	2	11	5	5	5	8	8	18	33	22	18
	S. E.	11	27	24	19	29	30	17	12	11	15	18	16	44	54	72	59
	E.	3	3	3	6	11	7	3	9	7	7	7	3	21	9	20	19
	N. E.	6	5	3	4	2	3	5	10	11	6	11	3	28	14	9	18
	Calm.	8	11	9	7	8	7	7	7	7	6	5	3	18	22	24	21
	Blank.	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0

Statement showing how many times the wind was observed blowing, &c.—Continued.

Station.	Wind.	July, 1875.	August.	September.	October.	November.	December.	January, '76.	February.	March.	April.	May.	June.	Spring.	Summer.	Autumn.	Winter.
Smithville, N. C.*	N.	...	...	...	...	21	12	16	18	17	11	11	4	39	...	...	46
	N. W.	...	...	...	...	7	18	13	8	6	8	3	1	17	...	...	39
	W.	...	...	...	...	8	18	8	12	43	5	6	10	24	...	...	38
	S. W.	...	...	...	...	18	20	23	20	12	32	10	29	54	...	...	63
	S.	...	...	...	...	6	3	10	4	17	9	24	13	50	...	...	17
	S. E.	...	...	...	...	2	0	4	3	7	4	9	24	20	...	...	7
	E.	...	...	...	...	7	4	6	6	13	11	16	7	40	...	...	16
	N. E.	...	...	...	...	20	16	10	12	5	8	12	1	25	...	...	38
	Calm.	...	...	...	...	1	2	3	4	3	2	2	1	7	...	...	9
	Blank.	...	...	...	...	0	0	0	0	0	0	0	0	0	...	...	0
Springfield, Mass.	N.	9	9	12	14	16	16	6	15	10	11	7	2	28	20	42	37
	N. W.	8	3	16	19	27	11	25	20	32	20	9	10	61	21	62	56
	W.	7	3	10	15	5	14	11	11	13	9	10	8	32	18	30	36
	S. W.	14	9	12	7	7	8	8	9	9	5	5	11	19	34	26	25
	S.	22	26	15	12	6	10	18	11	10	14	33	39	57	87	33	39
	S. E.	0	6	0	3	2	1	3	0	1	3	4	5	8	11	5	4
	E.	2	7	0	3	1	3	1	1	3	2	1	2	6	11	4	5
	N. E.	3	12	4	4	8	6	3	6	10	10	13	4	33	19	16	15
	Calm.	28	18	21	16	18	24	18	14	5	16	11	9	32	55	55	56
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Squan Beach, N. J.†	N.	4	2	5	5	5	6	3	...	...	...	...	...	...	...	15	...
	N. W.	15	4	19	23	31	21	20	...	...	...	...	...	...	...	73	...
	W.	8	4	13	17	10	22	24	...	...	...	...	...	...	...	40	...
	S. W.	17	16	12	11	10	7	20	...	...	...	...	...	...	...	33	...
	S.	13	24	11	15	6	4	11	...	...	...	...	...	...	...	32	...
	S. E.	17	8	10	4	9	4	2	...	...	...	...	...	...	...	23	...
	E.	0	2	3	8	6	8	5	...	...	...	...	...	...	...	17	...
	N. E.	11	23	7	4	12	14	3	...	...	...	...	...	...	...	23	...
	Calm.	8	10	10	6	1	4	5	...	...	...	...	...	...	...	17	...
	Blank.	0	0	0	0	0	0	0	...	...	...	...	...	...	...	0	...
Thatcher's Island, Mass.‡	N.	...	...	...	...	...	...	4	3	4	3	8	2	15	...	...	...
	N. W.	...	...	...	...	...	...	32	33	27	27	13	3	67	...	...	...
	W.	...	...	...	...	...	...	25	17	9	7	3	7	19	...	...	...
	S. W.	...	...	...	...	...	...	17	10	17	16	25	24	58	...	...	...
	S.	...	...	...	...	...	...	7	7	6	14	21	21	41	...	...	...
	S. E.	...	...	...	...	...	...	2	1	20	5	7	16	32	...	...	...
	E.	...	...	...	...	...	...	3	7	2	3	4	0	9	...	...	...
	N. E.	...	...	...	...	...	...	1	9	8	14	11	16	33	...	...	...
	Calm.	...	...	...	...	...	...	2	0	0	1	1	1	2	...	...	...
	Blank.	...	...	...	...	...	...	0	0	0	0	0	0	0	...	...	...
Toledo, Ohio	N.	6	5	7	6	6	11	3	9	7	11	4	0	22	11	19	23
	N. W.	4	3	9	8	5	0	1	3	7	4	5	0	16	7	22	4
	W.	10	9	13	26	21	25	26	12	21	16	9	5	46	24	60	63
	S. W.	19	31	21	24	11	13	21	19	16	24	27	32	67	82	56	53
	S.	12	11	22	16	8	18	27	29	14	11	8	16	33	39	46	74
	S. E.	7	6	4	1	4	5	3	2	1	1	6	12	8	25	9	10
	E.	18	13	6	5	16	15	6	6	13	9	6	4	28	35	27	27
	N. E.	12	14	8	4	17	5	3	6	9	9	19	8	37	34	29	14
	Calm.	5	1	0	3	2	1	3	1	5	5	9	13	19	19	5	5
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tybee Island, Ga.	N.	0	7	7	14	15	8	14	13	3	2	1	2	6	9	36	35
	N. W.	6	4	10	13	8	19	5	12	14	11	5	5	30	15	31	36
	W.	6	3	2	11	9	16	5	8	9	5	7	4	21	13	22	29
	S. W.	25	19	10	9	7	10	12	6	6	13	0	4	19	48	26	28
	S.	39	37	12	12	17	23	22	18	17	21	19	30	57	106	41	63
	S. E.	12	9	6	2	6	2	3	8	14	5	13	16	32	37	14	13
	E.	0	6	10	5	4	2	3	3	10	15	29	16	54	22	19	8
	N. E.	0	4	30	22	20	6	14	14	10	11	8	3	29	7	72	34
	Calm.	5	4	3	5	4	7	15	5	10	7	11	10	28	19	12	27
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vicksburgh, Miss.	N.	3	5	12	17	13	2	14	11	13	4	9	2	26	10	42	27
	N. W.	0	7	2	8	1	10	4	4	13	12	11	4	36	11	11	18
	W.	14	6	10	4	1	1	1	1	11	5	7	13	23	33	15	3
	S. W.	23	14	7	9	19	18	13	13	3	16	12	18	31	55	35	44
	S.	19	5	9	12	17	15	26	18	15	12	22	17	49	41	38	59
	S. E.	13	17	2	8	10	11	10	14	18	19	13	13	50	43	20	35
	E.	2	3	6	9	10	10	3	8	10	5	2	3	17	8	25	21
	N. E.	4	5	25	14	12	8	11	11	7	14	4	7	25	16	51	30
	Calm.	15	31	16	12	7	18	11	7	3	3	13	13	19	59	35	36
	Blank.	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0

* Station opened October 15, 1875.

† Station discontinued February 26, 1876

‡ Station opened December 26, 1875.

Statement showing how many times the wind was observed blowing, &c.—Continued.

Station.	Wind.	July, 1875.	August.	September.	October.	November.	December.	January, '76.	February.	March.	April.	May.	June.	Spring.	Summer.	Autumn.	Winter.
Virginia City, Mont.	N.	1	1	1	1	1	4	2	2	2	0	2	1	4	3	3	8
	N. W.	8	3	10	8	4	6	3	5	2	3	5	6	10	17	22	14
	W.	8	17	14	20	13	27	7	6	15	11	13	21	39	46	47	40
	S. W.	4	3	5	8	30	25	18	45	18	31	11	7	60	14	43	88
	S.	7	6	3	2	2	1	2	2	6	8	7	7	21	20	7	5
	S. E.	19	17	31	24	5	7	13	8	9	9	10	19	28	55	60	28
	E.	11	6	9	5	5	1	5	3	12	2	5	5	19	22	19	9
	N. E.	15	11	7	1	1	2	2	4	6	4	5	4	15	30	9	8
	Calm.	20	29	10	24	29	20	41	12	23	22	35	20	80	69	63	73
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Washington, D. C.	N.	8	14	16	11	19	11	7	4	4	10	8	5	22	27	46	22
	N. W.	15	4	13	24	15	17	21	19	29	25	10	13	64	32	52	57
	W.	9	3	7	7	7	5	6	15	20	10	4	8	34	20	21	26
	S. W.	2	8	6	4	4	9	8	0	0	9	8	18	17	34	14	17
	S.	19	25	14	18	16	12	26	10	11	15	32	28	58	72	48	48
	S. E.	8	2	1	3	3	4	5	6	3	3	3	10	9	20	7	15
	E.	5	2	4	4	7	7	2	8	12	6	11	3	29	10	15	17
	N. E.	2	13	3	4	11	20	7	8	7	4	11	0	22	15	18	35
	Calm.	19	22	26	18	8	8	11	17	7	8	6	5	21	46	52	36
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wilmington, N. C.	N.	0	13	16	16	12	9	11	14	10	10	6	3	26	16	44	34
	N. W.	0	8	6	4	7	6	10	8	10	5	3	3	18	11	17	24
	W.	18	1	9	13	3	21	9	12	15	8	4	7	27	26	25	42
	S. W.	41	22	13	14	20	21	27	14	6	26	12	28	44	91	47	62
	S.	19	28	4	14	8	6	11	15	15	12	19	14	46	61	26	32
	S. E.	6	14	6	5	4	5	3	2	20	7	13	22	40	42	15	10
	E	3	3	8	7	12	7	10	9	9	7	20	8	36	14	27	26
	N. E.	3	4	28	17	23	12	9	11	5	13	11	4	29	11	68	32
	Calm.	3	0	0	3	1	6	3	2	3	2	5	1	10	4	4	11
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wood's Hole, Mass.	N.	3	2	4	11	11	9	5	10	7	8	5	3	20	8	26	24
	N. W.	13	1	24	22	35	34	39	42	32	22	11	4	65	18	81	115
	W.	7	2	7	10	5	7	11	1	8	7	5	4	20	13	22	19
	S. W.	44	39	23	16	9	14	22	15	22	30	42	39	94	122	48	51
	S.	10	8	5	6	4	1	4	5	4	4	10	16	18	34	15	10
	S. E.	6	13	13	11	11	6	4	7	13	8	11	10	32	29	35	17
	E.	0	3	1	6	1	10	5	1	1	4	4	6	9	9	8	16
	N. E.	2	14	8	4	11	9	1	4	4	5	4	2	13	18	23	14
	Calm.	8	11	5	7	3	3	2	2	2	2	1	6	5	25	15	7
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wytheville, Va.	N.	3	5	8	9	6	3	5	3	3	3	4	2	10	10	23	11
	N. W.	5	9	14	20	11	8	14	17	20	13	7	5	40	19	45	39
	W.	56	16	19	40	18	43	46	32	25	24	21	34	70	106	77	121
	S. W.	5	5	8	4	6	4	9	6	5	3	3	5	11	15	18	19
	S.	0	6	4	5	0	2	5	1	10	1	6	5	17	11	9	8
	S. E.	5	8	4	1	7	1	0	3	5	8	9	18	22	31	12	4
	E.	12	18	16	3	21	17	5	9	11	7	10	1	28	31	40	31
	N. E.	3	5	8	2	6	2	2	3	1	1	2	0	4	8	16	7
	Calm.	4	21	9	9	15	13	7	13	13	30	31	20	74	45	33	33
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yankton, Dak.	N.	11	8	14	12	7	4	5	7	7	7	7	6	21	25	33	16
	N. W.	11	17	15	26	28	35	27	36	32	20	9	30	61	58	69	98
	W.	3	2	6	2	7	7	7	2	6	2	5	5	13	10	15	16
	S. W.	6	6	7	10	10	10	19	4	1	10	5	7	16	19	27	33
	S.	11	15	15	11	10	11	6	7	6	2	13	10	21	36	36	24
	S. E.	13	21	11	7	13	12	5	11	16	18	23	10	57	44	31	28
	E.	13	6	5	2	1	6	6	11	8	21	15	9	44	28	8	23
	N. E.	10	5	7	11	6	4	10	3	12	7	7	6	26	21	24	17
	Calm.	15	13	10	12	8	4	8	6	5	3	9	7	17	35	30	18
	Blank.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(Form 18*a*.)

[To be filled up, and sent on the first of each month, in an envelope addressed to "The Chief Signal-Officer, United States Army, Washington, D. C."]

WAR DEPARTMENT, SIGNAL SERVICE UNITED STATES ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

Place of observation, ——, county of ——, State of ——: latitude, ——; longitude, ——; height of ground above the sea, —— feet.
Name and post-office address of observer, ——.

Meteorological record for the month of ——, 187 .

Day of month.	THERMOMETER IN THE OPEN AIR.				RAIN AND SNOW.				CLOUDS.												WINDS.						Day of month.
									7 a. m.				2 p. m.				9 p. m.				7 a. m.		2 p. m.		9 p. m.		
									Upper clouds.		Lower clouds.		Upper clouds.		Lower clouds.		Upper clouds.		Lower clouds.								
	7 a. m.	2 p. m.	9 p. m.	Mean.	Time of beginning of rain or snow.	Time of ending of rain or snow.	Amount of rain and melted snow in gauge, in inches.	Depth of snow, in inches.	Kind and amount.	Direction, (moving from.)	Kind and amount.	Direction, (moving from.)	Kind and amount.	Direction, (moving from.)	Kind and amount.	Direction, (moving from.)	Kind and amount.	Direction, (moving from.)	Kind and amount.	Direction, (moving from.)	Direction.	Force.	Direction.	Force.	Direction.	Force.	
1																											1
2																											2
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26		26
27		27
28		28
29		29
30		30
31		31
Sums		Sums.
Means ...		Means.

The object of these observations is to enable the Chief Signal-Officer, United States Army, to prepare a series of maps to illustrate the face of the sky, &c., over the United States, for each day in the year, and thus to study the rise, progress, and course of American storms. Observers will be supplied with full directions for using all the instruments, on application to the Chief Signal-Officer, Washington, D. C.

EXPLANATION OF THE ABOVE COLUMNS.

THERMOMETER IN THE OPEN AIR.

This is intended for the register of the thermometer, and for the daily mean or average of the three observations. Fractions of degrees should be recorded in tenths, thus: 46°.5, 37°.3, 72°.1, &c.

RAIN AND SNOW.

Under this head are entered the time of beginning and ending of the fall of rain or snow, and the amount, in inches and hundredths, of rain or melted snow collected in a gauge at the surface of the ground; also the depth of the snow. Rain to be indicated by R and snow by S. When there is no rain or snow, mark 0. Amount of rain or melted snow in gauge should be recorded in inches, tenths, and hundredths, thus: 1.25, 6.03, 0.01, &c.

CLOUDS.

Under this general head are entered three daily observations on the aspect of the sky, &c.: 1st. The "amount of cloudiness," designated by figures, 10 being entire cloudiness; 5 half cloudiness; 0 entire clearness; and intermediate numbers in proportion. 2d. "Motion of higher clouds," which pass directly over the head of the observer, as given to eight points of the compass. The direction *from* which they move is to be given. This observation is important, as the course of the *higher clouds* is sometimes different from that of the *surface wind*, which is given in another column. 3d. The "velocity," or rate of motion, 10 being the highest, and 0 apparent rest. 4th. The description or "kind of clouds," to be entered by means of the following abbreviations: *S.* = Stratus; *Cu.* = Cumulus; *C.* = Cirrus; *N.* = Nimbus; *C. s.* = Cirro-stratus; *Cu. s.* = Cumulo-stratus; *C. cu.* = Cirro-cumulus.

WINDS.

This is for the record of the direction *from* which the wind is blowing as indicated by a vane, and its force by estimation. The direction is entered in eight points of the compass: N., N. E., E., S. E., S., S. W., W., N. W. The force is to be estimated and registered by figures from 1 to 10, as in the first column of the following table. The figures in the last column, expressing the number of miles per hour, are *not to be used* in the register. A little practice will enable observers to make use of the figures in the first column, corresponding to light, gentle, fresh, strong, &c., with accuracy, and it is very important that such should be the case, to make the record reliable.

0. Calm.
1. Very light breeze, varies between 1 and 2 miles per hour.
2. Gentle breeze, varies between 3 and 5 miles per hour.
3. Fresh breeze, varies between 6 and 14 miles per hour.
4. Strong wind, varies between 15 and 29 miles per hour.
5. High wind, varies between 30 and 39 miles per hour.
6. Gale, varies between 40 and 59 miles per hour.
7. Strong gale, varies between 60 and 69 miles per hour.
8. Violent gale, varies between 70 and 79 miles per hour.
9. Hurricane, varies between 80 and 99 miles per hour.
10. Most violent hurricane, varies from 100 upward.

Date.	BAROMETER.												HUMIDITY, DEW POINT, &C.												
	7 a. m.				2 p. m.				9 p. m.					7 a. m.				2 p. m.				9 p. m.			
187 .	Observed reading.	Attached thermometer.	Correction and reduction.	Pressure corrected and reduced.	Observed reading.	Attached thermometer.	Correction and reduction.	Pressure corrected and reduced.	Observed reading.	Attached thermometer.	Correction and reduction.	Pressure corrected and reduced.	Daily mean.	Dry.	Wet.	Dew point.	Tension of vapor.	Relative humidity.	Dry.	Wet.	Dew point.	Tension of vapor.	Relative humidity.	Dry.	Wet.	Dew point.	Tension of vapor.	Relative humidity.	Daily mean humidity.
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27																													
28																													
29																													
30																													
31																													
Sum																													
Mean																													

SUMMARY FOR THE MONTH.

Highest barometer .....
Lowest barometer .....
Mean barometer .....
Highest temperature .....
Lowest temperature .....
Mean temperature .....
Total rain-fall or melted snow .....
Prevailing wind .....
Maximum velocity or force .....
Total number of miles traveled .....
Number of days on which rain or snow fell ...
Number of days on which cloudiness averaged 0.8 or more .....
Depth of snow, in inches, at close of month ...
Thunder-storms, dates of .....
Hail, dates of .....
Frost, dates of .....
Aurora, dates of .....
Halos . { Solar, dates of .....
{ Lunar, dates of .....
Meteors, dates of .....
Polar bands, dates of .....
Mirage, dates of .....
Winds, followed by rain .....
Winds, followed by clear or fair weather .....

Elevation of surface of mercury in cistern of barometer above sea-level ..... feet.
Instrumental error of barometer used .....
Maker and number of barometer used .....
Kind of rain-gauge .....
Maker and number of thermometer—exposed ..
Maker and number of thermometer—maximum
Maker and number of thermometer—minimum
Maker and number of hygrometer .....

[Observers are specially requested to complete the summary.]

CASUAL PHENOMENA.

Note observations of the following:

Thunder-storms.—Time of occurrence and direction of motion. *Tornadoes.*—Time of occurrence, width and direction of path, effects produced, and whether attended by electricity or hail. *Lightning at a distance.*—Time of occurrence, direction from observer, whether zig-zag, forked, or diffuse. Objects struck by lightning, as trees, buildings, &c. *Hail-storms.*—Time of occurrence, direction and width of path, size and quantity of stones, and amount of injury. *Aurora borealis.*—Time of appearance and disappearance, time of the formation of arch, beams, and corona, and whether there is a dark cloud below the arch. Direction and time of occurrence of *meteors, shooting-stars, solar and lunar halos, parhelia,* and *paraselenes.* Time of early and late *frosts,* particularly first and last. *Depth of ground frozen,* in feet and inches; disappearance of frost from the ground. Time of closing and opening of *rivers, lakes, canals,* and *streams,* and their extreme rise and fall. *Temperature* of wells and springs, at least once each season. *Earthquakes.*—Time of occurrence, direction of impulse, number of shocks, and effects produced. *Hazy or smoky appearance of the atmosphere.*—Time of occurrence and intensity. *High winds, gales, hurricanes,* unusually *heavy rains,* or remarkable changes in the *temperature* between the regular hours of observation—date, time, and duration.

(Form 18b.)

METEOROLOGICAL REGISTER.

Station, ——. *Latitude.* ——. *Longitude,* ——. *Altitude of barometer above sea,* —— *feet.*

187 . Month.	Thermometer.				Self-registering thermometer.			Movements of atmosphere.									Amount of cloudiness.			Rain and melted snow.			Remarks.
								7 a. m.			2 p. m.			9 a. m.									
								Winds.		Motion of clouds.	Winds.		Motion of clouds.	Winds.		Motion of clouds.							
	7 a. m.	2 p. m.	9 p. m.	Daily mean.	Maximum.	Minimum.	Mean.	D.	F.		D.	F.		D.	F.		7 a. m.	2 p. m.	9 p. m.	Began.	Ended.	Quantity.	

SUMMARIES OF WINDS AND WEATHER.

N.		N. E.		E.		S. E.		S.		S. W.		W.		N. W.	
Number.	Force.	Number.	Force.	Number.	Force.	Number.	Force.	Number.	Force.	Number.	Force.	Number.	Force.	Number.	Force.

Average cloudiness. } Number of days of rain and hail. } Number of days of snow. }

—— ——, *Surgeon United States Army.*

METEOROLOGICAL REGISTER—Continued.

187 .	Dry and wet bulb thermometer.												
Month.	7 a. m.		2 p. m.		9 p. m.		Month.	7 a. m.		2 p. m.		9 p. m.		Remarks.
	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.		Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	
1							17							
2							18							
3							19							
4							20							
5							21							
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8							24							
9							25							
10							26							
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12							28							
13							29							
14							30							
15							31							
16														
Monthly mean.....														

187 .	Barometer and thermometer attached.						Remarks.
Month.	7 a. m.		2 p. m.		9 p. m.		
	Bar.	Ther.	Bar.	Ther.	Bar.	Ther.	
1							
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31							

(Indorsement): Station ——. Meteorological register for the month of ——, 187—. Transmitted by ——, Surgeon United States Army.

PAPER 19.

OFFICE OF THE CHIEF SIGNAL-OFFICER,
October 25, 1876.

GENERAL: I have the honor to submit the inclosed report upon the phenomena of the aurora of April 7, 1874, so far as they can be deduced from the observations that have been received by this office.

Very respectfully, yours,

CLEVELAND ABBE,
Assistant.

To the CHIEF SIGNAL OFFICER,
United States Army.

THE AURORA OF APRIL 7, 1874.

§ 1. The aurora of April 7, 1874, was not observed at Washington, but no sooner had the first reports concerning it (especially that from Buffalo) reached this office from stations in the State of New York than it was seen that the occurrence of the well-marked narrow arches of light might offer an opportunity for the determination of their altitudes, distances, &c.

A special circular asking for additional exact information in reference to this phenomenon was therefore soon issued, and a few valuable replies were received, but not so many nor of such a character as had been hoped for, and it was evident that a decided advance in minute accuracy of observation must be realized by our observers before very satisfactory conclusions can be attained in reference to so difficult a subject. Indeed it is hardly conceivable that I should have been able to weave these present vague reports into anything like a connected system had not the excellent observations of our own observers at Buffalo and Oswego, and especially those of Professor Newton, of Yale College, and Mr. Henry Haas, of Depauville, N. Y., offered me an available general frame-work.

§ 2. The observations which I have used are given in full, and very nearly in the words of the original reports, in the accompanying Appendix II, being preceded by the list of observers and stations given in Appendix I.

When several reports or letters have been received in reference to the observations of any one individual, the whole has been combined into one consecutive account as well as possible. In the present place I need only to give the following tabular view, showing the general nature of the phenomena observed at each station, as condensed from the full account and analysis presented geographically and chronologically in Appendix III.

TABULAR LIST OF ITEMS OBSERVED AT THE RESPECTIVE STATIONS.

(For fuller account see Appendix III.)

Stations.	Items observed.
(109)	Luminous cloud.
(95)	Bright aurora.
(14)	Aurora seen through clouds.
(48)	[1] Aurora 30° high. [2] Streamers in the N. W.
(75)	[1] Belt from E. to W.
(66)	[1] Arch. [2] Arch from W. to E. [3] Streamers.
(153)	[1] Bow from W. N. W. to E. S. E. [2] Fog from above.
(155)	[0] Dark segment. [1] Irregular arch. [2] Band across the zenith from E. to W. [3] Belt south of the zenith. [4] Switch of light. [5] Streamers. [6] Stripes in item number three.
(49)	[1] Light in the N. [2] Arch from the W. to E., near zenith, which broke into numerous patches. [3] Column of light in the W. and streamers.
(28)	[1] Column in the N. W.
(7)	[1] Clouds in the N. W. [2] Auroral beam.
(17)	[1] Arches from N. W. to N. E. [2] Beams to an altitude of 15°.
(44)	[2] Red flames in the N. N. E. [1] Dense black cloud. [3] White streamers.
(57)	[0] Slight darkness. [1] Diffused light and streamers. [2] Arch near zenith.
(101)	[1] Running fantastic forms. [2] A bow from E. to the W. horizon, moving from N. to S. of the zenith.
(111)	[1] Streamers in the N. [2] Arch from E. N. E. to W. N. W., and S. of zenith.

(77) [0] Flashes in the N. [1] Broad band E. and W. north of zenith. [2] Narrow band S. of zenith. [3] Narrow band S. of zenith. [4] Wave running longitudinally through number three. [5] Number three splits into pieces.

(47) [1] Auroral arch, 30° to 50° altitude in the N. [°] A dusky cloud. [2] A narrow beam passing from W. N. W. to E. S. E. through zenith and moving southward. (3) A curtain formation and merry dancers in the N.

(4) [0] Dark segment. [1] Arch. [2] Curtain in the N. [3] Arch near zenith. [4] Light, fleecy clouds.

(151) [1] Beam in the N. [2] Streamers in the W. [3] Arch from E. to W. moving south to the zenith.

(2) [1] Aurora hidden by fog.

(11) [1] Arch altitude 30° in the N.

(1) [1] Arch of cloud. [2] Arch of light. [3] Two streamers.

(8) [1] Light in the N.

(92) [1] Magnificent arch.

(42) [1] Mere uninteresting light segments.

(31) [0] Indistinct cloud. [1] Light below cloud. [2] Four white beams. [3] Three stratus clouds.

(58) [0] Very dark space. [1] A segment of an inferior converging arch. [2] The lower arch. [3] The exterior or upper arch. [4] Belt crossing the zenith. [5] Re-appearance of four as a belt S. of zenith, and shooting from due E. nearly to the W. [6] Three faint streamers. [7] Re-appearance of three, but nearer the zenith. [8] Hazy sky.

(63) [1] Black lower space. [2] Brilliant bow. [4] Streamers. [3] A brilliant white band from E. to W. near the zenith, and moving southward.

(64) [1] Streamers. [2] Arch (?) from S. E. to S. W.

(53) [1] Low arch. [2] Auroral arch perfect through zenith from E. to W. horizon, with wave-motion from E. to W.

(102) [1] Broad streamers from N. horizon toward zenith. [2] Band or arch formed of beams moving from E. over to W.

(36) [2] Arch nearly across the heavens. [1] Merry dancers in the N.

(46) [1] Arch from N. W. to N. E. [2] Dark and bright beams moving from E to W. and back again.

(43) [1] Dark clouds. [2] Arch from N. N. E. to N. N. W. [3] Corona. (?)

(6) [1] Bright light in N. horizon. [2] Dark segment. [3] Arch near zenith.

(62) [1] Diffused patches behind clouds. [2] Bright patches floating from E. to W.

(70) [1] Dark cloud below. [2] Arch from E. to W.

(51) [1] Faint arch from E. to W. 45° high.

(106) [1] Aurora bright in the N. [2] Beam from N. W. to S.E., a little N. of zenith; moved E. so as to show the W. end. [3] Flashes in the N.

(40) [1] Stratus cloud. [2] Flashes 20° high in the N. and N. E.

(22) [1] Faint aurora in the N.

(45) [1] Bright aurora. [2] Light streak near zenith, from E. to W.

(108) [1] Northern arch 30° high. [2] Streamers.

(13) [1] Dark bank of stratus clouds, 15° high. [0] Slender luminous beams. [2] White arch from E. to W., 15° N. of zenith. [7] Thin haze. [3] Luminous column shot up from E. horizon to zenith, and thence to the W. [8] Ripples transverse to number three moving rapidly from E. to W. [9] The waving and dividing of arch number three. [4] Arch 15° S. of zenith. [5] Arch 35° S. of zenith. [10] Curtain formation among the beams, number zero. [6] Arch 65° S. of zenith.

(154) [1] Auroral tendencies in the N. horizon. [2] Magnificent bow from E. to W., apparently very near the earth.

(54) [1] Dark cloud below arch, number two, but above horizon. [2] An arch.

(85) [1] Patches and streamers of light. [2] Band from N. W. to E. S. E. [3] Auroral vapors passing from E. to W.

(5) [1] Luminous appearance. [2] Arch at 45°. [3] Arch of 60°. [4] Merry dancers near zenith.

(34) [1] Arch N. E. to N. W., span 90°; altitude 25°.

(90) [1] Beautiful arch. [2] Streamers.

(89) [1] Aurora from N. W. to N. E.

(88) [1] Arch from N. W. to S. E.

(104) [1] Mist. [2] Aurora N. E. and N. W.

(25) [1] Arch from N. 90° E. to N. 60° W., and altitude 45°. [2] Streamers on the eastern borders. [3] Streamers at the base. [4] Stratus clouds.

(16) [0] Stratum of haze. [1] Lower arch from E. N. E. to W. N. W. [2] Upper arch from E. N. E. to W. N. W.; altitude 40°. [3] More brilliant from E. to W., near the zenith; it did not change its position. [4] Beams from arch number two; extending to the zenith. [5] Beams from arch number three extending to the southern horizon.

(78) [0] Dark clouds below. [1] Lower arch, altitude 10°. [5] Middle dark cloud. [2] Upper arch, altitude 18°. [3] Belt of short streamers moving from E. to W. [4] Broad belt advanced from E. to W., forming arch 25° high.

(3) [1] Auroral corona. [2] Low arch light.

(110) [1] Aurora seen through clouds.

(41) [1] Ill-defined, pale light in the N. horizon, altitude 40°; no beams or flashes.

(69) [1] Arch 15° high.

(103) [1] Luminous cloud in the E., expanded due W. through the zenith for 120°, swaying from N. to S., and then receding as it came.

(35) [1] Beautiful arch. [2] Streamers.

(10) [1] Faint yellow light, extending from N. to N. E. [2] Luminous beams from 3° to 5° high. [3] An arch from E. N. E. to N. N. W., passing a little N. of the zenith.

(21) [0] Cloud in the N. [1] Arch in the N., behind a cloud-bank; altitude of highest point, 30°. [2] Streamer in the E. 60° high. [3] Smaller streamer from the N. W. [4] Other streamers, altitude 60° and less, and moving from E. to W.

(60) [0] Dark clouds below. [2] High arch from E. to W., 10° N. of zenith. [1] Arch in the N.

(15) [1] Pale band from N. 2° E. to N. 43° E., altitude 4°. [2, 3, 4, 5, 6] Distinct streamers moving downward from a point due east at an altitude of 47°, and ending after passing westward about 20°.

(74) [0] Cloud of misty light. [1] Banner in the E., extending N. W. [2] Band on the S. side.

(38) [1] Bright streamers in the N. horizon, moving from the E. to W. [2] Bright arch 20° high. [3] Narrow arch rose to altitude of 30°, and then contracted to a patch of light.

(72) [1] Very bright aurora.

(73) [0] Luminous spots in a very dark base. [1] Arch from S. E. to N. W. [2] Active streamers to the zenith.

(65) [0] Dark base. [1] A small arch.

(50) [1] Aurora bright in the N.

(20) [1] Northern lights from the N. W. to the N. E.

(19) [1] Very faint yellow light lasted 20 minutes in northern sky, and no prominent features.

(27) [1] Slender arch from N. to S. E., altitude 45°. [2, 3, 4] Four distinct arches from N. or N. E. to S. or S. E., at no time west of the meridian. [5] Small circles at intervals in the long slender bands.

(55) [1] Arch, lower edge 13° high. [2] Streamers.

(99) [1] Bright streamer in the N. E., extending from horizon, to near zenith, and pointing toward S. W.

(79) [1] Dark clouds beneath aurora. [2] Aurora from E. to N. W.

(76) [1] Cloud at the base. [2, 3] A double arch. [4] White streamers.

(105) [1] Aurora dim in the N.

(9) [1] Light in the N. [2] Beam in the N. E. [3, 4, 5] Wide beams. [6] Arch from E. S. E. to W. N. W.

(52) [1] Slight aurora.

(71) [1] Beam in the N. E. [2] Beam in the N. [3] Beam in the N. W. [4] Beam in the S. W. [5] Red lights in all directions. [6] Aurora did not get higher than 45°. [7] No perfect arch.

(12) [1] Arch from light from N. E. to W. [2] Rays shooting up higher than 45°. [3] Long, round, unbroken cloud, apparently close to the earth, moved rapidly S. [4] The illuminated stratus clouds above apparently moved rapidly N., much resembling a curtain aurora.

(24) [1] Obscured by clouds. [2] Pale light 5° high and 30° broad along the northern horizon.

(96) [1, 2, 3] Three beautiful arches. [4] Numbers one, two, and three united into one arch. [5] Whole sky covered with light.

(18) [1] Narrow belt of light on northern horizon. [3] Elsewhere stratus clouds, among which are patches of aurora. [2] Clouds breaking away showing a broken arch; altitude 60°.

(26) [1] Bright aurora.

§ 3. For convenience of comparison, I give in Appendix I, Table II, a list of the stations, arranged in order of longitude, beginning with the most eastern one and proceeding westward by steps of one degree each; within each such step the order is that of latitude, beginning at the north. In reading the reports from the various observers it will be found most instructive to take them up very nearly in the order of longitude, and the numbers by which they are designated would have been assigned in this order had not the original numbers, given them in the order in which the reports came in, been already adopted in the following text.

§ 4. The first step has been to prepare the chart No. 1, showing the geographical relations of the stations. Upon this map are given also the deviations and inclinations of the magnetic needle by means of the usual system of isogonics, &c.

§ 5. In the study of these observations the next step has been to convert all the items relating to local times into a uniform system of Washington time, by applying the proper corrections for longitude. The errors of the observer's clocks and watches, and even the standards of time used by them, are generally not stated in their reports, so that the uncertainty of this vitally important matter will be found to throw obscurity upon some interesting features that might otherwise have presented no difficulty. The Washington times thus obtained are inserted within brackets [ ] in the text of the observations given in Appendix II, and immediately succeed the respective local times given by the observers. These are the times given in Appendix III, and are the only ones that will be hereafter referred to.

§ 6. The positions of the stars and their alignments, noted by the observers, have been carefully worked out on a celestial globe, and the resulting altitudes and azimuths are inserted within brackets in the text of Appendix II.

§ 7. In the analysis of the observers' reports it has been found convenient to assign a number inclosed within brackets to each feature especially recorded at any station. Thus, at station 31, there was recorded: [1] "An upper portion or indistinct cloud; [2] four beams of uniform width; [3] stratus clouds about 30° high." These numbers generally begin with the northern and end with the southern features of the aurora; being inclosed within brackets, they afford a convenient notation and means of reference, and are given both in the tabular list of items in article 2 and in the Appendices II and III.

§ 8. In order to study successfully phenomena so intimately dependent upon the distribution of magnetic force, it is necessary to have a correct conception of this latter subject. Now, Galle has proposed to assume that at any point in an auroral beam the latter is parallel to the magnetic needle, freely suspended at a point on the earth's surface vertically below; with this assumption he proceeds to calculate the height of the beams above the earth. This assumption, however, requires some demonstration of its plausibility, and failing this, it would be far more philosophical if we seek rather by means of observations on well-defined arcs and coronas to determine the true inclination of the beams to the plane of the horizon. All arguments for the plausibility of Galle's assumption fail when we recall that at neighboring stations during an auroral display the magnetic needle is subject to extreme and violent fluctuations, having, so far as yet known, no simple relation to each other, and, therefore, that parallelism which may and probably does exist at ordinary or average seasons appears to fail precisely at the moment when the auroral beams are observed. I have, however, undertaken the computation of the position of the needle for a point above the earth's surface, the means for doing which are afforded in the expressions for the components X, Y, Z of magnetic force as given by Gauss. The details of this calculation are given in Appendix IV. I have selected as a representative point that which is 90° west of Greenwich and in latitude 45° north, not far, therefore, from the center of Wisconsin, for which latitude and longitude Gauss's formula gives:

	Declination.	Inclination.	Total force.
For the surface of the earth	— 7° 17′.2	75° 56′.0	1738.1
For a point elevated 1-10 of radius, or about 400 miles	— 7° 40′.2	75° 0′.6	1289.5

For the region in question, therefore, at an elevation of one-tenth of the earth's radius, the inclination of the needle is nearly one degree less than at the surface of the ground; a change that is not negligible in case we have very exact observations to deal with, but which is scarcely appreciable in the case of such as are presented in Appendices II and III. We may therefore, if need be, assume that the needle remains parallel to itself at all points in the same vertical without materially increasing the errors of results based on very crude observations.

§ 9. We shall find that the magnetic meridian—the lines, namely, that contain the magnetic needle, or local meridian, at every point, or the line described by one who proceeds along the earth's surface in the direction of the needle that he carries with him—offers a natural and useful view of the effects of terrestrial magnetism. Such meridians are represented in red on Chart No. I, together with the magnetic parallels drawn perpendicular thereto; these parallels are not necessarily lines of equal dip. The meridians here given are drawn through such cities as Saint Louis, Cincinnati, Washington, Toronto, Boston, &c. That drawn through Toronto is numbered 100° W., since it very nearly corresponds to that number of degrees west of the magnetic meridian of Greenwich as numbered on the charts of Professor Airy.

If now the auroral arches be horizontal and symmetrical about the magnetic poles,

their projections would in fact constitute magnetic parallels, such as given on Chart I. This is a hypothesis, however, that we are not at present warranted in assuming, although it is plausible, and one that has frequently found defenders. The north magnetic pole is to the northwest of the greater part of our stations, being to the west of longitude 95° W., and about in latitude 74° N. More plausible is the hypothesis of Professor Newton, that the auroral arches are on the whole parallel to the zone of greatest auroral frequency and brilliancy, as investigated by Loomis, Fritz, &c. This zone covers Labrador and British America between the latitudes 50° and 60°, its axis being there very nearly coincident with the parallel of 56° N. Our present observations harmonize only moderately well with this hypothesis; but rather stimulate to new researches freer from all assumptions.

§ 10. The next step in our analysis must consist in identifying, so far as possible, those features that were observed at several stations. In commencing this delicate work, it is necessary first to assure ourselves that the beams, arches, &c., were not so very low or near the surface of the earth as to prevent distant observers from seeing the same features. This point, about which there was originally much reason for doubt, has become clearer since it has been ascertained that Professor Newton's observations were made at Sherburne station, (155,) and not at New Haven. It does not appear that the aurora, as a whole, was so elevated as to be visible in its entirety from all our stations, and it can be shown that the arches were lower than on some previous well-authenticated occasions, and that persons distant from each other by 100 miles were prevented from seeing some, if not all, of the same individual features by reason of mere geographical positions. To the local and temporary nature of certain features and the occasional local clouds and haze, as well as to personal peculiarities, must be ascribed some of the many conflicting statements. The limits of possible visibility of atmospheric phenomena are given in the accompanying table, so far as the vision is limited by the dip and the refraction. In this table h is the height of the object above the earth and d the distance at which it appears visible in the apparent horizon.

The table is computed by the approximate formula—

$$h=\frac{3}{7R}d^2=\frac{d^2}{9235}$$

where R=radius of earth=3956 miles and h and d are expressed in miles.

And

h. In miles.	d. In miles.	d. In arc. °	h. In miles.	d. In miles.	d. In arc. °
0.01	10	0.1	100.	961	13.9
0.10	30	0.4	200.	1359	19.6
1.00	96	1.4	300.	1664	24.1
10.	304	4.4	400.	1922	27.9
			500.	2149	31.1

§ 11. It will conduce to clearness if we characterize by letters A, B, C, &c., those features of the aurora that we are able to identify as having been observed at several stations. These letters may be inserted in the text of Appendix III, by which means the collation of the reports will be much facilitated, and we shall be able to present in a condensed form the results of the great labor that has been expended upon this somewhat unsatisfactory undertaking.

The well-defined arches recorded by so many observers have, of course, been the principal objects of study, and I give in the following table a synopsis of the data relating to their positions and changes in 77 instances.

Positions of arches or belts.

Designation of arch.		Station.		Description of arch.	
Letter.	Current number.	Number.	Item.	Apparent altitude.	Time of appearance.
C	1	(66)	[2]	90°	8h. 39m. to 9h. 39m.
C	2	(153)	[1]	.....	8h. 39m. to 9h. 39m.
A	3	(155)	[1]	12° or 15°	9h. 9m.
B	4	(155)	[2]	65°	9h. 7m.
C	5	(155)	[3]	115°	9h. 49m.
B	6	(49)	[1]	50°	8h. 42m. to 9h. 57m.
	7	(49)	[2]	85°	Soon after 8h. 42m.
C	8	(49)	[3]	105°	9h. 57m.
C	9	(57)	[2]	Near 90°	8h. 50m. to 9h. 15m.
D	10	(101)	[2]	90° or less	7h. 44m. to 10h. 44m.
	11	(101)	[2]	100° or more	

Position of arches or belts — Continued.

Designation of arch.		Station.		Description of arch.	
Letter.	Current number.	Number.	Item.	Apparent altitude.	Time of appearance.
D	12	(111)	[2]	107°	8h. 14m. to 10h. 44m.
D	13	(77)	[1]	72°	8h. 50m.
D	14	(77)	[2]	108°	9h. 20m.
D	15	(77)	[3]	120°	9h. 50m(?),
	16	(47)	[1]	30°	7h. 16m. and 8h. 46m.
	17	(47)	[1]	45° and 50°	8h. 16m. and 9h. 41m. and 10h. 01m.
D	18	(47)	[2]	90°, 105°	8h. 59m. to 10h. 1m.
A	19	(4)	[1]	12°	7h. 7m. to 9h. 7m.
D	20	(4)	[3]	102°	8h. 47m. to 10h. 47m.
D	21	(151)&(4)	[3]	90°	
D	22	(11)	[1]	30°	10h. 33m.
	22	(1)	[3]	30°	10h. 18m.
	23	(8)	[1]	15°	
	24	(92)	[1]	.....	Magnificent arch.
	25	(32)	.....	.....	
	26	(53)	[3]	90°	8h. 54m. to 9h. 14m.
	27	(102)	[2]	90°	
	28	(46)	[1]	20° or 30°	8h. 55m.
	29	(43)	[2]	23°	8h. 40m.
	30	(58)	[1], [2]	Less than 12°, 12°	8h. 58m.; united at 9h. 28m.
	31	(58)	[1 & 2]	Sank toward horizon	10h. 8m.
	32	(58)	[3]	43° to 50°	8h. 58m. to 9h. 58m.
	33	(58)	[4]	Near 90° from NE. to SW	9h. 58m.
	34	(58)	[5]	90°	9h. 28m.
E	35	(63)	[3]	North of 90°; At 95°; 20° S. of 90°	8h. 26m.; 8h. 41m.; 9h. 11m.
E	36	(6)	[3]	At 90°; Disappeared at 97°	8h. 49m.; 9h. 29m.
E	37	(51)	[1]	45°	7h. 59m. to 9h. 29m.
	38	(106)	[2]	Little north of 90°	10h. 58m.
	39	(45)	[2]	Near 90°	
	40	(108)	[1]	30°	
	41	(13)&(154)	[2]	75° (or 105°??)	
	42	(13)&(154)	[3]	Near and south of 90°	9h. 48m. to 11h. 58m.
	43	(13)&(154)	[4]	105°	12h. 30m.
	44	(13)	[5]	125°	
	45	(13)	[6]	155°	
	46	(54)	[2]	.....	Very bright arch.
	47	(85)	.....	.....	A fine band.
	48	(5)	[2]	45°	
	49	(5)	[3]	60°	
	50	(34)	[1]	25°	
	51	(90)	.....	.....	A beautiful arch.
G	52	(25)	[1]	45°	7h. 56m.
	53	(16)	[1]	.....	
	54	(16)	[2]	40°	
	55	(16)	[3]	90°	10h. 4m. to 11h. 4m., no change in position.
G	56	(78)	[1]	10°	
	57	(78)	[2]	18°	8h. 24m. to 8h. 54m.
	58	(78)	[4]	25°	8h. 55m. to 9h. 5m.
	59	(3)	[2]	Low	
G	60	(69)	[1]	15°	11h. 37m.
	76	(103)	[2]	.....	
F	61	(35)	.....	.....	Double arch.
F	62	(35)	.....		
F	63	(10)	[3]	Near 90°	10h. 57m.; lasted only a few minutes.
	64	(24)	[1]	30°	
F	65	(60)	[2]	80°	8h. 43m. to 9h. 43m.
F	66	(38)	[2]	20°	8h. 46m.
	67	(38)	[3]	30°	
	68	(73)	[1]	60°	9h. 34m.
	69	(65)	.....	.....	Small arch.
	70	(27)	.....	Summit in the N. E. alt. 45°	
	71	(55)	[1]	Summit in the N. N. E. alt. 13°	
	72	(76)	[1]	.....	Double arch.
	73	(76)	[2]		
	74	(9)	.....	.....	Beams or parts of arches in E. and N. E.
	75	(12)	.....	.....	Arch of doubtful character.
	76	(103)	[2]	.....	Perhaps a zenithal arc.
	77	(18)	[1]	.....	Irregular arch.

In this table the altitudes have been, for the sake of uniformity, reckoned from 0° at the north to 180° at the south point, and might be properly called meridional distances from the north point.

§ 12. If now I assume that the auroral light emanated from regions elevated 100 miles or more above the earth's surface, I find it impossible to reconcile the innumerable discrepancies in any manner consistent with due respect for accuracy and fullness of the observers' reports. The lower I place the seat of the phenomenon the better agreement do I find between the records, and the simpler the explanation of the discordances. For instance, assuming the average altitude of the arches to be 69 miles, (corresponding to one degree of the meridian in this latitude,) I have plotted about fifty of the seventy-seven arches noted in the preceding table, and by allowing a rather wide range of errors, one might be satisfied to conclude that numbers 3 and 19 refer to the same arch A, and so on for other arches, as shown in the following table:

Identifications of arches.

Designations of arches.		Region over which arch must have been vertical.	
Number.	Letter.*	Latitude.	Longitude.
3, 19	A	47°.5	From 72° to 74°.
4, 6	B	44°.4	72° to 73°.
1, 2, 8, 9, 26, 27, 29	C	43°.2 to 43°.8	71° to 76°.
10, 11, 12, 13, 14, 15, 18, 20, 21, 22	D	Moved N. and S., between 42° & 43°	72° to 74°.
35, 36, 37	E	43°.6	76°.5.
61, 62, 63, 65, 66	F	From 44° to 45°	88° to 92°.
52, 56, 60	G	48° to 49°	83° to 88°.

* These letters are also given in the table of the preceding article.

On the other hand, when I consider not merely the apparent altitudes but the diverse appearances and motions of these arches, I am forced to conclude that these identifications are quite illusory, and the possession of records from so many places in New York and New England has seemed to justify the conclusion that the auroral light emanated from a region much nearer to the earth than 69 miles, unless indeed we give up the idea that the auroral light has a definite position.

§ 13. The movements of the aurora are described as a rising or falling motion when an arch is in the northern part of the sky, corresponding to a movement from the north or south respectively, when the arch is near the zenith. The principal cases noted are as follows:

Meridional motions of arches.

Station.	Item.	Arch.	Motions.
(155)	1	3 A.	9h. 9m., the northern arch rising.
(49)	2	7	8h. 42m. to 9h. 57m., arch moved slowly and irregularly from a few degrees N. of the zenith to 14° S.
(57)	2	9 C.	8h. 50m., arch near the zenith, moving slowly southward.
(101)	2	10 D.	Bow moved from a little N. of zenith to 10° or more S.
(77)	3	15 D.	9h. 45m., band 18° S. of zenith moved slowly S. to zenith, distance 25° or 29°.
(47)	1	16 & 17	7h. 16m. to 8h. 28m., arch moves from altitude 30° up to 45°.
			8h. 46m., arch receding to 30° or 40°.
			9h. 41m., altitude of arch 50°.
			10h. 1m., arch receded to 40°.
(47)	2	18 D.	9h. 1m., belt through the zenith.
			9h. 21m., belt 10° or 15° S. of zenith.
			9h. 41m., belt re-appears 10° or 15° S. of zenith.
(4)	3	20 D.	8h. 47m. to 9h. 32m., zenithal arch moving slowly southward.
			9h. 32m. to 10h. 7m., stationary.
			10h. 7m. to 10h. 47m., returned northward to original position.
(53)	3	26	8h. 54m. to 9h. 14m., zenithal arch does not change its position.
(58)	2	30	9h. 3m., arch is sinking gradually.
			9h. 58 m., arch [1 and 2] has moved up higher.
			10h. 8m., arch [1 and 2] again sank toward horizon.
	3	32	8h. 58m. to 9h. 58m., arch [3] appeared and re-appeared higher up.
	5	34	9h 28m. to 9h. 43m., zenithal arch moved southward.
(63)	3	35 E.	8h. 26m. to 9h. 11m., band moves from N. of zenith, southward, to zenith, distance 15° or 20°.
(6)	3	36 E.	8h. 49m. to 9h. 19m., zenithal belt moves toward the S.
(13)	9	42	9h. 58m. to 11h. 8m., occasionally zenithal arch [3] would wave from N. to S., and vice versa.
(154)	2	42 (?)	10h. 8m., at times zenithal bow moved from N. to S.
(103)	2	76	9h. 49m. to 10h. 34m., arch swayed slightly from N. to S.
(38)	3	67	9h. 16m., to 9h. 31m., arch rose to altitude 30°.
18	1	77	9h. 45m., irregular belt on the northern horizon.
			10h. 50m., broken arch, altitude 60°.

Arch D is the only one for which sufficient observations are given to afford us the means for comparing observed motions, while it is recorded at stations (101 and 77) that this arch moved southward, the observer at station (18) records its disappearance and re-appearance, while the observer at station (20) notes only the fact that it remains stationary, and began moving northward, after having reached its southernmost position.

These different records might be plausibly combined together but do not seem to me to afford any argument in favor of the identification of the arches, especially when we consider the uncertainty and indefiniteness of the recorded times.

§ 14. The east and west motions, both of streamers above arches and of points of light in the zenithal belts, are collected in the following table:

East and west movements of beams and waves.

Station	Item.	Arch.	Motion from—	Text.
66	[2]	1 C.	W.	About 8h. 39m., a bright band rose from the W. and passed to the E.
155	[1]	3 A.	E.	9h. 26m., westward motion of streamers.
155	[2]	4 B.	E.	8h. 48m., and earlier, stripes moving westward along the belt, [2] maximum velocity, 2° or 3° per second.
155	.....	.....	E.	9h. 59m., streamers in belt [3] move westward one-half degree per second fitfully.
155	[4]	4 B.	W.	10h. 58m., due W.; column of light [may have been there much earlier.]
49	[2]	7	W.	8h. 42m., *et seq.*, white arch moved from W. nearly across to E.
49	[3]	.....	W.	10h. 17m., white column sprang up from due W.
(28)	[1]	.....	N. W.	7h. 40m. to 11h. 40m., *et seq.*, column in N. W. moved over to the S. E.
(7)	[2]	.....	N. W.	7h 44m. to 1h. 44m., column in N. W. moved S. E. through zenith.
57	[1]	.....	E.	9h. 25m., streamers began moving westward.
57	[2]	9 C.	E.	8h. 50m. to 9h. 15m., zenithal arch whose light near the zenith was driven with great rapidity from E. to W.
77	[4]	15	.....	9h. 50m., wave ran along arch [3] (18° S. of zenith.)
47	[1]	.....	W.	8h. 31m., merry-dancers in N. sky moving from W. to E.
47	[3]	.....	W.	9h. 21m., curtain formation in N. sky; undulations from W. to E.
47	[2]	18 D.	E.	9h. 21m., while those in the belt zenith arch [2] move from E. to W.
4	[2]	.....	W.	8h. 47m. to 9h. 7m., curtain formation in the N.; undulatory motion from N. W. to S. W., (N. E.?)
53	[3]	26 C.	E.	8h. 54m. to 9h. 14m., zenithal arch; gentle wave-like motion from E. to W.
102	[2]	27 C.	E.	Jets moved from E. through zenith to W.; band continues, sometimes appearing and disappearing.
46	[2]	.....	E. W.	Streamers on the northern arch move from E. to W. several times.
58	[5]	34	E.	9h. 28m., narrow belt passes from due E., near horizon, through zenith to near W. horizon. [May not refer to motions but only positions.]
6	[3]	36	E.	8h. 44m., cloud in E.; 8h. 49m., arch proceeded from a cloud, and in a moment reached the W. horizon.
(62)	[1]	.....	E.	9h. 57m., striated patches in the N. float from E. to W.
(106)	[2]	38	W.	10h. 58m., *et seq.* A streak from N. W. to S. E., near the zenith, moved E., so that W. end could be seen.
(13)	[3]	42	E.	9h. 48m., slender column shot up from E. horizon, and puffs of vapor issued from zenith toward W.; 9h. 58m., formed a perfect arch, ripples [8] in which, near the zenith, moved rapidly from E. to W.; occasionally the arch divided—re-unites.
(54)	[2]	46	E.	10h. 8m., magnificent zenithal bow ran from E. to W. [This may refer to position only.]
(85)	[3]	47	E.	Auroral vapors pass from E. to W. along arch [2]. [This arch must have stretched from N. W. to N. E.]
(5)	[4]	.....	.....	11h. 13m., merry-dancers near the zenith, moving toward zenith from every point except S.
(16)	[4]	54	St'ny	8h. 54m., *et seq.* Beams above arch [2] shooting to the zenith, but no lateral motion.
(16)	[5]	55	St'ny	10h., *et seq.* Beams from zenithal arch [3] shoot southward to horizon.
(78)	[3]	.....	E.	8h. 54m., *et seq.* Curved line of streamers [curtain formation] moving rapidly for ten minutes from E. to W.
(78)	[4]	58	E.	9h. 5m., *et seq.* Soon after [3] had disappeared, a broad belt moved rapidly from E. to W. forming an arch, altitude 25; soon disappeared.
(103)	[1]	76	E.	9h. 49m., cloud of light in the E. expanding due W., forming a narrow arch [2]; motion W.; this arch gradually receded to the E.
(21)	[4]	64	E.	9h. 41m., streamers moving from E. to W. along arch [1] in the N.
(15)	[2]	.....	E.	12h. 43m., five streamers moving from due E. westward.
(74)	[1]	.....	E.	8h. 49m., aurora began with banner in the E., extending northwestward.
(38)	[3]	67	E.	9h. 31m., narrow arch from E., 15° N. W., 15° N.
(38)	[3]	67	W.	9h. 36m., contracted to a patch in the E, and had disappeared at 9h. 46m.
(38)	[1]	66?	E.	10h. 16m., a few streamers in the N. moved from E. to W.
(9)	[3, 4, 5]	74	S. E.	11h. 4m., three streamers, beginning at S. of E., reach over toward N. E. and N. W.; disappear entirely at 11h. 24m.
(9)	[6]	74?	E. S. E.	11h. 24m., a single beam extends from E. S. E. over the zenith toward W. N. W.; disappeared at 12h. 4m.

A brief consideration of the E. and W. movements, recorded in the preceding table, shows that the formation of auroral arches proceeded from a region over Eastern New York, corresponding nearly with Lake Champlain and the Hudson River Valley, whence waves or beams of light moved eastward over New England and westward over the Lake Region.

The disappearance or fading of the light was accompanied by an inverse movement or contraction toward Central New York. Station 47 notes that the movements in the northern sky were from W. to E., while those at the zenith and S. of it were from E. to W.; and the records of other observers agree with this to such an extent as to justify the statement that apparently in general the development of light was accompanied by a motion from the central region, while its decline or disappearance was accompanied by movements toward the central region. Especially are these statements confirmed by phenomena recorded at extreme western stations. Of the velocity of this motion I can give no determination. The estimates of apparent angular velocity are in general quite crude, and if we have recourse to the comparison of the times of formation and breaking up of arches at neighboring stations, we meet with two difficulties: first, the uncertainty of the recorded times; and second, the extreme probability that the development of light generally began at several points in an E. and W. line, and proceeded forward from each simultaneously, precisely as was observed at Station (13) [3] between $9^h\ 48^m$ and $9^h\ 58^m$.

§ 15. The similarity of the phenomena described in the preceding paragraphs to those of the electric discharge continually forces itself upon the attention. In the latter, the dielectric between the charged conductor and neighboring bodies, (on which the conductor acts inductively,) is in a state of electric tension—such that, if favorable molecular changes take place at one or more points in its substance, a discharge takes place along the line, connecting these points. We can reproduce the same conditions in the case of the aurora of April 7, if we suppose the electrified bodies to be masses of atmosphere E. and W. of New York, acting upon each other through the intermediate air, in which, regions favoring the electric discharge are formed by the cooling of the air and condensation of its vapor.

On the other hand, if the formation of arches had not been so prominent a feature, the vertical movements of the beams, streamers, or merry-dancers would have suggested simply an electric discharge upward between the earth and atmosphere. In general, therefore, it is allowable to consider an aurora as an electric discharge between the earth and upper atmosphere on the one hand, and, on the other, between various portions of the atmosphere itself, the details of which are very nearly as follows:

(*a.*) The auroral light exists sometimes as patches or clouds, but more frequently as luminous lines, inclined to the earth's surface, and approximately parallel to the free magnetic needle.

(*b.*) The luminous lines are associated together, forming wave and cylindric surfaces, either of which appears sharply defined in the portions where their tangent planes are directed toward the observer, giving rise to the appearance of beams or streamers which are therefore ill-defined on one edge, but sharply defined on the other.

(*c.*) The luminous wave surfaces are themselves arranged parallel to each other, giving rise to arches or belts across the sky, which, when the observer is favorably situated so that his lines of sight are nearly parallel to the luminous lines, are seen by him as striated belts or arches, each stria of which corresponds to an elementary wave surface, and which structure is well described by the observer at station (49) as resembling the vertebræ and ribs of an animal. A slight curvature in the luminous lines or a perspective effect prevents the striated appearance from being well seen except near the meridian. When the luminous lines are quite straight, and especially when associated together in perfect parallelism, but without being grouped into wave surfaces, there results the corona around the magnetic zenith with merry-dancers on all sides, as recorded by the observer at station (5) [4] $11^h\ 13^m$. This phase of the aurora is probably best seen when the luminous lines are comparatively short.

(*d.*) Inasmuch as the definite edge of a streamer is simply an optical effect produced by viewing those portions of a curved surface that lie in the tangent plane that passes to the observer, it follows that a person at a distance, viewing the same wave surface will receive from a slightly different portion thereof the impression of a definite streamer, if, indeed, he sees any at all. For a similar reason, that which appears to one as a well-defined arch or belt near his zenith will appear to an observer further S. as a collection of streamers which may, in fact, easily become so faint or ill-defined as to be scarcely noticeable, while the streamers which he does observe, as such, may be formed by an entirely different set of luminous lines and surfaces. Furthermore, an observer to the N., looking southward, may, with equal ease, be observing quite a different object from either of the others. The statement is therefore warranted that although the auroral light emanates from definite points and lines, yet the arches and streamers have no proper locus.

(*e.*) The luminous lines have motions both transverse and parallel to their direction,

but, in addition to this, slight changes in the flexures or arrangement of the luminous surfaces, arrayed, as they often are, one behind the other, give rise to a complete change in the appearance of the arches and beams. Thus it results that the movements of the arches up and down, or N. and S., and the movements of the beams or striæ, take place in a manner entirely diverse from the changes going on among the luminous points.

(*f.*) A comparison of the apparent angular motion E. and W. of the waves near the zenith, and of the streamers observed from stations further S. would, if the same objects were observed, afford an additional means of determining the average elevations of the mass of light. The data at hand are too crude to afford any result, in the present case the general indications are, however, very strongly in favor of the conclusion that the luminous lines were within ten miles of the earth.

(*g.*) The electric phenomena of the atmosphere embrace on the one hand lightning, attending cumulus clouds, and, on the other, the aurora, attending cirrus or stratus and haze, and in both cases the electrification of the atmosphere is evidently primarily due to the inductive influence of the earth. Between these comes a third class of electric discharges, that, namely, which gives rise to the phosphorescence of clouds. Such phosphorescence was noted April 7th, at stations (109) and (12;) it has been observed by myself in Washington on occasions too numerous to enumerate, when the whole heavens were obscured and rain or snow imminent; especially has it been remarkably distinct on the edges of the banks of clouds advancing from the N. W., and immediately preceding a sudden change from warm, moist, southerly to cold, dry N. or N. W. winds; it has also been frequently recorded in connection with the lightning and rain of hurricanes. In fact the luminous or phosphorescent clouds due to the silent discharge of electricity between their component atoms is a far more frequent phenomenon in these latitudes than either lightning or aurora, and connects together all the luminous electric phenomena of the atmosphere in such a way as to show that while the electricity is due to the induction of the earth, the form of the discharge is due to the state in which the atmospheric moisture exists at the time.

(*h.*) It accords with the preceding views that we find the beams and arches higher above the ground and far less numerous and brilliant in the W. than in the E., and that, in general, the Lower Lakes and New England have ever been distinguished by brilliant auroral displays, since here not only mountains with their high elective tension but moisture and rapid alternations of temperature predominate.

(15.) The present study, therefore, tends to remove the aurora from among the cosmic and to bring it among the atmospheric phenomena, but the crudeness of my data constrains me to hope that, for the further elucidation of this subject, the number of aurora observers may be increased, especially in New York and New England, and that they will adopt a uniform standard of time, for which Washington time is preferable, since it may always be obtained by telegraph from the Naval Observatory, and affords the most convenient standard for the United States.

CLEVELAND ABBE.

OCTOBER 25, 1876.

APPENDIX I.—TABLE I.

AURORA OF APRIL 7, 1874.

Stations and observers.

Current number.	Locality.	Observer.	Latitude.		Longitude.		Reduction to Washington time.	Altitude.
		SIGNAL-SERVICE OBSERVERS.	°	′	°	′	*Minutes.*	*Feet.*
1	Squan Beach, N. J	Furnished by the Chief Signal-Officer.	40	8	74	1	12 E.	23
2	Sandy Hook, N. J	do	40	28	74	1	12 E.	23
3	Toledo, Ohio	do	41	40	83	32	24 W.	649
4	Albany, N. Y	do	42	40	73	45	13 E.	174
5	Erie, Pa	do	42	07	80	10	13 W.	672
6	Oswego, N. Y	do	43	28	76	35	1 E.	299
7	New Haven, Conn	do	41	17	72	57	16 E.	107
8	Barnegat, N. J	do	39	48	74	0	11 E.	21
9	Saint Paul, Minn	do	44	53	93	5	64 W.	794
10	Grand Haven, Mich	do	43	5	86	18	37 W.	616

1

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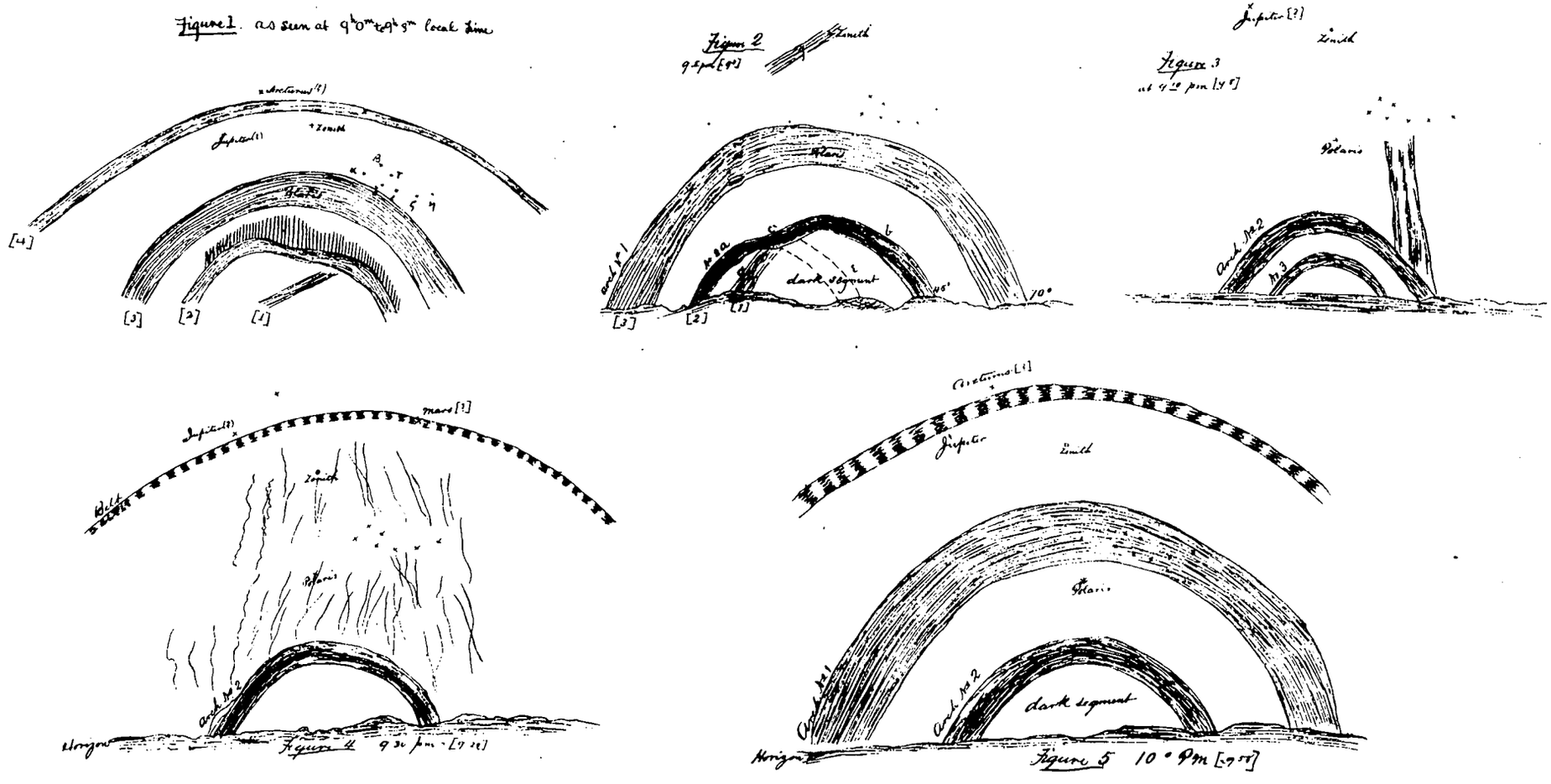

Aurora April 7th 1874 As observed by Henry Haas at Dexterville Jefferson Co. New York

2

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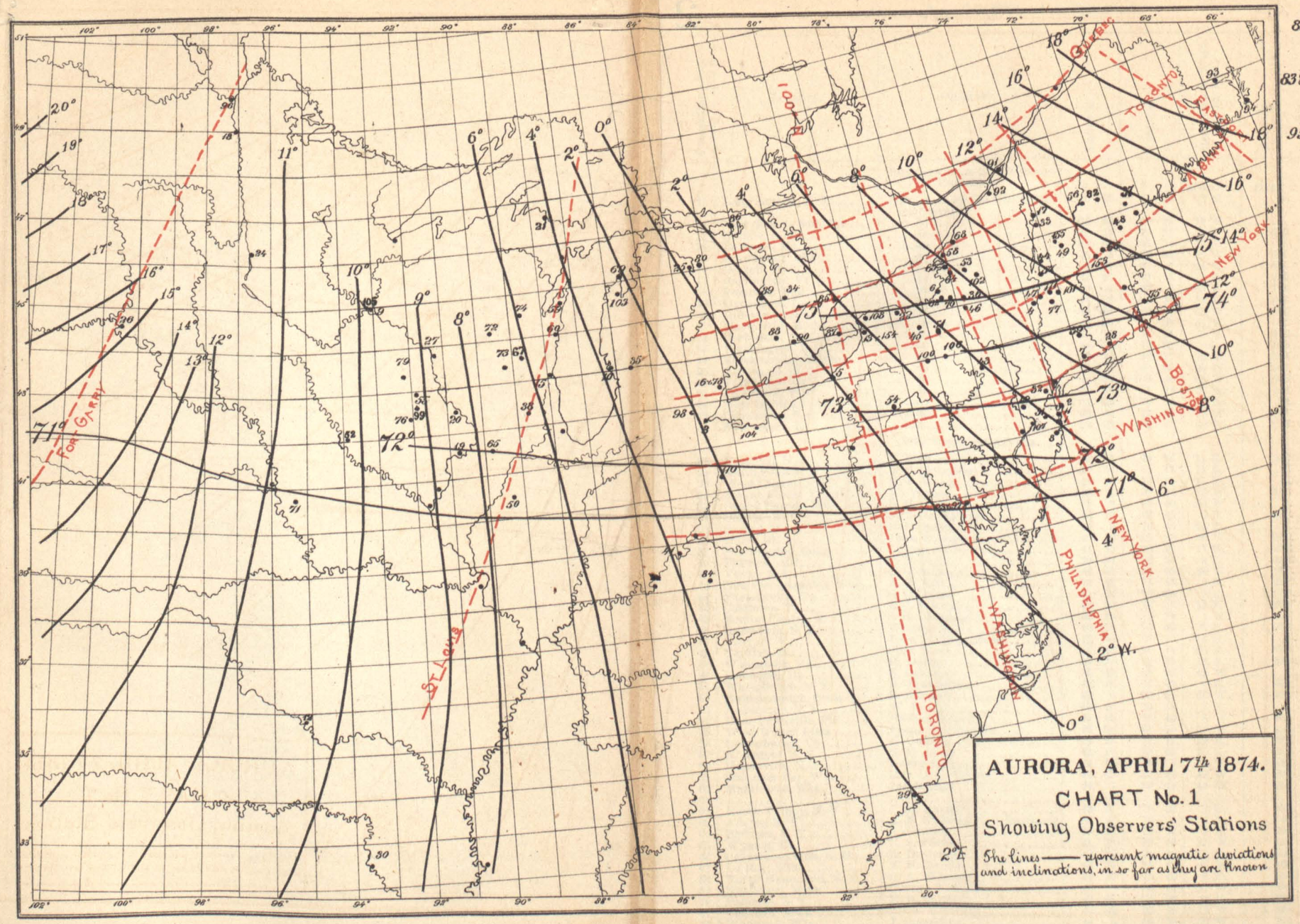

81. St John's N.F.
Lat. 47°.34. Lon. 52°.40.

83 & 109. Harbor Grace N.F.
Lat. 47°.41. Lon. 53°.13.

95. Sydney C.B.
Lat. 46°.12 Lon. 60°.12.

Red lines show Magnetic meridian and parallels

Aurora of April 7, 1874.—Continued.

Current number.	Locality.	Observer.	Latitude.		Longitude.		Reduction to Washington time.	Altitude.
		SIGNAL-SERVICE OBSERVERS.—Continued.	°	′	°	′	*Minutes.*	*Feet.*
11	Long Branch, N. J	Furnished by the Chief Signal-Officer.	40	18	73	59	12 E.	28
12	Fort Gibson, Ind. Ter	do	35	43	95	16	72 W.	.....
13	Buffalo, N. Y	do	42	53	78	55	8 W.	662
14	Eastport, Me	do	44	55	66	54	45 E.	61
15	Milwaukee, Wis	do	43	3	87	54	43 W.	661
16	Detroit, Mich	do	42	21	83	7	24 W.	656
17	Burlington, Vt	do	44	29	73	15	15 E.	222
18	Pembina, Dak	do	49	0	97	5	80 W.	790
19	Davenport, Iowa	do	41	32	90	38	54 W.	603
20	Dubuque, Iowa	do	42	30	90	45	55 W.	665
21	Marquette, Mich	do	46	33	87	36	41 W.	666
22	Rochester, N. Y	do	43	8	77	51	2 E.	584
23	Washington, D. C	do	38	54	77	03	0	105
24	Breckenridge, Minn	do	46	11	96	17	79 W.	966
25	Alpena, Mich	do	45	5	83	28	26 W.	607
26	Fort Sully, Dak	do	44	39	100	40	95 W.	1,688
27	La Crosse, Wis	do	43	48	91	23	57 W.	686
28	New London, Conn	do	41	22	72	09	20 E.	24
29	Charleston, S. C	do	32	45	79	55	12 W.	61
30	Shreveport, La	do	32	30	93	45	66 W.	229
		VOLUNTARY OBSERVERS.						
31	Freehold, N. J	T. Richardson	40	15	74	16	11 E.	200
32	South Orange, N. J	W. J. Chandler	40	44	74	17	11 E.	90
33	West Charlotte, Vt	M. E. Wing	44	20	73	15	15 E.	90
34	Mount Forest, Canada	W. Wylie	44	1	80	54	15 W.	450
35	Grand Rapids, Mich	L. H. Streng	43	0	85	40	34 W	.....
36	Oneida, N. Y	Stillman Spooner	43	10	75	45	5 E.	500
37	Oxford, Me	H. D. Smith	44	8	70	30	26 E.	.....
38	Riley, Ill	John W. James	42	12	88	33	46 W.	900
39	Southington, Conn	Luman Andrews	41	35	72	51	17 E.	294
40	Fallston, Md	G. E. Curtis	39	31	76	24	3 E.	450
41	Vevay, Ind	C. G. Boerner	38	46	84	59	32 W.	525
42	New Germantown, N. J	A. B. Noll	40	40	74	45	9 E.	257
43	Factoryville, Pa	G. C. Green	41	34	75	50	5 E.	1,060
44	Castleton, Vt	R. J. Williams	43	37	73	8	16 E.	490
45	Benton Centre, N. Y	S. H. Chapman	42	44	77	11	1 W.	.....
46	Cazenovia, N. Y	William Soule	42	55	75	46	5 E.	1,260
47	Troy, N. Y	John W. Heimstreet	42	44	73	40	14 E.	55
48	Cornish, Me	Silas West	43	40	70	44	25 E.	784
49	Woodstock, Vt	H. Doton	43	36	72	36	18 E.	698
50	Hennepin, Ill	E. Osborne	40	30	89	20	49 W.	.....
51	Waterburgh, N. Y	D. Trowbridge	42	30	76	48	1 E.	800
52	Boonsborough, Iowa	E. Babcock	42	5	93	55	68 W.	1,160
53	Houseville, N. Y	W. D. Yale	43	40	75	32	6 E.	.....
54	Near Pennville, Pa	Nathan Moore	41	10	78	40	6 W.	1,400
55	West Union, Iowa	Frank McClintock	42	58	91	50	59 W.	1,250
56	Lunenburgh, Vt	H. Cutting	44	28	71	41	22 E.	1,210
57	N. Argyle, N. Y	G. M. Hunt	43	18	73	20	15 E.	290
58	Depanville, N. Y	Henry Haas	44	10	76	8	2 E.	350
59	Sturgeon Bay, Wis	Mrs. C. C. Pinney	44	45	87	22	42 W.	625
60	Manitowoc, Wis	Jacob Lüps	44	7	87	45	43 W.	658
61	.....	.....	.....	.....	.....	.....	.....	.....
62	North Volney, N. Y	J. M. Partrick	43	25	76	20	3 E.	350
63	Adams, N. Y	A. B. Watkins, R. S. Bosworth	43	48	76	0	4 E.	640
64	Rodman, N. Y	S. Johnson	43	45	75	55	5 E.	500
65	Wyanet, Ill	E. S. Phelps	41	30	89	40	51 W.	750
66	Contoocookville, N. H	E. D. Couch	43	15	71	30	21 E.	450
67	Le Roy, Wis	E. H. Benton	43	34	88	45	46 W.	1,000
68	North Hammond, N. Y	C. A. Wooster	44	30	75	40	6 E.	200
69	Northport, Mich	George N. Smith	45	8	85	43	37 W.	592
70	Palermo, N. Y	E. B. Bartlett	43	26	76	26	3 E.	397
71	Clarinda, Iowa	—— Peterson	40	43	95	21	73 W.	1,044
72	Wautoma, Wis	J. Spaulding	44	5	89	30	50 W.	900
73	Rocky Run, Wis	W. W. Curtis	43	26	89	12	49 W.	755
74	Embarrass, Wis	J. E. Breed	44	31	88	37	49 W.	.....
75	Kingston, Mass	G. S. Newcomb	42	0	70	45	25 E.	65
76	Independence, Iowa	J. Warne	42	25	92	6	60 W.	940
77	Williamstown, Mass	C. M. Dodd, F. H. Andrews	42	43	73	13	15 E	.....
78	Detroit, Mich	F. W. Higgins	42	18	83	4	24 W.	577

Aurora of April 7, 1874—Continued.

Current number.	Locality.	Observer.	Latitude.	Longitude.	Reduction to Washington time.	Altitude.
		VOLUNTARY OBSERVERS—Con'd.	° ′	° ′	*Minutes.*	*Feet.*
79	Cresco, Iowa	G. Marshall	43 23	92 10	61 W.	1,858
80	Sugar Island, Mich	J. W. Paxton	45 2	83 6	24 W.	574
81	St. John's, N. F	John Delaney	47 34	52 40	98 E.	150
82	Shelburne, N. H	Fletcher Odell	44 23	71 8	24 E.	740
83	Harbor Grace, N. F	Archibald Munn	47 41	53 13	87 E.	60
84	Winchester, Ky	James M. Ogden	38 4	84 15	29 W.	875?
85	Toronto, Can	Furnished by observatory at Toronto.	43 39	79 23	9½ W.	.....
86	Little Current, Can	do	46 0	81 59	20 W.	.....
87	Welland, Can	do	43 0	79 30	10 W.	.....
88	Granton, Can	do	43 12	81 20	18 W.	.....
89	Pt. Clark, Can	do	44 6	81 52	19 W.	.....
90	Ingersoll, Can	do	43 3	80 58	8 W.	.....
91	Montreal, Can	do	45 31	73 33	14 E.	.....
92	Huntingdon, Can	do	45 5	74 10	20 E.	.....
93	Frederickton, N. B	do	45 57	66 39	40 E.	.....
94	St. John, N. B	do	45 17	66 4	44 E.	.....
95	Sydney, C. B	do	46 12	60 12	68 E.	.....
96	Winnipeg, B. A	do	49 52	97 0	80 W.	.....
97	Washington, D. C	J. R. Eastman	38 54	77 3	0	100
98	Adrian, Mich	J. J. Breedon	41 53	84 5	28 W.	.....
99	Guttenberg, Iowa	J. C. Dickinson	42 45	91 50	55 W.	690
100	Tioga, Pa	E. J. Bentley	41 55	77 10	0	1,000
101	Florida, Mass	Jacob Davis	42 39	73 1	16 E.	1,850
102	South Trenton, N. Y	S. Barrows	43 30	75 4	9 E.	835
103	Traverse City, Mich	E. S. Wait	44 45	85 40	34 W.	598
104	Sandusky, Ohio	Thomas Neill	41 27	82 26	22 W.	850
105	Saint Anthony, Minn	N. H. Winchell	44 57	93 21	65 W.	821
106	Nichols, N. Y	Robert Howell	42 0	76 32	2 E.	.....
107	Fallsington, Pa	E. Hance	40 12	74 48	9 E.	30
108	Lockport, N. Y	B. W. Clark	43 11	78 47	7 W.	.....
109	Harbor Grace, N. F	Henry Clift	47 41	53 13	95 E.	.....
110	Bellefontaine, Ohio	W. Barringer	40 23	83 40	27 W.	1,237
111	North Adams, Mass	B. D. Frost	42 42	73 10	16 E.	710
112 to 150	.....	.....	.....	.....	.....	.....
		EXTRACTS FROM NEWSPAPER REPORTS.				
151	Albany, N. Y	.....	42 40	73 45	13 E.	.....
152	Troy, N. Y	.....	42 44	73 40	13 E.	.....
153	Concord, N. H	.....	43 25	71 40	22 E.	.....
154	Buffalo, N. Y	.....	42 53	78 55	7 E.	.....
155	Sherburne, Vt	H. A. Newton	43 43	72 48	17 E.	.....

APPENDIX I.—TABLE II.

Stations arranged in order of longitude.

Stations.	Longitude.	Latitude.	Stations.	Longitude.	Latitude.
	° ′	° ′		° ′	° ′
81	52 40	47 34	66	71 30	43 15
83 and 109	53 13	47 41	153	71 40	43 25
95	60 12	46 12	155	72 48	43 43
93	66 39	45 57	49	72 36	43 36
94	66 4	45 17	39	72 51	41 35
14	66 54	44 55	28	72 0	41 22
37	70 30	44 8	7	72 57	41 17
48	70 44	43 40	91	73 33	45 31
75	70 45	42 0	17	73 15	44 29
56	71 41	44 28	33	73 15	44 20
82	71 8	44 23	44	73 8	43 37

Stations arranged in order of longitude—Continued.

Stations.	Longitude.		Latitude.		Stations.	Longitude.		Latitude.	
	°	′	°	′		°	′	°	′
57	73	20	43	18	89	81	52	44	6
101	73	1	42	39	88	81	20	43	12
111	73	10	42	42	104	82	26	41	27
77	73	13	42	43	25	83	28	45	5
152 and 47	73	40	42	44	80	83	6	45	2
151 and 4	73	45	42	40	16	83	7	42	21
2	74	1	40	28	78	83	4	42	18
11	73	59	40	18	3	83	32	41	40
1	74	1	40	8	110	83	40	40	23
8	74	9	39	48	98	84	5	41	53
92	74	10	45	5	41	84	59	38	46
32	74	17	40	44	84	84	15	38	4
42	74	45	40	40	69	85	43	45	8
31	74	16	40	15	103	85	40	44	45
107	74	48	40	12	35	85	40	43	0
68	75	40	44	30	10	86	18	43	5
64	75	55	43	45	21	87	36	46	33
53	75	32	43	40	59	87	22	44	45
102	75	4	43	30	60	87	45	44	7
36	75	45	43	10	15	87	54	43	3
46	75	46	42	55	74	88	37	44	31
43	75	50	41	34	67	88	45	43	34
58	76	8	44	10	38	88	33	42	12
63	76	0	43	48	72	89	30	44	5
6	76	35	43	28	73	89	12	43	26
62	76	20	43	25	65	89	40	41	30
70	76	26	43	26	50	89	20	40	30
51	76	48	42	30	20	90	45	42	30
106	76	32	42	0	19	90	38	41	32
40	76	24	39	31	27	91	23	43	48
23 and 97	77	3	38	54	55	91	50	42	58
22	77	51	43	8	99	91	50	42	45
45	77	11	42	44	79	92	10	43	23
100	77	10	41	55	76	92	6	42	25
108	78	47	43	11	105	93	21	44	57
13 and 154	78	55	42	53	9	93	5	44	53
54	78	40	41	10	52	93	55	42	5
85	79	23	43	39	30	93	45	32	30
87	79	30	43	0	71	95	21	40	43
29	79	55	32	45	12	95	16	35	43
5	80	10	42	7	24	96	17	46	11
34	80	54	44	1	96	97		49	52
90	80	58	43	3	18	97	5	49	0
86	81	59	46	0	26	100	40	44	39

APPENDIX II.

The original reports of observations.

The reports of observations of the aurora are classified as those of (A) Signal-Service observers, (B) voluntary observers, (C) reports obtained from newspapers and scientific publications.

In the following notes there are given for each station the copies of the observers' records very nearly as they have been received at this office. The numbers by which the stations are known are as given in Appendix I, Table I. Any additions that have been made by myself are inclosed in brackets, [ ], and relate especially either to the conversion into Washington time, corresponding to the observer's local time, or to the altitude and azimuth corresponding to the observer's description, or else to the number by which, for convenience of reference, I have designated the individual items that are mentioned in the notes. Azimuths are assumed unless there is contrary evidence to have been counted from 0° at the south through 90° at the west, and so on to 360°. Duplicate accounts in slightly-different words are sometimes inserted in parenthesis.

(1.) *Squan Beach.*—An aurora visible at 10.30 p. m. [10.18,] was of the first class. Altitude of arch [3] 30°. Azimuth 160° to 190°. (Two streamers visible at 11 p. m., [10.48.]) At 11.12 p. m. [11.0] two streamers [2] visible within the arch; altitude of streamers [2] was about 20°, sometimes rising to 30° and inclined to the northeast at an angle of about 85°. The aurora was bounded by an arch of heavy cloud [1 ;] became indistinct at 11.30 p. m., [11.18.]

(2.) *Sandy Hook.*—At 10.50 p. m. [10.38] a faint aurora [1] was observed growing

brighter until 11.20 p. m. [11.08] when it was hidden by the fog [2;] its variety, extent, and altitude could not be ascertained for the fog.

(3.) *Toledo.*—At a few minutes before 9 p. m. [9.26] a perfect auroral corona [1] [arch?] was observed by Private Montague, who was on duty at the time. Its position in the sky was N. N. E at an elevation (of its center) of about 55° from the horizon. The beams all tended into the center and were of a brilliant white color. An irregular arch of light [2] was observed very low down on the horizon. After about 30 minutes [10.0] the sky was overcast with cirrus clouds and the aurora was obscured.

(4.) *Albany.*—A continuous auroral display took place between 7.20 p. m. [7.07] and 11.20 p. m. [10.07.] At first, an arch [1] on the northern heavens, with its extremities at 160° and 220° in azimuth, and its vertex at an altitude of 12°, superposing a dark segment [0] of what seemed heavy clouds, and exhibiting a white light of moderate brilliancy. Numerous streamers of from two to three degrees in breadth issued from the arch to an altitude of 30°. Although white light was predominant in these streamers, rays of light-red light were observed. Several streamers were apparently in front of the dark segment, and through the latter the former could be seen.

At 9 p. m., [8.47,] streamers became innumerable, and, as it were, the arch seemed to be dissolved into brilliant streamers of a light crimson tint, which rapidly one after the other shot up to an altitude of 30°; then just as rapidly forming into a curtain formation [2] of nearly 20° in height extending from 160° W. to 220° W. in azimuth, with a slight inclination toward the northwestern horizon.

The light exhibited by this curtain [2] was principally white, with light-yellow, blue, and even greenish tints, while its undulating motion from N. W. to S. W. was exceedingly slow.

At 9.20 p. m. [9.07] the phenomenon faded out, and light fleecy clouds [4] of similar formation were observed in the same position. Simultaneously [8.47] with the curtain [2] formation a perfect arch, [3,] extending from 100° W. to 200° [?] [260°] W. in azimuth, and passing through a point 12° S. of the zenith, was observed. This arch, 4° in breadth, exhibited brilliant white light, and continued until 11.20 p. m., [11.07,] moving slowly toward the south until 9.45 p. m., [9.32,] remaining stationary until 10.20 p. m., [10.07,] and returning to the position from which it had started at 11 p. m., [10.47.]

(5.) *Erie.*—An aurora observed as a luminous [1] appearance in the N. at 8 p. m., [8.13.] Shortly after, beams shot up to an altitude of 45°. At 9 p. m. [9.13] it again changed to two arches, [2 and 3,] (see Loomis's Meteorology, p. 174, art. 348,) extending entirely across the heavens from E. to W., the first [2] having an altitude of 45°, the second [3] of 60°; also, beams from lower to upper arch. At 11 p. m. [11.13 extremities from N. E. to N. W. Afterward, at 11 p. m., [11.13,] arches disappeared and aurora changed to merry dancers, [4,] appearing almost directly in the zenith, and seeming to have a motion from every point of compass except the extreme S. Light of pale or straw color. (This is the finest auroral display I have observed at this station.) Aurora disappeared at 12 m., [12.13.]

(6.) *Oswego.*—At 8.40 [8.39] a dark [2] segment or cloud was observed resting upon the northern horizon, extending from N. E. to N. W. At 8.45 [8.41] there appeared in the E. a cloud [3] more dense than the one referred to, and of a conical shape, resembling a cumulus cloud. At 8.50 p. m. [8.49] an arch [3] of a pale straw color seemed to proceed from this cloud toward the zenith, and in a moment had reached the western horizon; extremities were due E. and 60° W., (or 15° N. of W.) This lasted until 9.20 p. m., [9.19,] the eastern extremity changed about 5° to the S. of E., when the belt or arch began to recede more toward the south and gradually disappeared; the summit of arch was a little south (say, 7°) of zenith. At the same time the dark [2] segment resting in the north began to quiver, extending in filaments upward; beyond this cloud was bright light, [1.] At 9.30 p. m. [9.29] the arch had entirely disappeared, and the beams of light in the N. had extended nearly to the zenith. My assistant, I. Craig, says from this time there was nothing of remarkable note, more than at times the flashes would assume a serpentine form, shooting and darting like lightning, and had not disappeared at 12.30 [12.29] a. m. of the 8th.

(7.) *New Haven.*—About 8 p. m., [7.44,] at a height of about 35° and above some decamping clouds [1] in the N. W., became visible the extremity of an auroral beam [2] or column. The sky continued to clear, showing about 10° of the upper part of the column at 8.30 p. m., [8.14;] a few minutes after this time, however, a covering of cumulus spread over, obscuring the phenomenon; 9.30 p. m. [9.14] the sky having again cleared, the whole solitary beam appeared as a luminous column [2] resting on the horizon about 20° W. of N. and extending to a point about 10° S. E. of the zenith. No more clouds appearing during evening, the single column [2] was seen to move bodily from the above-described position toward the S. W., being subjected in its progress to recurring fits of brilliancy, the maximum of which occurred about 11.16 p. m., [11.00.] At midnight [11.44] the column was still visible, extending from a point about 20° above the horizon at due N. W., to 30° S. E. of zenith, crossing the latter. Between 1 [12.44] and 2 [1.44] a. m. of the 8th, the light disappeared, not recurring throughout the night.

(8.) *Barnegat Inlet*—At 11 p. m. [10.49] auroral [1] lights were seen in the N., about 15° above the horizon.

(9.) *Saint Paul.*—Between 7 [8.04] and 8 p. m., [9.04,] or about 7.30 p. m., [8.34,] an aurora [1] was visible in the N. extending from N. E. to S. W., from which one [2] single beam 4° wide appeared reaching from the N. E. end of aurora to 70° or 80°, or nearly to the zenith, color rosy red, visible until after midnight, [1.04.] The aurora [1] was simply a diffused light having an altitude of 10° or 15° above the horizon; between 9 [10.04] and 10 [11.04] p. m., or about 10 [11.04] p. m. there were seen at a point a little [280°†] S. of E. three [3 and 4 and 5] very wide (about 8° each) beams extending obliquely from each other, and the lower end of beams was 12° to 15° above the horizon, while the upper end of one of them [5] reached the zenith, the second [4] a grade lower, and the third [3] a grade lower still, disappearing a few minutes after 10 p. m., [11.04,] entirely disappeared at 10.20 p. m., [11.24,] and shortly after that [after 11.24] a single beam [6] spanned the sky from horizon to horizon, commencing from E. S. E. and ending at a point a little W. of N. W.; the beam [6] was of a pale straw-color at each end, and as it reached the zenith the color changed to a faint red; the beam was of uniform width, of about 1° or 1½° (about 2-3°) and very distinct, and lasting about half an hour, disappeared about 11 p. m., [12.04.]

The beam [6] appeared to incline a little to the south of the actual zenith-point. The extreme ends of the aurora [1] did not reach within 8° or 10° of the extended beam or auroral bow; aurora proper remained visible until after midnight, [1.04].

(10.) *Grand Haven.*—A fine display of aurora was observed at 7.30 p. m., [8.07,] and continued until 3 a. m. [3.37] of the 8th, with the exception of a short disappearance at midnight, [12.37.] It was composed of a faint, yellowish light, [1,] extending from N. to N. E., and appeared from 3° to 5° above the horizon, accompanied by luminous beams [2] of same color that extended from 3° to 50° toward zenith. An arch of light [3] of the same kind, extending from E. N. E. to N. N. W., the highest point of which nearly reached zenith, formed at 10.20 p. m., [10.57,] and lasted a few minutes.

(11.) *Long Branch.*—At 10.45 [10.33] p. m. an aurora [1] was first observed in the N.W., reaching an altitude of 30°, or two-thirds of the zenith-distance. It was visible until after midnight, [11.48.] There was not much action attending the phenomenon, as observed from this place, other than a plain arch. It grew gradually less brilliant about 11 p. m., [10.48,] until after midnight, [11.48.] At the time the office was closed, it was only a luminous arch, [1,] resembling cirrus clouds, somewhat phosphorescent. This last was about 12.30 a. m. [12.18] of the 8th.

(12.) *Fort Gibson.*—Between 6 [7.12] and 7 [8.12] p. m., there was an arch [1] of light extending from N. E. to W., [1,] very much resembling an aurora, rays [2] of light shooting up more than half-way to the zenith. At the same time a long, round, unbroken cloud, very close to the earth and apparently close to us, moved rapidly south, possibly 40 or 50 miles an hour. At the same time the stratus clouds [4] over it, made visible by the strange illumination, were moving rapidly in the opposite direction, the light upon them making them very much resemble auroras as seen in folds of a curtain rolling and unrolling. Have never seen anything like it before.

(13.) *Buffalo.*—Aurora visible during the evening. First observed at 8.50 p. m., [8.58.] It then consisted of slender luminous beams, [0,] of a pale bluish light, resting upon a dark bank [1] of stratus clouds that extended along the northern horizon from 155° to 205° of azimuth, and the center and thickest part of the bank extending in altitude to about 15°, while overhead at a height of about 75° an arch [2] of white luminous vapor extended from E. to W., in breadth about 2°, but so dim and undefined at its extremities as to be undistinguishable from the surrounding sky. At 9.20 p. m., [9.28,] this arch [2] had entirely disappeared, but the slender luminous beams [0] still shot up toward the zenith, varying in altitude from about 20° to 50°. These [0] remained stationary while the arch [2] was visible, but at intervals several of them [0] seemed to blend together, forming columns of pale-yellow light that would gradually fade and disappear, after lasting 3 to 5 minutes, and temporarily eclipsing in splendor the adjacent beams. Meanwhile, a thin haze, [7,] which up to the present [9.38] had been almost imperceptible, began to increase in density and to veil the luster of the stars that had been previously shining with unusual brilliancy. At 9.40 p. m., [9.48,] a slender column of luminous vapor [3] shot up from the eastern horizon, gradually extending its summit upward toward the zenith, while puffs of thin white vapor issued therefrom, and moved toward the west in a direct line, passing through the zenith. These gradually united, and at 9.50 p. m. [9.58] formed a complete arch, [3,] spanning the heavens from E. to W., varying in breadth from 2° to 5°. At this time ripples [8] of thin, white, luminous vapor, varying in length from 2° to about 6°, and with their extremities pointing N. and S., were distinctly visible in the zenith, moving rapidly along the arch from E. to W. This arch [3] remained visible up to 11.50 p. m., [11.58,] the stars being distinctly visible through the luminous vapor, and then gradually disappeared. At no time during its appearance was its light brilliant. Occasionally it [3] seemed to wave [9] from N. to S., and *vice versa*. Again it [3] would divide, the vapor overhead being parted as if a strong current of air had swept

through it. It would, however, reunite and assume its former position. There was seemingly no visible connection between the arch [3] and the beams [0] previously alluded to. About 12.15 a. m. [12.23] of the 8th, the arch [4] again began to form, and was complete at 12.30, [12.38,] its position being about 15° south of the zenith. Meanwhile the beams [0] along the northern horizon increased in brilliancy and assumed a purple tinge, moved with a quick lateral motion, sometimes from E. to W., and *vice versa*. Again the arch disappeared, and at 1.30 a. m. [1.38] was re-formed [5] about 20° farther S., while the beams [0] in the N. began to assume the appearance of a sinuous curtain [10] arranged in numerous and complex folds, ever varying and developing new undulations. This arch [5] again disappeared and another [6] was formed at 3.15 a. m., [3.23,] at an altitude of about 25° above the southern horizon, [Z. D. south 65°.] About 4 a. m., [4.08,] the arch [6] began to break up, and the beams [0] to diminish in number. Both gradually faded and finally disappeared toward day-break. During the earlier part of the display, the air was highly charged with moisture, the humidity ranging about 90 per cent.; toward morning, however, it fell to about 75 per cent.

(14.) *Eastport.*—Dense cirrus cloud covered the sky at midnight, [11.15 p. m.,] through which there could be observed auroral light.

(15.) *Milwaukee.*—At 8.30 [9.13] faint light appeared in N. E. An auroral display in the N. E. after 8.55 p. m., [9.38,] consisting of a band or bow [1] of pale light, stretching from about 2° [azimuth 182°?] E. to 43° [azimuth 223°?] E.; height at center about 4°; color, pale yellow, with short alternate crimson flush. At and after midnight, [12.43.] In connection with this display, on an average five [numbers 2, 3, 4, 5, and 6] distinct streamers of a silvery white, (having a motion commencing at an altitude of 47° above due E. and ending after passing westward about 20°,) motion downward and from E. to N. W., prevailed at intervals from about 10° N. of the zenith and 40 E.; length of streamers on an average 25°; width from ½° to 1°. The display ceased some time after 2 a. m., [2.43,] April 8, 1874.

(16.) *Detroit.*—About 8.30 p. m. [8.54] an unusually brilliant aurora became visible. It consisted of two [1 and 2] distinct concentric arches, extending from a point a little to the E. of N. E. [E. N. E.] to a point slightly W. of N. W., [W. N. W.;] the upper one [2] having an altitude of about 40°; the accompanying stratum of haze [0] from contrast appeared much darker than usual; beams [4] were constantly shooting toward and sometimes reaching the zenith; no lateral motion noticed. About 9.40 p. m. [10.04] a third [3] but much broader and more brilliant band than the others appeared; it extended in the same direction from E. to W. as the other two, reaching to the zenith; from this arch there shot beams [5] of light which sometimes reached to the southern horizon. About 11 p. m. [11.24] the arches disappeared, but the northern heavens still presented a luminous appearance. (Shortly before 11 p. m. [11.24] the two [1 and 2] lower and the greater portion of the upper arch [3] disappeared, and the remaining portion, the middle of the arch, [3,] disappeared at 11 p. m. [11.24.] It [3] did not change its position during the display.) The color, pale yellow, did not change during the display.

(17.) *Burlington.*—First observed in due N. at 10.15, [10.00.] Beautiful aurora at 11 p. m. [10.45] in the N. Position often changing from N. W. to N. E., forming curves or arches [1] from due N. W. to due N. E., with slender beams [2] shooting from the center to an altitude of 15° above the horizon.

(18.) *Pembina.*—8.25 p. m., [9.45,] aurora; a narrow and irregular belt of light [1] of a pale straw-color resting on the northern horizon, remainder of the sky covered with stratus clouds, [2.] 8.50 p. m., [10.10,] patches of aurora [1] observable through rifts in the clouds, N; 9.30 p. m., [10.50,] clouds breaking; aurora assumed the appearance of a broken arch, [2;] altitude 60°, partially obscured by stratus clouds. 9.55 p. m., [11.15,] weather clearing rapidly; aurora [2] now a diffuse light, fading gradually.

(19.) *Davenport.*—An auroral light very faint [1] in appearance, of a pale-yellow color. Was visible in the northern sky from 9 to 9.20 p. m., [9.54 to 10.14.]

The display was extremely faint and diffuse with no well-marked or prominent [1] features, and its duration was short, as above stated.

(20.) *Dubuque.*—A large number of northern lights [1] were observed from 9 p. m. [9.55] until some time after the 10.05 p. m. [11] observation, extending from the N.W [1] around to the northeastern horizon.

(21.) *Marquette.*—7.20 p. m., [8.01,] aurora. Along the northern horizon a thick bank of cloud [0] obscures the view, but in the E. a streamer [3] of a bright-white color rises to a height of about 60°. There is also a smaller one [2] in view in the N.W., 8 p. m., [8.41.] There is evidently an arch [1] along the northern horizon, but the main body is obscured by the above-mentioned bank of cloud. The upper portion of it, [1,] however, can be seen, as also its eastern and western extremities, the colors of which are bright white, tinged with red, 9 p. m., [9.41.] The large streamer [3] in the E. has disappeared, but others [4] are moving along the arch from E. to W. and shooting upward, some to an elevation of 60°, others to 40° and less. Height of topmost portion of the arch [1] 30°. At 10.45 p. m. [11.26] streamers [4] less active. Greatest

azimuth of aurora from about N. 60° W. to N. 70° E. Barometer rising; weather fair.

(22.) *Rochester.*—Faint aurora at 9.10. p. m. [9.08] in N.

(23.) *Washington.*—No aurora. Sky became covered with stratus after midnight.

(24.) *Breckenridge.*—An aurora somewhat obscured [1] by clouds, so that I am unable to determine its exact form, but think it resembles that of the 4th instant. It became entirely hidden about 9.30 p. m., [10.49.] All that could be seen was a pale light [2] extending along the northern horizon about 30° and to an altitude of 5°. (The aurora of the 4th is thus described: 9 p. m. [10.19] a faint aurora in view, having the form of a pale band of light extending from the 140th to the 210th degrees of azimuth and to an altitude of 20°.)

(25.) *Alpena.*—Auroral display first noticed 7.30 p. m., [7.56.] An arch [1] of light, of a bright-yellow light, ranging along the northern horizon from N. 90° E. to N. 60° W. and up from the horizon 45°. Upon the eastern border streamers [2] of sparkling brilliancy rise and fall, 9 p. m., [9.26.] The base of this grand aurora is illumined by streamers [3] ever varying in hue—rosy, emerald-green, and bright and pale yellow. At 10.34 p. m. [11] pale-green light and occasional streamers. At 11 p. m. [11.26] a bright-yellow light nearly obscured by stratus [4] clouds.

(26.) *Fort Sully.*—A bright aurora [1] was observed during the evening. About 8 [9.35] p. m. first observed; at 9.25 [11.00] still quite bright, without any change in position, which was N. N. E. from station. Altitude a few degrees above horizon.

(27.) *La Crosse.*—Supposed halo [evidently aurora] at night, extending from N. and N. E. to S. and S. E.; long, slender bands with small circles [5] at intervals. When first observed it formed an arch [1] from N. to S. E., with summit altitude about 45°. Formation changed several times; at one time 4 distinct circles, [1, 2, 3, and 4;] this very small. At no time before 12 p. m. [12.57] did it extend W. of the N. and S. line.

(28.) *New London.*—8 p. m. [7.40] column in N. W. [1] from horizon to 40°, moved due S. E. from original position; toward midnight [11.40] extending from 10° above N. W. horizon to a point about 10° S. E. of zenith. Base of auroral arch immediately above horizon was ill-defined.

(29.) *Charleston.*—Lightning observed in the N. and E.

(30.) *Shreveport.*—Heat-lightning observed from 6 p. m. [7.6] to 10.50 [11.56] p. m.

(31.) *Freehold.*—At 8 p. m. [7.49] an aurora borealis appeared, which disappeared at 10 p. m., [9.49.] There was no distinct arch, as the upper portion [1] seemed to be merged into an indistinct cloud, [0.] The beams [2] lasted from 8.20 [8.09] to 9.50, [9.39;] were four [2] in number, of nearly uniform width, but varying in intensity. They were white on a ground of delicate pink, and were crossed by three stratus [3] clouds of about 30° elevation.

(32.) *South Orange.*—Aurora in the evening.

(33.) *West Charlotte.*—Crimson aurora 7.30 p. m., [7.15,] followed by a seemingly steady auroral light at 8 p. m. [7.45,] (and auroral display at night.)

(34.) *Mount Forrest.*—On the 7th, at 9 p. m., [9. 15,] the main arch [1] of a first-class aurora; span by compass, N. E. to N. W., or 90°, and altitude of apex 25°—measured by Headley's quadrant—with coruscations; streamers [2] to a higher altitude.

(35.) *Grand Rapids.*—Aurora borealis commenced 7.30 p. m., [8.04.] At its height 8.30 p. m., [9.04;] beautiful, arch-like, with streamers; about 11.30 p. m. [12.04] ended. [A rough sketch seems to show a double arch with streamers between and above, and a dark segment below.]

(36.) *Oneida.*—Aurora borealis appeared at 8 o'clock [7.55] and disappeared at 10 o'clock, [9.55.] Very bright arch [2] extending nearly across the heavens. Merry dancers [1] in the N. (No date is given to this entry, but probably should be April 7.)

(37.) *Oxford.*—Aurora 9 p. m., [8.34.]

(38.) *Riley.*—Bright aurora evening. At 8 p. m. [8.46] a bright arch [2] of light 20° altitude. At 8.45 [9.31] [a second account says at 8.30 = 9.16] a narrow arch [3] 2° or 3° broad has risen to an altitude of 30°, extending from E. 15° N. to W. 15° N. In a minute or two (at 8.50 = 9.36) it [3] contracted to a bright cloud-like patch 4° or 5° broad, extending from corona borealis [N. 70 E., Z. D. 67°] to Perseus, [N. 45 W., Z. D. 65°,] and disappeared in a very few minutes, (just after 9 = 9.46.) At 9.30 [10.16] a few bright streamers [1] shot up and moved along from E. to W. with a motion like the spokes of a wheel revolving with considerable velocity. At 10.30 [11.16] p. m. the display had nearly ceased, and resolved itself into a mere northern twilight.

(39.) *Southington.*—9 p. m., [8.43,] bright aurora.

(40.) *Fallston.*—Night of the 7th, flashes of auroral light from N. to N. E.; stratus cloud [1] along horizon; light flashing [2] up vertically 20°, disappearing almost as soon as seen.

(41.) *Vevay.*—A little before 9 p. m., [9.32,] faint aurora; pale yellow; undefined form [1] around north horizon; rosy tint at upper limit, about 40° above horizon; entire absence of luminous beams or flashes of light; vanished at 9.30 [10.02] p. m.

(42.) *New Germantown.*—Auroras on the evenings of the 6th and 7th; mere light segments from 7 [6.51] to 10 [9.51] p. m.; quite uninteresting; was surprised to hear that it was so fine elsewhere.

(43.) *Factoryville.*—Aurora borealis at 8.30, [8.25.] Extremities of the arch [2] were about N. N.E. and N. N.W.; altitude, 23°; beams and corona [3] at 9, [8.55;] dark clouds, [1;] disappears at about 10 p. m. [9.55.] No streamers noticed.

(44.) *Castleton.*—9 p. m., [8.44,] aurora; larger than last night and brighter; occasional red flames [2] just above the horizon at the E. of N.; red as fire and wavy as flame; a few white [3] streamers, a dense black cloud [1] near the horizon; sometimes a star could be seen through it. Watched it till 10 [9.44] o'clock.

(45.) *Benton Centre.*—Aurora [1] April 7 all the evening; very bright; a light streak [2] overhead from E. to W.; disconnected from 10 [10.01] to 11 [11.01] p. m., or longer.

(46.) *Cazenovia.*—Aurora 9 p. m., [8.55,] April 7. Long arch, [1,] 20° to 30° high, in the N., extended from N. W. to N. E.; summit nearly in N.; beams [2] also; dark and bright beams [2] shot up higher, and the whole moved from E. to W. and back again several times.

(47.) *Troy.*—7½ [7.16] p. m., an auroral arch [1] of considerable brilliancy and 30° elevation now noticed. At 8.30 p. m., [8.16,] or at 8.42, [8.28,] quite brilliant, particularly in N.W., and has extended up to 45°; 8.45 p. m., [8.31,] now of the most brilliant character, and the whole northern sky alive with merry dancers, [3,] undulating from W. to E.; 9 p. m., [8.46,] receding to 30°, (40° ?,) and much fainter; at 9.13 [8.59] a narrow beam [2] of light rose in W.N.W., about 25° N. of W., and by 9.15 p. m. [9.01] had extended entirely across the sky to the eastern horizon at a point about 5° S. of E., forming a very perfect belt [2] passing through the zenith; 9.35 p. m., [9.21,] the belt, [2,] scarcely a degree in width, is now very perfect, and passes nearly 15° S. of (or 10° below) the zenith. The display is in the N., of the most splendid character, presenting the appearance of a flag [3] waving in the breeze, the folds very numerous and complex; the undulations are constant and of brilliant emerald-green, occasionally tinged with crimson, and exhibiting a great variety of most graceful curves. The undulations in the belt [2] are from E. to W.; in the arch [1] in the N., from W. to E. At 9.36, [9.22,] belt grew fainter. At 9.45 [9.31] the belt [2] has disappeared and the aurora [1] in the N. fading. At 9.55 p. m., [9.41,] this belt [2] has now re-appeared, and occupies nearly the same position as at 9. 35 p. m., [9.21,] and for 15 minutes was very perfect and well defined. The arch [1] in the N. has an altitude of 50°, and sends out numerous streamers, frequently rising to the height of 70°. At 10.15 [10.01] the belt [2] has disappeared, the arch (aurora) [1] in the N. receded to 40°, and surmounted by a dusky [4] cloud of a peculiar character, through which stars of the second magnitude are faintly visible. 11 p. m., [10.46,] the aurora [1] much fainter and few streamers noticed; observations ceased.

(48.) *Cornish.*—Aurora [1] two-thirds the way up to Polaris, with streamers [2] in the N. W. It lasted about all night.

(49.) *Woodstock.*—A rich display of auroral light early in the evening; height, 50° to 60°. Before 9 p. m. [8.42] the northern portion of the heavens was lighted up to the height of 45° or 50°, [1.] Soon after 9 o'clock [8.42] a luminous arch [2] of white light was formed, extending from the horizon in the W. nearly across the heavens, a few degrees N. of zenith at right angles with the magnetic meridian, [magnetic declination about 11° W.,] and apparently from 3° to 5° broad. From the first formation it [2] moved toward the S. with a slow, but waving and irregular, motion till it [2] reached the magnetic zenith, [magnetic dip about 76°;] and at 10.15 p. m., [9.57,] the whole arch [2] separated into innumerable patches by lines passing obliquely across it; and very soon after this it [2] faded away. All this time the broad arch [1] remained in N.; columns of light shooting up from it and moving along its entire length. At 10.30 [10.17] a column of light [3] sprung up from W. to 35° or 40°, and from southerly side a streamer branched off in southeasterly direction about 15° or 20° long, remaining half an hour, and fading away.

(50.) *Hennepin.*—Bright aurora during the evening in the N.

(51.) *Waterburgh.*—Aurora bright. First noticed, 8 p. m., [7.59.] Faint arch [1] 45° altitude; fully formed at 9 p. m., [8.59.] About 9.30 [9.29] disappeared; arch extended from E. to W., [1.]

(52.) *Boonsboro'.*—Evening, slight aurora, [1.]

(53.) *Houseville.*—Aurora, 7.30 [7.24] to 8 [7.54] low arch [1]; 9 p. m., [8.54] streamers [2]; 9 to 9.20, [8.54-9.15.] auroral cloud or arch [3] perfect, entire, extending from E. to W. horizon, passing through the zenith, 5° wide, tapering to a point at the extremes, of a bright white light, did not change its position, but had a gentle wave-like motion from E. to W. Aurora continued quite bright to 10, [9.54.] Arch [3] only observed from 9 to 9.20, [8.54-9.14,] when it disappeared.

(54) *Near Pennville.*—April 7, 7.30 [7.36] p. m., aurora borealis appeared; formed an arch [2] at 8.20 [8.26] p. m.; appeared very bright, with dark cloud [1] under, but not low enough to obstruct the light at the horizon; remained until 10 o'clock, [10.06]; the atmosphere in other respects was entirely clear. It remained some time after 10, [10.6,] but was not observed much later.

(55) *West Union.*—April 7. Saw an aurora of the second class in the evening at 8.30

p. m., [9.29,] when the arch [1] was nearest perfect. The elevation of lower edge of arch at its greatest altitude at the magnetic meridian was 13° above the horizon. At that time it [2] began sending off streamers, [2] and its continuity was broken, the arch assuming an irregular, broken appearance. Summit of arch very poorly defined; sky entirely clear; does not know of any other arches before he retired at 11 p. m., [11.59.] Time correct, local.

(56) *Lunenburg.*—April 7. Aurora.

(57) *Argyle.*—Aurora 8.55 [8.50] p. m., first observed. An arch [2] spanning the heavens from E. to W. near the zenith with a very slow motion southward; 3° wide at zenith and 1½° at each horizon. At this time a diffuse light [1] over the N. heavens, rising near Polaris, and slight darkness [0] near horizon; 9.20, [9.15,] streamers [1] commenced with a motion eastward and continued till 9.30 p. m., [9.25,] when the arch [2] over the heavens had entirely disappeared. Immediately after the disappearance of the arch [2] the streamers [1] commenced advancing westward. During the motion toward east the streamers [1] seemed to burst out of a very black cloud [0] and to rise upward. During the continuance of the arch [2] there was a rapid motion near the zenith of the light from E. to W., similar to that of very thin clouds driven by a violent wind, [but] much quicker; 10 p. m., [9.55,] observation ceased. The streamers [1] that seemed to burst from the black [1] cloud, had at their base a color like a rainbow, the colors not very bright. While the colors showed, and during the continuance of the arch, [2] the motion of streamers [1] was E., but changed to W. on disappearance of arch [2] and color. Watch about 10 minutes slow of local time; [assume that the narrative gives watch time.]

(58) near *Depauville.*—Sky cloudless; temperature + 31; gentle S. wind; moon in last quarter, rising at midnight. 9 p. m., [8.58,] double arch; upper one [3] regular; rather broad, of dim diffused light; altitude was such that Polaris [altitude 43°] was in center of arc; compass-bearings of its extremities: eastern limb 70° east; western limb 70° W. of N.

Lower arch [2] irregular, but continuous, narrow, with bright milky light; short beams from its upper edge, not reaching the exterior arch, [3;] all the space below the lower arch [2] very dark. A detached belt [4] of whitish light crosses from E. to W., near the zenith. At 9.5 p. m., [9.03,] in addition to the above arches there appears now in the black space below the lower arch [2] a segment [1] of an inferior converging arch. 9.10 p. m., [9.08,] the upper arch [3] has faded away; also the belt [4] crossing the zenith lower arch [2] is sinking gradually toward the horizon; all the short beams have disappeared except on the N. E. limb, where three [6] faint streamers shoot up toward Ursa Major. The segment [1] in the black space [0] has now formed a complete arch, and is parallel with the second arch, [2.] 9.30 p. m., [9.28,] both of these arches have united into one, [1 and 2,] sending up a number of short whitish beams, which soon disappear again. From near the horizon due E. a cloudy narrow belt [5] of milk-white light passes through zenith and reaches near the western horizon; it lies a little south of Jupiter, [? S. 27° E; Z. D. 40°,] cuts the meridian beyond zenith, and has Mars [? ?] in its western descent, extending about two-thirds beyond that planet to the horizon; [probably Alpha Geminorum and Alpha or Beta Leonis have been mistaken for Jupiter and Mars.] A number of short and faint beams (7) spread over the atmosphere. 6.45 p. m., [9.43,] the E. and W. belt [5] has moved more to the S. and lies now S. of Jupiter [S. 37 E. Z. D. 40] and N. of a bright star (Arcturus ?) [S. 80. E. Z. D. 45°] in the middle; [Arcturus may be a mistake for Beta or Alpha Leonis S. 15° W. Z. D. 30°] 10.0 p. m., [9.58,] upper arch [3] re-appeared, but faint, and higher up, covering Ursa Major; its lower edge is above Polaris, [Z. D. 43;] its upper edge approaches zenith. The lower arch [1 and 2] has moved to a higher altitude, with distinct bright edge along the black cloud beneath; a few beams. 10.10 p. m., [10.08,] upper arch [3] and belt [4] gone, and in their place appears a hazy sky, [8,] dimming the stars with a diffused streaky auroral light. Lower arch [1 and 2] again sunk lower toward the horizon, but retaining its brightness all along. 10.30 p. m., [10.28,] black clouds, [0,] dark segment, contracting or sinking lower; lower arch [1 and 2] is the only one remaining and is fading; some faint detached comet-tail-like beams reach zenith; diffuse light pervading over all; no more observations. This aurora seems to have lasted all night.

Figure 2 represents the position and appearance at 9.05 p. m., [9.03.] The aurora was first noticed at 9 p. m., [8.58;] sky cloudless; temperature 31°. At 9 p. m., [8.58,] double arch. Upper arch [3] No. 1 complete, broad, dim, diffuse; altitude such that Polaris [Z. D. 47°] was in center of arc. Compass-bearing of extremities: eastern limb, 70° E. of N.; western limb, 70° W. of N. Inner arch [2] appeared as consisting of two arcs (*a* [2] and *b* [1] Fig. 1) intersecting or cutting each other near the middle, (*c*,) forming an indent or notch.

The dotted lines *d* [*d* and *f* are less definite than represented on the accompanying illustration] and *e* would be the missing limbs. Arch [2 and 1] is narrow; of a bright, milky light; well defined; brightest along lower edge. From upper edge issued short beams, not reaching lower edge of upper arch, [3.] Altitude of summit, 12°; compass-

bearing of eastern limb: 45° E. of N.; of western limb, 45° W. of N. At same time, unconnected with arches, and above the upper arch, a streamer [4] extended from N. E. to S. W. across and some way beyond zenith.

9.05 p. m., [9.03,] fragment of arc (Fig. 1, *f*) makes its appearance in the dark segment, which seems a continuation of the eastern half inner arch, [2.] Its upper end did not quite reach the lower edge of the arch, the upper arch [3] fading away.

[It is probable that Figure 1 was intended by the observer as a general sketch of prominent features, and does not represent the appearance at any definite moment.]

(59) *Sturgeon Bay.*—Aurora borealis commencing 7.30 p. m., [8.12.]

(60) *Manitowoc.*—The arch [1] in N. from 8 [8.43] to 12 [12.43] p. m.; also beams and dark cloud below; also an arch [2] from the horizon in the E. to very near the horizon in the W., and about 10° N. of the zenith between 8 [8.43] p. m. and 9 [9.43] p. m. Saw none on the morning of the 8th.

(61) Blank.

(62) *North Volney.*—After 9 p. m. [8.57] the north was well lighted up with diffused [1] and bright patches [1] behind the clouds. Bright [2] striated patches [2] floating from E. to W. after 10 p. m. [9.57]. Compass-bearing of extremities from N. W. to N. E

(63) *Adams.*—The aurora of the 7th had the usual bow, [2,] very brilliant, but continually changing in outline, while the lower bow [1] (space below) was intensely black, probably by contrast. About 8.30 p. m., [8.26,] in addition to the usual streamers, [4,] a brilliant white band [3] spanned the heavens from E. to W., running higher and passing the zenith about 8.45 p. m., [8.41.] In the zenith it was some 5 degrees wide, narrowing down to the horizon by perspective. It [3] slowly fell over some 15° or 20° to the S. of the zenith, and disappeared gradually about 9.15, [9.11,] (soon after 9,) [8.56.]

(64) *Rodman.*—Grand auroral display noticed about 8.30 p. m., [8.28,] April 8, according to my memorandum, but think it must have been the 7th; magnificent running (arch?) [2] from S. E. to N. W.; streamers [1] and powerful light. (NOTE.—This evidently refers to the night of 7–8 April; the night of 8–9 was cloudy.)

(65) *Wyanet.*—Aurora borealis, 8 p. m., [8.51;] small arch, [1;] dark under [0.]

(66) *Contoocookville.*—Aurora first observed at 8 p. m. [7.39;] some short streamers [3] rose above the arch [1] at 8.30 p. m. [8.09] 2° or 3° in width rose from the western horizon, about 10° N. of W., and passed over through the zenith to a point about 10° S. of E. in the eastern horizon, remaining with but slight change until 10 p. m., [9.39,] or later; no other light, the arch [1] excepted, being visible at the time. Only once before (several years since) have I witnessed a similar display.

(67) *Le Roy.*—Aurora borealis from 8 [8.46] till —— —— ——. Arch; beams; corona.

(68) *North Hammond.*—Northern lights at 9 p. m. [8.54.]

(69) *Northport*—Northern lights this evening at 11 o'clock, [11.37;] an arch [1] raised about 15°.

(70) *Palermo.*—Beautiful aurora, (this evening,) with arch [2] reaching from E. to W., with a dark cloud [1] below.

(71) *Clarinda.*—9.13, aurora borealis, one beam [1] in N. E.; one in N., [2;] one in N. W., [3,] and one in S. W., [4.] Red lights [5] in all directions. Beams only visible a few minutes; lights visible at twilight; ceased to observe them about 11 p. m., [12.13;] no perfect arch; did not get higher than 45°.

(72) *Wautoma.*—9 p. m, [9.50,] very bright aurora.

(73) *Rocky Run.*—8 p. m., [8.49,] aurora. 8.45 p. m., [9.34,] arch [1] from S. E. to N. W., a little south of the Great Bear, [30° N. of zenith, in meridian,] with streamers [2] to the zenith, very active. At times very dark, [0;] base constantly changing. Luminous spots [0] in base.

(74) *Embarrass.*—Aurora 8 p. m., [8 49,] &c. Aurora commenced with a banner [1] in E., extending N. W., and no arch; then like a luminous cloud for some time. No distinct arch at any time, but more like a cloud of misty light. Tremulous and faint most of the time, and not of a very bright appearance. Spread [1] over ¼ of the N. E., with a band [2] on the southerly [2] side. When last observed, I can best describe as a misty, floating cloud; continued for some time. 9.30 p. m. last noticed, and then quite faint.

(75) *Kingston.*—Bright auroral belt [1] across the sky from E. to W. at 10.30 p. m., [10.05.]

(76) *Independence.*—8 p. m., [9.00,] aurora; 8.30, [9.30,] cloud [1] under double arch, [2 and 3] and white [4] streamers.

(77) *Williamstown.*—Splendid aurora. Noticed about 9.05 p. m. [8.50] a magnificent broad band [1] extending E. and W. through the big dipper [Z. D. 18° north] bowl and handle. 9.35 p. m., [9.20,] a narrow band [2] of same width throughout, passing a little N. of Orion, [?] [or from N. 80° W; Z. D. 80°,] through the northern stars [S. 15° E; Z. D. 18°] of the Sickle in Leo, a little south of Arcturus, [S. 55° E. Z. D. 40°.] Faded away almost entirely before 10.00 p. m., [9.45,] when another band [3] appeared

in the same place, not as bright or as narrow, or as regular in width, as the one of 9.35 p. m., [9.20.] At one time a wave [4] ran through the one [3] of 10.00 p. m. [9.45] longitudinally. It [3] slowly moved a little S., running through the Sickle down nearly as far as the handle, [crossing the meridian at S. 25° to 29°.] It [3] gradually widened in the middle, and on the southern side split up so as to resemble the backbone of a vertebrated [5] animal. Toward the E. the vertebræ [5] disappeared, and the band grew intensely bright and narrow, and ended suddenly in a point at some distance from the horizon. The vertebræ [5] moved S. until those nearest the zenith extended [to 6° S. of equator or Z. D. south of 49° or] about as far below the last star in the handle of the Sickle [Regulus] as [18° or] as that star is S. of the most northern part of the Sickle. At 10.30 p. m. [10.15] the band [3] was hardly visible. About 11.15 [11.00] I noticed from my window that the same band had grown quite broad and bright again in the E. Some of the flashes [0] in the N. were very sharply defined, and rose very high. The color of all was white.

(78) *Detroit.*—Smoky; aurora after 7.30 p. m., [7.54.] At 8 p. m. [8.24] double arch; dark cloud [0] below and between [5] arches; crown of upper arch [2] about 18° above horizon; lower arch [1] about 10°; short streamers, [6,] none extending higher than 32°; arches quite elliptical; summits from 3° to 5° E. of magnetic meridian. 8.30, [8.54,] upper arch [2] disappeared, succeeded soon after by curved line of short [3] streamers, which had a rapid lateral motion from E. to W. for a short time, lasting about 10 minutes. Soon after these disappeared they were followed by a broad belt [4] of whitish light, which moved rapidly across the heavens from E. to W. in the form of an arch, whose summit was about 25° high, which soon disappeared. 9 p. m., [9.24,] double arch, streamers, and patches of bright whitish light; 9.30, [9.54,] dark cloud [5] dissipated, arches indistinct, faint streamers, shooting upward about 45°; not observed thereafter.

(79) *Cresco.*—A very fine aurora [2] extending from E. to N. W.; began at 7.45, [8.46;] last seen at 10 p. m., [11.01;] most vivid at 8.30, [9.31;] dark clouds [1] resting on the horizon beneath it.

(80) *Sugar Island.*—9.0 p. m, [9.24,] aurora bright, partially clouded; very light air from S.; wind feels very cold.

(81) *St. John's, N. F.*—Evening fine; at night, sky dull-looking. [Aurora not visible through stratus clouds.]

(82) *Shelburne, N. H.*—Aurora not noted.

(83) *Harbor Grace, N. F.*—Overcast; aurora not noted.

(84) *Winchester.*—7 to 8 p. m., thunder and lightning, with hail-storm.

(85) *Toronto.*—Fine aurora after 7.0 [7.9] p. m. At 10 p. m. [10.9] auroral light patches and streamers, [1;] fine band [2] across sky from N. W. to E. S. E. At 10.30 [10.39] disappeared. At midnight [12.09] band again visible; waving of auroral vapors [3] passing from E. to W.

(86) *Little Current.*—Aurora at 9 p. m, [9.20;] second class.

Welland—Aurora at 9 p. m., [9.10;] second class.

(88) *Granton.*—Arch [1] from S. E. to N. W. at 10 p. m., [10.18;] first class.

(89) *Point Clark.*—Aurora [1] from N. W. to N. E. between 8.9 [8.19] and 10.0 [10.19] p. m.; first class.

(90) *Ingersoll.*—Beautiful auroral arch [1] and streamers, [2;] first class.

(91) *Montreal.*—Aurora at midnight.

(92) *Huntington.*—Magnificent arch [2] at 10 p. m., [9.40;] first class.

(93) *Frederickton.*—Aurora, second class.

(94) *St John, N. B.*—Aurora, fourth class.

(95) *Sydney.*—Bright aurora on 6th and 7th; first class.

(96) *Winnipeg.*—Three beautiful arches [1, 2, and 3] at 8 p. m.; about [9.20] formed into one, [4,] and shortly after the whole sky [5] was covered with auroral light.

(97) *Washington (naval observatory.)*—No account of aurora.

(98) *Adrian.*—Did not observe aurora; can find no one who did. The sky was not so obscured as to prevent its being seen.

(99) *Guttenberg.*—Heavens clear. A sick family and their physician state that near 12 p. m. [12.55] they saw a bright light [1] nearly due N. E. three times the width of a rainbow, extending from the horizon nearly to the zenith; broadest at the horizon; no movement. About 2 a. m. [2.55] it faded out. At 1 a. m. [1.55] the physician saw it pointing toward the S. W. [I presume it did not extend much beyond the zenith.] It was a bright white light, with no color.

(100) *Tioga.*—Aurora not seen at that place.

(101) *Florida.*—Unusual aurora from 8 p. m. [7.44] till 11 p. m. [10.44] and after; was constantly changing into indescribable forms: mountains tipped with light, overhanging precipices, running fantastic forms [1] extending E. to W.; a bow [2] extending nearly E. and W. from the horizon, at first a little N. of zenith, moved slowly S. of the zenith 10° or more; of various breadths from 1° to 3°, and very bright at times.

(102) *South Trenton.*—8 p. m., [7.51,] broad luminous bands darted toward zenith at different points in northern horizon, [1,] many extending to eastern point of compass.

From the E. the jets moved until the western point was met. This band [2] continued for some little time appearing and disappearing, arch constantly changing. Aurora continued until 2 a. m. [1.51] of the 8th.

(103) *Traverse City.*—About 9.15 p. m. [9.49] in the E., in form of cumulus cloud, [1,] differently shaped and sized; rolling, trembling, and expanding in a due W. direction; in a short time formed a narrow arch [2] extending a distance of about 120° across the heavens, swayed slightly from N. to S., and gradually receded in same manner as it formed, a portion remaining after 10 p. m., [10.34.] Observations ceased.

(104) *Near Sandusky.*—8 p. m., [8.22,] aurora N., and more E. than W., [2;] mist [1] obscured both W. and E., as well as above.

(105) *Saint Anthony.*—9 p. m., [10.05,] dim aurora [1] in N.

(106) *Nichols.*—About 11 p. m. [10.58] aurora [1] very large and bright in N., almost overhead, a little to N.; a very bright streak [2] from N. W. to S. E., like a rainbow. Shortly after it moved E., so that west end could be seen; at same time flashes [3] in N. in every direction.

(107) *Fallsington.*—Aurora, class No. 1 of old Smithsonian instructions; no streamers observed.

(108) *Lockport.*—About 8.30 p. m. [8.37] bright aurora began arch [1] in N. 30° high, with streamers [2] shooting toward zenith.

(109) *Harbor Grace.*—Luminous phosphorescent cloud all around.

(110) *Bellefontaine.*—9 p. m., [9.27,] six-tenths nimbus; auroral light seen through the breaks of clouds, [1,] but soon obscured entirely.

(111) *North Adams.*—From 8.30 [8.14] to about 11 p. m. [10.44] very brilliant, well-defined, silver-colored arch [2] spanning heavens completely from mountain to mountain, at about 60° polar distance, (*i. e.*, or 17 south of zenith,) the base being in a corresponding position between E. and N. E. on right hand, and W. and N. W. on left hand. Occasional streamers [1] of light were seen shooting up from the northern horizon, but were neither constant nor brilliant, and were of a whitish green tint.

(151) *Albany.*—Aurora between 8 p. m. [7.47] and 11 [10.47] silvery arch [3] of light, waving appearance, spanned heavens from E. to W., and finally passed to zenith, where it disappeared; streamers [2] of golden light from western horizon; a burst [1] [beam] of yellow light in the N.

(152) *Troy.*—(Similar record to the preceding,) possibly from same source.

(153) *Concord, N. H.*—Auroral display, culminating in beautiful bow [1] extending from W. N. W. to E. S. E. At 9 p. m. [8.38] it spanned entire heavens; gradually died away, and succeeded an hour later [9.38] with fog, [2,] which seemed to descend from above.

(154) *Buffalo.*—Shortly before 10 p. m. [10.08] magnificent (auroral) bow [2] ran from E. to W.; at times took a purplish tinge; moved from the N. to S.; at times apparently immovable; again it would break [3] as if a strong wind had swept through it. It hung very low, (*i. e.*, overhead, but apparently near the earth;) stars seen through it; 2 a. m. of the 8th, still visible; marked auroral tendencies [1] in northern horizon, sustaining no visible connection with the bow, [2.]

(155.) *Sherburne.*—On the evening of Tuesday we were favored with one of the most interesting auroral displays witnessed for years. It consisted of two distinct parts. One was a bright, white band [2] of light extending across our zenith, nearly or quite across from the eastern to the western horizon. There was also, low in the N., an irregular arch [1] of light, from which at one time streamers [5] shot up nearly or quite to the zenith. Below this was a dark segment [0] of sky. Spots of light in this northern [1] arch were at times brighter than any auroral arch ever before witnessed by the writer. Irregular stripes [6] of light sometimes crossed the southern [2] belt, which traveled westward with a fitful, tremulous motion, often as fast as two or three degrees a second. This belt [2] was from 3° to 10° broad, and when first seen, somewhat after 9 p. m., [8.48,] it [2] lay across the stars of the Great Bear, [or crossed the meridian at Z. D. 25° N.] In the course of an hour the band [2] had swept S. (probably this was a new arch farther south) so as to cover the Sickle in Leo [Z. D. south 25°], and even Jupiter [Z. D. 41° S]. It [2] traveled southward, therefore, more than 50°.

At 9.19 p. m. [9.07] the stars Epsilon, [N. 45° E., Z. D. 26°,] Zeta, [N. 50° E., Z. D. 29°,] and Eta, [N. 62° E., Z. D. 33°,] in the Great Bear, were centrally in the southern belt [2] of light. The belt [2] was 8° broad near the meridian, but toward either horizon narrowed down to a single degree or two. [The belt must have crossed the meridian at Z. D. 25° North.] 9.21 p. m., [9.09,] Capella [N. 60° W., Z. D. 55°] and the bowl [N. 25° E., Z. D. 18°] of the Dipper were in the belt, [2.] The arch of the northern light [1] was rising and its outline more vague. It [1] was 12° or 15° high to the upper edge.

9.24 p. m. [9.12] the southern star of the pointers, Beta of the Great Bear, [N. 13° E., Z. D. 14°,] was in the middle of the belt, [2.] 9.26 p. m., [9.14,] Capella [N. 60° W., Z. D. 55°] was 3° N. of the north edge [N. 62° W., Z. D. 56°] of the belt, [2.] Arcturus [S. 80° E., Z. D. S. 51°] was on the south edge.

9.28 p. m. [9.16] bright streamers break out in the lower [1] arch, a very brilliant

group near the eastern end of the arch; the lower edge of the streamers is a well-marked irregular line 10° high. Its amplitude is 100°.

9.30 p. m. [9.18] the middle of the belt [2] was 8° south of Beta and Gamma of the Great Bear [or middle passes through N. 30° E. Z. D. 6½°, and through N. 70 E. Z. D. 13°.]

9.31 p. m., [9.19,] under Polaris, [N. Z. D. 47½] and 4° or 5° east of it, is a patch or group of short streamers of intense brightness; its center is 8° high. Arcturus [S. 80° E. Z. D. 50°] is in the center of the E. part of the southern belt, [2,] which is now narrower.

9.34 p. m. [9.22] the belt [2] fades away at Castor, [W. Z. D 39°,] and 10° north of Zeta and Mu of the Lion, [or at S. 40° W. Z. D. 12° and at S. 60° W. Z. D. 13°.]

9.38 p. m. [9.26] the arch [1] is somewhat irregular, and has an amplitude of 80°, and the height to the quite sharp line between the arch and the dark segment under it is 4° or 5°. Streamers rise nearly to the zenith. I went into the house, supposing that the southern belt [2] had finally disappeared.

10.01 p. m. [9.49] the belt [2] was seen to have re-established itself [3] about 4° broad, tolerably uniform, and extending nearly down to each horizon. It [3] was 8° south of Arcturus, [or at S. 65° E. Z. D. 51.] East of the Sickle [S. 45° W. Z. D. 28°] was a slight bend to the south. The ends cut the horizon nearly 180° apart. The north edge of the belt [3] was 2° south of Nu, Bootes, [or at N. 70° E. Z. D. 49°.]

10.03 p. m. [9.51] the belt [3] touches the star Mu [S. 50° W., Z. D. 24°] in the Lion. Pollux [W. Z. D. 45°] is in the center of the belt, [3.]

10.04 p. m. [9.52] the belt [3] is 6° broad. It covers Gamma, [S. 35° W., Z. D. 26°;] Zeta, [S. 40° W., Z. D. 23°;] and Epsilon, [S. 50° W., Z. D. 27;] in Leo. Near Arcturus, [S. 70° E., Z. D. 44½°,] the north edge [is?] as before. The broadening of the belt [3] carries the S. edge farther S.

10.06 p. m. [9.54] Pollux [W. Z. D. 45½] is N. of the belt, [3.] The Trapesium in Leo, of which Beta, [S. 15° E., Z. D. 29½°,] Delta [S. Z. D. 22½°,] and Theta [S. Z. D. 27½°] are three stars, was central in the belt, [3.] The star Eta, [S. 38° W., Z. D. 30°,] in Leo, is in the southern edge.

10.08 p. m. [9.56] in the W. the belt [3] is breaking up. A bright ray retains the old place of the belt [3] low down, but above Gemini [W. Z. D. 50°] the belt swings away from the lower part to the S.

10.10 p. m. [9. 58] the belt [3] is 7° broad, and lies across the band of the Sickle [S. 40° W., Z. D. 21°.] The north edge of the east end is 1° S. of Nu (or Mu?) [or at N. 70° E., Z. D. 46°] in Bootes.

10.11 p. m. [9.59] some short streamers 4° or 5° long run north from the belt [3.] They travel westward with a hopping movement, about half a degree in a second.

10.12 p. m. [10.00] the west end reunites with the main belt, [3,] and the whole extends nearly down to each horizon.

10.14 p. m. [10.02] E. end [3] is narrower and brighter, the center diffuse and 8° or 10° broad, and near Jupiter [S. 10° E., Z. D. 41°] it is broken into streamers. The W. end [3] was 5° broad, and the S. end of streamers 5° N. of Jupiter, [or at S. 10° E., Z. D. 36°.] The S. edge of the belt [3] is almost down to Regulus, [S. 35° W., Z. D. 35°,] and Epsilon [S. 55° W., Z. D. 28½°] and Zeta [S. 45° W., Z. D. 24½°] in Leo are in the N. edge.

10.18 p. m. [10.06] the N. edge in the E. is 3° S. of Nu in Bootes, [or at N. 72° E., Z. D. 47°.]

10.20 p. m. [10.08] streamers 10° long rise from a line through Jupiter [S. 8° E., Z. D. 41°.]

10.21 p. m. [10.09] belt [3] 10° broad near Regulus, [S. 40° W., Z. D. 36°,] which is within the S. [N?] edge of the belt. The N. edge [S?] is 10° S. of Arcturus, [or at S. 60° E., Z. D. 49°.]

10.22 p. m. [10.10] the star Gamma in Leo [S. 40° W., Z. D. 28°] is in N. edge. Belt [3] fading rapidly; shortly after it disappears.

11.08 p. m. [10.58] a switch [4] of light 4° wide, bright below and fading toward upper part, sweeps up from 4° S of Pollux [or from W. Z. D. 50°] in direction of and up to the Sickle, [or center of curve about at S. 45° W., Z. D. 28°]. Lower down is an arm of the belt [3] in the W.

11.12 p. m. [11.00] the N. edge of the switch [4] of light is a sharp line 2° S. of Pollux, [or at W. Z. D. 50°.] The light is 6° broad, with its southern [edge] diffuse. It [4] nearly faded out by 11.15, [11.03.] The westward motion of the streamers was at one time probably as rapid as 5 miles in a second. [New York or railroad time was used by Professor Newton.]

APPENDIX III.

Synopsis of observations arranged geographically.

In the following notes will be found systematically arranged pretty much all that can be gathered from Appendix II of definite or exact information in regard to the aurora.

Washington times only are here given.

The only abbreviations are N., for north; S., south; E., east; W., west; Z., for zenith; D., for distance; Az., for azimuth:

Stations.	Items.	Time.	Test.
(81) (83) (109)	.....	.....	Overcast, but the clouds were phosphorescent.
(95) (93) (94) (14) (37)	.....	.....	Bright aurora seen and recorded, but no description.
(48)			Aurora two-thirds of the way up to Polaris's streamers in the N. W.
(75)	[1]	10.05 p. m.	Bright belt across the sky from E. to W.
(56)			Aurora recorded.
(82)			Aurora not noted.
(66)		7.39	First observed the aurora.
		8.09	Some short streamers [3] rose above the arch, [1.] About $8^h\ 39^m$ a bright band [2] 2° or 3° in width rose from the W. horizon about 10° N. of W., and passed over through the zenith to a point about 10° S. of E. in the eastern horizon, remaining with but slight change until $9^h\ 39^m$, or later. No other light visible at the time.
(153)	[1]		Beautiful bow, extending from W. N. W. to E. S. E.
		8.38	Spanned the entire heavens, and gradually died away.
		9.38	Succeeded by fog descending from above.
(155)	[1]		Irregular arch low in the N.; spots of light in which were at times unusually bright.
		9.09	The northern arch rising and its outline more vague; altitude of upper edge 12° or 15°.
		9.16	Bright streamers break out in lower; very brilliant group near the eastern end; the lower edge of the streamers is a well-marked irregular line, 10° high; its amplitude is 100°.
		9.19	A group of short intensely bright streamers, 4° or 5° E. of the meridian; the center is 8° high.
		9.26	The arch is somewhat irregular; its amplitude 80°; the altitude of its well-defined lower edge is 4° or 5°; the streamers rise nearly to the zenith. The westward motion of the streamers was at one time probably as rapid as five miles in a second.
	[2]		A bright, white band of light extending from E. to W. horizon, nearly through the zenith; irregular stripes of light sometimes crossed the belt, traveling westward, with fitful tremulous motion, often as fast as 2° or 3° a second; this belt was from 3° to 10° broad.
		8.48	The belt lay across the meridian about 25° N. of the zenith.
		9.07	Belt crosses meridian about 25° zenith distance N.; it was 8° broad near the meridian, but narrowed down to 1° or 2° near the horizon.
		9.09	Zenith distance in the meridian is 15° or 18° N.
		9.12	Zenith distance in the meridian 13° or 14° N.
		9.14	Zenith distance in the meridian 5° N.
		9.18	Zenith distance in the meridian 2° to 5° N.
		9.19	The eastern part of the belt is now narrower.

Synopsis of observations arranged geographically—Continued.

Stations.	Items.	Time.	Test.
		9.23 p. m.	The belt fades away at the points (W. Z. D. 39°) and W. Z. D. 10°.
		9.26	Ceased observing temporarily, supposing that the belt had disappeared.
	[3]	9.49	The belt is 4° broad, tolerably uniform, extending nearly down to each horizon, [at about 2° N. of the W. and E. points, and crossing the meridian at about Z. D. 10° S.]
		9.51	Belt crosses meridian about Z. D. 25° S.
		9.52	Belt is 6° broad, due to an extension of the southern edge; crosses meridian about Z. D. 28° S.
		9.54	Belt crosses meridian about Z. D. 26° S., [and is 8° broad or more.]
		9.56	Belt is breaking up in the W.; a bright ray is left low down in the W., but above an altitude of 40° the belt swings away to the S.
		9.58	Belt is 7° broad; [crosses meridian, Z. D. 23° S.]
		9.59	Streamers 4° or 5° long; extend northward from the belt and move westward fitfully, about ½ a degree in a second.
		10.00	The W. end reunites with the main body, and the whole belt extends down nearly to each horizon.
		10.02	The E. end is narrower and brighter; the center is 8° or 10° broad and diffuse, and about 10° E. of the meridian is broken into streamers, reaching southward to Z. D. 36°; the northern edge of the belt crosses meridian about Z. D. 23° S.
		10.06	N. edge passes through the point; (N. 72° E.; Z. D. 47°.)
		10.08	Streamers 10° long rise from the belt at 8° E. of the meridian.
		10.09	Belt 10° broad; [the N. edge crosses meridian near the Z. D. 35° S.; the S. edge crosses near Z. D. 47°.]
		10.10	Belt fading rapidly; N. edge crosses meridian about Z. D. 25°; soon after, belt disappears.
	[4]	10.58	A switch of light 4° wide sweeps up from a point due W.; altitude 40° to the point; (S. 45° W.; Z. D. 28°;) lower down in the W. is an arm of the belt.
		11.00	The N. edge of the switch is a sharp line passing through the point, (Z. D. 50° W.;) the light is 60° broad, diffuse on its southern edge.
		11.03	The switch had nearly faded out.
(49)	[1]	8.42	The northern portion of the heavens lighted up to altitude 45° or 50°.
		9.57	Up to this time the broad arch remained in the N., its streamers moving along its entire length.
	[2]	8.42	Soon after 8h 42m a luminous white arch, 3° to 5° broad, was formed, extending from the W. horizon nearly across the heavens a few degrees N. of the zenith, at right angles with the magnetic meridian, [or from W. 11° S. to E. 11° N.;] it moved slowly and irregularly toward the S.
		9.57	It reached the magnetic zenith, [or 14° S. of zenith,] and the whole arch separated into innumerable patches by oblique transverse lines. Very soon after this it faded away.
	[3]	10.17	A column of light sprang up from due W. to altitude 35° or 40°, the streamer branching off to the S. E., about 15° or 20° long.
		10.47	The column and streamer fade away.
(39)			Aurora recorded.
(28)	[1]	7.40	Column in the N. W. from horizon; altitude 40°; moved to due S. E. from original position.

Synopsis of observations arranged geographically—Continued.

Stations.	Items.	Time.	Test.
		11.40 p. m.	About midnight extended from 10° altitude above the N. W. horizon to a point about 10° S. E. of zenith; the base of arch was ill defined.
(7)	[2]	7.44	Aurora beams in the N. W. above some clouds; altitude 35°.
		9.14	The sky having cleared, the beam appeared as a luminous column, its base on the horizon bearing N. 20° W.; it extended to a point about 10° S. E. of the zenith. The column moved bodily southwestward.
		11.00	The column is at its maximum brilliancy.
		11.44	The column extends from a point due N. W., altitude 20°, to the zenith and beyond 30° to the S. E.
		1.44 a. m.	Between 12h 44m p. m. and 1h 44m a. m the light disappeared.
(91)			Aurora at midnight.
(17)	[1]	10.00 p. m.	Aurora first observed due N.
	[1]	10.45	Forming arches from due N. W. to due N. E.
	[2]		Slender beams shooting to an altitude of 15°.
(33)		7.15	Crimson aurora.
		7.45	Steady auroral light; aurora continued during the night.
(44)	[1]	8.44	Dense black cloud near the horizon; stars seen through it.
	[2]		Red flames just above the horizon, bearing E. of it.
	[3]		A few white streamers.
		9.44	Ceased observing aurora.
(57)	[0]	8.50	Slight darkness near the horizon.
		9.15	Black cloud in the N.E. horizon.
	[1]	8.50	Diffuse light in the N. up to altitude 40°.
		9.15	Streamers moving eastward.
		9.25	Streamers began moving westward.
	[2]	8.50	Arch from E. to W. near the zenith, moving slowly southward, 3° wide at the zenith and 1½ at each horizon.
		9 15	Arch had entirely disappeared.
			During the continuance of the arch its light near the zenith appeared to be driven like clouds from E. to W. with great rapidity.
		9.55	Observations ceased.
(101)		7.44	until 10h 44m and later.
	[1]		[Curtain formation] extending from E. to W.
	[2]		A bow nearly E. and W. to each horizon. At first a little N. of the zenith, but moved slowly to 10° or more S. Breadth from 1° to 5° and very bright at times.
(111)	[1]		Occasional streamers shooting up from N. horizon of whitish-green tint.
	[2]	8.14 to 10.44	Brilliant, well-defined silver-colored arch, the bases bearing E.N.E. and W.N.W.; the summit 17° S. of zenith.
(77)	[0]	11.00	Flashes and streamers in the N. Very high and sharply defined.
	[1]	8.50	Magnificent broad band extending E. and W. crossing meridian about Z. D. 18° N.
	[2]	9.20	Narrow band crossing meridian about Z. D. 18° S.; its western base bears N., 80° W.
		9.45	Narrow band had almost entirely faded away.
	[3]	9.45	Another band appears in the same place, fainter, broader, and less regular than the preceding. At one time a wave [4] ran through [3] longitudinally.
	[3]		The band slowly moved southward [to Z. D. 25° or 29° S.]
	[5]		The band widens in the middle and splits up on the southern side into vertebræ [5.] The vertebræ disappear toward the E. where the band is intensely bright and narrow, and ends suddenly in a point some distance above the horizon.

Synopsis of observations arranged geographically—Continued.

Stations.	Items.	Time.	Test.
	[5]		The vertebræ move S., and near the meridian reach to Z. D. 49°.
	[3]	10.15 p. m.	The band is hardly visible.
	[3]	11.00	The band has grown quite bright and broad in the E.
(152)			Aurora recorded apparently a duplicate of No. 151.
(47)		7.16	Arch in the N. of 30° elevation.
		8.16 or 8.28	Has extended up to 45° and brilliant in N. W.
		8.31	Most brilliant light; northern sky alive with merry dancers [3] moving from W. to E.
		8.46	Much fainter, and receding to 30° or 40°.
		9.21	Display in the N. most splendid; a fine curtain formation [3]; light, brilliant emerald green, occasionally tinged with crimson; undulations move from W. to E. while those in the belt are from E. to W.
		9.31	Aurora in the N. fading.
		9.41	The altitude of arch 50°; streamers frequently rising to 70°.
		10.01	Arch has receded to 40°, and surmounted by a peculiar dusky [4] cloud through which bright stars are faintly seen.
		10.46	Aurora much fainter; observations ceased.
	[2]	8.59	Narrow beam rose at N. 65° W.
	[2]	9.01	Beam had extended through the zenith to the eastern horizon at E. 15° S.
		9.21	Belt very perfect, scarcely 1° wide, passes 10° or 15° S. of the zenith; undulations in the belt moved from E. to W., while in the northern arch they moved from W. to E.
		9.22	Belt has grown fainter.
		9.31	Belt has disappeared.
		9.41	Belt has re-appeared; position nearly the same as at 9^h 21^m.
		9.56	For 15 minutes the belt has remained very perfect.
		10.01	Belt has disappeared.
		10.46	Observations ceased.
(4)	[0]	7.07	Dark segment of what seemed heavy clouds beneath arch and behind streamers.
	[1]	7.07	An arch from az. 160° to 220°; altitude of summit, 12°; numerous streamers up to 30°.
		8.47	Arch seemed to be dissolved into numerous light crimson streamers, which rapidly shot up to altitude 30°. Streamers rapidly assumed a curtain formation 20° in height, and from az. 160° to 220°, inclined slightly toward the N. W.; light-yellow, blue, and green tints exhibited; undulatory motion from N. W. to S. W.
		9.7	The phenomenon faded out, and light fleecy clouds [4] of similar formation were observed in the same position.
	[3]	8.47	A perfect arch was observed extending from W. to E.; summit, 12° S. of zenith; of breadth, 4°; brilliant white light.
		9.32	Moving slowly southward until 9^h 32^m.
		10.07	Remained stationary until 10^h 07^m.
		10.47	Had returned slowly to original position, [or 12° A. of zenith.]
151)	[1]	7.47	Aurora observed from 7^h 47^m to 10^h 47^m; yellow light in the N.
	[2]		Streamers of golden light from the western horizon.
	[3]		Silvery arch spanned the heavens from E. to W., and finally passed to the zenith, where it disappeared.
(2)		10.38	Faint aurora observed.
		11.08	Growing brighter when it was hidden by the fog.

Synopsis of observations arranged geographically—Continued.

Stations.	Items.	Time.	Text.
(11)	[1]	10.33 p. m.	Aurora in the N. W. up to altitude 30°; only a plain arch.
		10.48	Growing fainter.
		11.48	Luminous arch resembling phosphorescent cirrus clouds.
		12.18	Last observed.
(1)	[1]	10.18	Aurora visible; bounded by arch of heavy cloud.
	[2]	10.48 or 11.00	Two streamers visible within the arch; altitude varying from 20° to 30°; inclined to the N. E. at an angle of 85°
	[3]	10.18	Arch from az. 160° to 190°; altitude, 30°.
		11.18	Aurora became indistinct.
(8)	[1]	10.49	Aurora seen in the N.; alt. about 15°.
(92)	[1]	9.40	Magnificent arch.
(32)			Aurora recorded.
(42)		6.51 to 9.51	Noticed some segment of auroral light; nothing interesting.
(31)	[1]	7.49	Aurora appeared in the N.; no distinct arch.
		9.49	Aurora disappeared.
	[0]		Indistinct cloud, surmounting upper portion of northern light.
	[2]	8.09	Four beams, of uniform width; white, on delicate pink background.
		9.39	Beams disappeared.
	[3]		Three stratus clouds of 30° alt., crossing the beams [2.]
(107)			Aurora recorded; no streamers observed.
(68)			Aurora recorded.
(64)	[1]	8.28	Streamers.
	[2]		Magnificent arch from S. E. to N. W.
(53)	[1]	7.24 to 7.54	Low arch.
		9.54	Aurora continues quite bright.
	[2]	8.54	Streamers.
	[3]	8.54	Perfect arch from E. to W. horizon through the zenith; tapering from 5° at the center to a point at the extremes; bright white; did not change its position, but had a gentle wave-like motion from E. to W.
		9.14	Arch disappears.
(102)	[1]	7.51	Beams darting toward the zenith at different points in the N. horizon.
	[2]		Jets move from the E., through the zenith, to the W.; this band continued for some little time, appearing and disappearing.
(36)		7.55	Aurora appeared.
	[1]		Merry dancers in the N.
		9.55	Aurora disappeared.
(46)	[1]	8.55	Long arch from N. W. to N. E.; summit nearly due N., and 20° or 30° high.
	[2]		Dark and bright beams shot up higher, and moved from E. to W. and back again several times.
(43)		8.25	Aurora appears.
	[1]		Dark clouds.
	[2]		Arch from N. N. E. to N. N. W.; altitude 23°.
	[3]	8.55	Beams and corona.
(58)	[0]		Very dark space below the lower arch.
	[1]	9.03	A segment of an inferior converging arch appears in the dark space.
		9.08	The segment has now formed a complete arch parallel with [2.]
		9.28	Arches [1] and [2] have united.
		10.28	Sending up short white beams. Black cloud is sinking lower.
	[2]	8.58	Double arch; the *lower* one irregular, continuous, narrow, of a bright milky white; short beams on its upper edge not reaching arch [3;] space below it is very dark; extremities bear 45° E. and W.; summit alt. 12°.

Synopsis of observations arranged geographically—Continued.

Stations.	Items.	Time.	Text.
	[2]	9.03 p. m.	Arch is sinking gradually toward the horizon; its beams have disappeared, except on its N. E. limb, where three faint streamers [5] shoot up.
	[2]	9.28	Arches [1] and [2—have united.
	[1 & 2]	9.58	The lower arch has moved up higher; well defined on its lower bright edge; the black cloud is beneath; a few beams.
	[1 & 2]	10.08	Lower arch again sank toward the horizon.
	[1 & 2]	10.28	Lower arch is the only one remaining, and is fading; some faint beams reach the zenith; diffuse light pervading over all; ceased observing. The aurora seems to have lasted all night.
	[3]	8.58	Double arch; *upper* one regular; alt. of middle 43°; extremities bearing 7° E. and 70° W. of N.; dim, diffuse.
		9.08	Arch has faded away.
		9.58	Upper arch re-appeared; faint, fainter, and higher up; lower edge alt. about 50°; upper edge near the zenith.
		10.08	Upper arch is gone and replaced by a hazy sky of diffuse, streaky light.
	[4]	8.58	Detached belt of whitish light near the zenith, crossing from E. to W., (or from N. E. to S. W.)
		9.08	Belt has faded away.
	[5]	9.28	A cloudy narrow belt passes from near the horizon, due E., through the zenith, and reaches nearly to the western horizon; it lays a little S. of [Z. D. 40°.?]
	[5]	9.43	The E. and W. belt has moved southward, [Z. D. 45°.?]
		10.08	The belt is gone, and replaced by a hazy sky.
	[6]	9.08	Three faint streamers in the N. E.
	[7]	9.28	Number of short faint beams spread over the atmosphere.
	[8]	10.08	Hazy sky of streaky auroral light.
(63)	[1]		Intense black space below the aurora.
	[2]		Very brilliant arch.
	[3]	8.26	Brilliant white band from E. to W.
		8.41	Band had moved S. to the zenith, where it was 5° wide, narrowing down to the horizon.
		9.11	Band slowly moved to Z. D. 15° or 20° S., and gradually disappeared.
	[4]	8.26	The usual streamers above arch No. [2.]
(6)	[1]	9.19	Bright light beyond the dark segment.
	[2]	8.39	Dark segment or cloud from N. E. to N. W., close to the horizon.
		9.19	Dark segment began to quiver, extending in filaments upward.
	[3]	8.44	Darker and denser cloud of conical shape appeared in the E.
		8.49	From this cloud a pale straw-colored arch proceeded toward the zenith, and in a moment reached the western horizon; its extremities were due E. and 15° or 30° N. of W.
		9.19	Eastern extremity had changed about 5° S. of E., when the belt receded more toward the S. and disappeared; the summit was 7° S. of Z.
		9.29	The arch had entirely disappeared, and beams in the N. extended nearly to the zenith.
		12.29	Aurora continues, but nothing remarkable except a curtain formation.
(62)	[1]	8.57	Diffused and bright patches in the N.
		9.57	Striated patches floating from E. to W.; extremities bear N. W. and N. E.
(70)	[1]		Dark cloud below.
	[2]		Arch from E. to W.
(51)	[1]	7.59	Faint arch, alt., 45°.

Synopsis of observations arranged geographically—Continued.

Stations.	Items.	Time.	Text.
		8.59 p. m.	Arch fully formed, extended from E. to W.
		9.29	Arch disappeared.
(106)	[1]	10.58	Very large, bright aurora in the N.
	[2]		Very bright streak a little N. of zenith; from N. W. to S. E. like a rainbow. Shortly after it moved E., so that the W. end could be seen.
	[3]		At the same time flashes in the N. from every direction.
(40)	[1]		Stratus clouds along the horizon.
	[2]		Flashes of auroral light 20° high in the N. and N. E.
(23) (97)			No record of aurora; sky covered with stratus after midnight.
(22)		9.08	Faint aurora in the N.
	[1]		Aurora all the evening; very bright.
(45)	[2]		A bright streak near the zenith, from E. to W.; disconnected from 10.01 to 11.01, or longer.
(100)			Aurora not seen.
(108)		8.37	Bright aurora began.
	[1]		Arch in the N. 30° high.
	[2]		Streamers shooting toward the zenith.
(13)	[1]	8.58	Dark bank of stratus cloud along the northern horizon from 155° to 205°; alt. of the center and thickest portion about 15°.
	[0]	8.58	First observed slender bluish beams resting on [1.]
		9.28	Beams varying in altitude from 20 to 50°; beams occasionally blended together, forming brilliant pale-yellow columns, lasting 3 to 5 minutes, then fading away; these continued while arch [No. 2] was visible; there was no connection between the beams [0] and the arch [3].
		1.38	Beams assumed a curtain formation.
		4.08	Beams diminish in number and disappeared at daybreak.
	[2]	8.58	Arch of white vapor about 2° broad, ill-defined at its extremities, extends from E. to W., passing within 15° of the zenith [N. ?].
		9.28	The arch had disappeared.
	[7]	9.28	Thin haze increases in density, somewhat obscuring this arch.
	[3]	9.48	Slender column shot up from the E. horizon; gradually extended its summit to the zenith, while puffs of vapor issued therefrom toward the W.
		9.58	These united and formed a complete arch, varying from 2 to 5° broad.
	[3]	11.58	The arch has remained visible, but now gradually disappears.
	[8]	9.58	Ripples of white light, 2 to 6° broad, their extremities pointing N. and S.; visible in the zenith, moving rapidly from E. to W. along the arch. Occasionally the arch would divide and reunite, being parted overhead as if by a wind.
	[9]		Occasionally the arch would wave from N. to S., and *vice versa*.
	[4]	12.23	Another arch began to form.
		12.30	Arch is complete; its position about 15° S. of Z.
	[5]	1.38	Arch [4] disappeared and formed anew at 35° S. of Z.
	[6]	3.23	Arch [5] disappeared and a new one formed 65° S. of Z.
		4.08	Arch [6] began to break up and beams [0] diminished. Both faded away towards daybreak.
(154)	[1]	2.00 a. m.	Auroral tendencies still visible in the N. horizon; no connection with the bow [2].
	[2]	10.03 p. m.	Magnificent bow ran from E. to W.; sometimes of a purplish tinge; at times immovable, at others moved from N. to S.; apparently hung very near the earth; stars seen through it.

Synopsis of observations arranged geographically—Continued.

Stations.	Items.	Time.	Text.
	[3]		At times it would break as if by a strong wind.
(54)		7.36 p. m.	Aurora appeared.
	[1]	8.26	Dark cloud beneath, but did not obstruct the light at horizon.
	[2]	8.26	Very bright arch.
		10.06	Aurora continues; observations ceased.
(85)		7.09	Fine aurora.
	[1]	10.09	Auroral light, patches and streamers.
	[2]		Fine band across the sky from N. W. to S. W.
		10.39	Disappeared.
		12.09	Band again visible.
	[3]		Auroral vapors passing from E. to W.
(87)			Aurora recorded.
(29)			No aurora, but lightning in the N. and E.
(5)	[1]	8.13	Luminous appearance in the N.; shortly after beams shot up to 45°.
(2)	[3]	9.13	Aurora changed to two arches, extending from E. to W. entirely across the heavens; the lower one had altitude of 45°, the upper one of 60°; beams from the lower to the upper arch.
		11.13	Extremities of arches are at the N. E. and N. W.
	[4]	11.13	The arches disappear and aurora changes to merry dancers near the zenith; moving from every point except the extreme S.
		12.13	Aurora had disappeared.
(34)	[1]	9.15	Main arch of aurora from N. E. to N. W., altitude 25°.
	[2]		Streamers to a higher altitude.
(90)	[1]		Beautiful auroral arch.
	[2]		Streamers.
(86)			Aurora recorded.
(89)	[1]		Aurora from N. W. to N. E. between S. 19 and 10. 19.
(88)	[1]	10.18	Arch from N. W. to S. E.
(104)	[1]		Mist obscures aurora both E. and W.
	[2]	8.22	Aurora in the N., and more to the E. than to the W.
(25)		7.56	Aurora first noticed.
	[1]	7.56	Bright-yellow arch from N. 90° E. to N. 60° W., altitude 45°.
	[2]		Brilliant streamers on the eastern border rising and falling.
	[3]	9.26	Rosy, emerald, green, and yellow streamers illumine the base.
		11.00	Pale-green light and occasional streamers.
	[4]	11.26	Bright-yellow light, nearly obscured by stratus clouds.
(80)		9.24	Bright aurora, partially clouded.
(16)	[0]	8.54	Aurora became visible; very dark haze.
	[1 & 2]		Two distinct concentric arches became visible from E. N. E. to W. N. W.
	[2]		The upper arch has an altitude of 40°.
	[4]		Beams constantly shooting up to the Z., but no lateral motion.
	[3]	10.04	Band much broader and brighter than the others, extending from E. to W., like the others, but reaching to the zenith.
	[5]		Beams shoot from arch [3] southward to the southern horizon.
		11.24	Shortly before 11.24 the arches [1] and [2] and the greater part of [3] disappeared; the middle of [3] disappeared at 11.24, and [3] did not change its position or color during the display.
(78)		7.54	Smoky aurora.
	[0]	8.24	Dark cloud below arches.
	[1]	8.24	Lower arch, altitude about 10°.

Synopsis of observations arranged geographically—Continued.

Stations.	Items.	Time.	Test.
	[5]		Dark cloud between the arches.
	[2]		Upper arch; altitude about 18°; summit from 3 to 5° E. of the meridian; arches quite elliptical.
	[6]		Short streamers; none higher than 32°.
	[2]	8.54 p. m.	Upper arch disappeared.
	[3]	8.54	Soon succeeded by curved line of streamers, moving rapidly for about ten minutes from E. to W.
	[4]		Soon after [3] had disappeared, a broad belt of white light moved rapidly from E. to W., forming an arch whose summit altitude was about 25°, but which soon disappeared.
		9.24	Double arch; streamers and patches of light.
		9.54	Dark cloud dissipated; arches indistinct; faint streamers up to altitude 45°; observations ceased.
(3)	[1]	9.26	A few minutes before 9.26 a perfect corona in the N. N. E.; elevation of its center about 55°; brilliant white beams tending to its center.
	[2]		
		10.00	Irregular arch, very low down on the horizon.
(110)		9.27	Sky overcast with cirrus clouds, obscuring the aurora.
(98)			Aurora seen between clouds, but soon obscured.
			Sky not obscured; no record of aurora.
(41)		9.32	A little before 9.32, faint aurora; pale-yellow, on the N. horizon; rosy tint at upper limit, about 40° above; no luminous beams or flashes.
		10.02	Aurora vanishes.
(84)			Thunder and lightning with hail.
(69)	[1]	11.37	Auroral arch; altitude 15°.
(103)	[1]	9.49	Cumulus cloud of light in the E., rolling and expanding due W.
	[2]		In a short time it formed a narrow arch, extending about 120°; swayed slightly from N. to S.; gradually receded as it had formed.
		10.34	A portion still remained.
(35)		8.04	Aurora began.
		9.04	At its height; a beautiful double arch, dark segment below and streamers between and above.
		12.04	Aurora ended.
(10)		8.07	Aurora observed, and continued until $3^h\ 37^m$, except a short disappearance at $12^h\ 37^m$.
	[1]		Faint, yellow light between N. and N. E.; altitude from 3° to 5°.
	[2]		Luminous beams rising from 3° to 50°.
	[3]	10.57	Similar arch from E. N. E. to N. N. W.; summit near the zenith; lasted a few minutes.
(21)	[0]	8.01	Thick bank of cloud in the N. horizon.
	[1]	8.41	Evidently an arch in the N., but obscured by bank of cloud; but its upper portion and eastern and western extremities can be seen.
	[1]	9.41	Height of arch 30°.
	[2]	8.01	Small streamer in view in the N. W.
	[3]	8.01	Large, bright, white streamer rises to altitude 60°.
	[4]	9.41	Streamer has disappeared, but others are moving along the arch from E. to W., shooting up to 60° or less.
	[4]	11.26	Streamers less active.
			Greatest amplitude of aurora from N. 60° W. to N. 70° W.
(59)			Aurora noted, beginning at $8^h\ 12^m$.
(60)	[1]	8.43	Aurora in the N. from $8^h\ 43^m$ to $12^h\ 43^m$.
	[2]		Arch from the E. horizon to very near the W. horizon, passing about 10° N. of the zenith between $8^h\ 43^m$ and $9^h\ 43^m$. Beams [3] and dark cloud [0] below.
(15)		9.13	Faint light in the N. E.
	[1]	9.13	Pale, light-yellow bow from 2° E. to 43°; altitude 4°; short, crimson flushes.

Synopsis of observations arranged geographically—Continued.

Stations.	Items.	Time.	Test.
	[2]	12.43 p. m.	Five distinct streamers moving from due E. westward for about 20°.
(74)	[1]	8 49	Aurora began with a banner in the E., extending N. W.; no distinct arch at any time, but rather a cloud of misty light.
	[2]		A band on the southerly side of the light in the N. E.
		10.16	Quite faint; observations ceased.
(38)	[2]	8.46	Bright arch; altitude 20°.
	[3]	9.31 or 9.16	Narrow arch, 2° or 3° broad, had risen to altitude 30°, extending from E. 15° N. to W. 15° N.
		9.36	In a minute or two it had contracted to a bright patch 4° or 5° broad.
		9.46	It disappeared in a very few minutes, just after 9^h 46^m.
	[1]	10.16	A few bright streamers shoot up and move from E. to W.
		11.16	The display had nearly ceased.
(72)			Aurora recorded.
(73)		8.49	Aurora.
	[1]	9.34	Arch from S. E. to N. W., [crosses meridian at about Z. D. 30° N.]
	[2]		Streamers to the Z.; very active.
(65)	[0]		Base very dark at times with constantly changing, luminous spots.
(50)	[0]	8.51	Dark beneath.
(20)	[1]		Small arch.
			Bright aurora in the N.
(19)			Northern lights observed from 9^h 55^m until after 11^h, extending from N. W. to the N. E.
(27)		9.54	Very faint yellow aurora in the N.
		10.14	Display very faint and diffuse, and of short duration.
	[1]		Auroral arch from N. to S. E.; summit altitude 45°.
	[2, 3, 4]		Formation changed several times; at one time four distinct bands, with small circles at intervals.
(55)		12.57	At no time did the aurora extend W. of the meridian.
			Aurora in the evening.
	[1]	9.29	When the arch was nearest perfect, the altitude of its summit, lower edge, was 13° in the magnetic meridian; the upper edge was very poorly defined.
	[2]	9.29	Continuity of the arch was broken, and streamers began to be sent off.
(99)		11.59	Observations ceased; no other arches had been observed.
	[1]	12.51	Bright beam, nearly due N. E., three times the width of a rainbow, broadest at the horizon, extending up nearly to the zenith; no movement.
(79)		1.55	Beam still seen pointing to the S. W.
		2.55	It faded out.
	[1]		Dark clouds resting on the horizon, beneath aurora.
	[2]	8.46	Fine aurora from E. to N. W.
(76)		9.31	Most vivid.
		11.01	Last seen.
		9.00	Aurora recorded.
	[1]	9.30	Cloud under double arch.
	[2, 3]		Double arch.
(105)	[4]		White streamers.
(9)		10.05	Dim aurora in the N.
		3.34	Between 8^h 4^m and 9^h 4^m aurora visible between N. E. and N. W.
	[1]		Simply a diffused light; altitude 10° or 15°.
		1.04	Remained visible until after midnight.
	[2]		A single beam 4° wide reaching from N. E. end of aurora nearly to the zenith, or 70° or 80°.

Synopsis of observations arranged geographically—Continued.

Stations.	Items.	Time.	Test.
	[3]	11.04 p. m.	About $11^h\ 04^m$ at a point a little S. of E. three very wide beams appeared extending obliquely from each other, lower end of beams at 10° or 15° altitude; the upper end of [5] reached the zenith, the second [4] a grade lower, the third [3] a grade lower still.
	[4]		
	[5]		
		11.24	Beams disappeared soon after $11^h\ 04^m$ and entirely at $11^h\ 24^m$.
	[6]	11.24	Shortly after $11^h\ 24^m$ a single beam commenced at the E. S. E. horizon, and ended near the W. N. W.; of a pale straw-color at each end, but a faint, pale red near the Z.; the width about 2°; well defined; inclined a little to the S. of the actual Z.; its extremities did not reach within 8° or 10° in az. of the extremities of arch [1].
		12.04	Beam [6] disappeared.
			Slight aurora recorded.
			Heat lightning observed from $7^h\ 6^m$ to $11^h\ 56^m$.
			Aurora visible at twilight.
(52)	[1]		Beam in the N. E.
(30)	[2]		Beam in the N.
(71)	[3]		Beam in the N. W.
	[4]		Beam in the S. W.
			Beams were only visible a few minutes.
	[5]		Red lights in all directions.
			Lights did not rise higher than 45°; no perfect arch formed.
		12.13	Ceased observing.
	[1]		Between $7^h\ 12^m$ and $8^h\ 12^m$ an arch like an aurora extended from N. E. to W.
	[2]		Rays shot up above 45°.
(12)	[3]		Long, round, unbroken low cloud moving S.
	[4]		Upper stratus clouds moving N. and illuminated by the light.
	[1]		Aurora obscured by clouds.
	[2]		Pale light along the northern horizon.
			Amplitude 30° and altitude 5°.
(24)		10.49	Entirely hidden by clouds.
(96)		9.20	Three beautiful arches formed into one. Shortly after the whole sky was covered with auroral light.
(18)	[1]	9.45	Narrow, irregular belt, pale straw-color resting on northern horizon.
	[2]		The rest of the sky covered with stratus clouds.
	[1]	10.10	Patches of aurora in the N. through rifts in the clouds.
		10.50	Aurora appears like a broken arch; altitude 60°, partly obscured by stratus clouds.
	[2]	11.15	Aurora diffuse, fading gradually.
(26)		9.35	First observed aurora to the N. N. E.; altitude a few degrees.
		11.00	Still quite bright, without any change in position.

APPENDIX IV.

The magnetic forces above the earth's surface.

The theory and formulæ of Gauss give us the means of computing the three rectangular components of the earth's magnetic force at any point of space. If we substitute in his formulæ the longitude $\lambda = -90^\circ$, or east from Greenwich, and the latitude 45°, corresponding to a point within the region covered by the present series of observations, we obtain the following values of X, Y, and Z:

$$
\begin{aligned}
X = & \left(\frac{R}{r}\right)^3 \left\{ 747.038\, a \right\} + \left(\frac{R}{r}\right)^4 \left\{ 6.030 - 55.192\, a^2 \right\} \\
& + \left(\frac{R}{r}\right)^5 \left\{ -20.633\, a - 76.549\, a^3 \right\} \\
& + \left(\frac{R}{r}\right) \left\{ 27.477 + 43.806\, a^2 - 377.928\, a^4 \right\} \\
Y = & \left(\frac{R}{r}\right)^3 \left\{ -89.024 \right\} + \left(\frac{R}{r}\right)^4 \left\{ +66.893\, a \right\} \\
& + \left(\frac{R}{r}\right)^5 \left\{ 24.587 - 164.280\, a^2 \right\} \\
& + \left(\frac{R}{r}\right)^6 \left\{ -77.559\, a + 284.357\, a^3 \right\} \\
Z = & \, 2 \left(\frac{R}{r}\right)^3 \left\{ 1104.528\, a \right\} \\
& + 3 \frac{R}{r}^4 \left\{ 7.353 - 16.522\, a^2 \right\} \\
& + 4 \left(\frac{R}{r}\right)^5 \left\{ 20.880\, a - 12.219\, a^3 \right\} \\
& + 5 \left(\frac{R}{r}\right) \left\{ -9.330 + 114.239\, a^2 - 123.227\, a^4 \right\}
\end{aligned}
$$

Where

X = horizontal component of magnetic force, positive toward the north.
Y = horizontal component of magnetic force, positive toward the west.
Z = vertical component of magnetic force, positive toward the earth's center.
R = mean radius of the earth.
r = radius vector for the place of observation.
a = Sine or cosine of 45° = 0.72911; logarithm = 9.84949.

By substituting for a its numerical value, the above formulæ become as follows:

$$
\begin{aligned}
X &= +\ 528.23 \left(\frac{R}{r}\right)^3 - 21.566 \left(\frac{R}{r}\right)^4 - 41.620 \left(\frac{R}{r}\right)^5 - 45.602 \left(\frac{R}{r}\right)^6 \\
Y &= -\ 89.024 \left(\frac{R}{r}\right)^3 - 47.301 \left(\frac{R}{r}\right)^4 - 57.556 \left(\frac{R}{r}\right)^5 + 45.70 \left(\frac{R}{r}\right)^6 \\
Z &= +\ 1562.06 \left(\frac{R}{r}\right)^3 - 2.724 \left(\frac{R}{r}\right)^4 + 41.776 \left(\frac{R}{r}\right)^5 + 84.90 \left(\frac{R}{r}\right)^6
\end{aligned}
$$

For points upon or elevated above the surface of the earth, we give $\frac{R}{r}$ the successive values $\frac{1}{1.0}$, $\frac{1}{1.1}$, $\frac{1}{1.2}$, but for our present purpose the first two of these values will suffice. For these we deduce the following values of X, Y, Z:

	$\frac{R}{r} = \frac{1}{1.0}$	$\frac{R}{r} = \frac{1}{1.1}$
X	+ 419.44	+ 330.57
Y	− 53.58	− 44.515
Z	+ 1686.02	+ 1245.55
Declination	− 7° 17′.2	− 7° 40′.2
Inclination	− 75° 56′.0	− 75° 0′.6
Total force	1738.1	1289.5

The three last of the above quantities are deduced from the X, Y, Z by the ordinary formulæ—

$$\text{Tang declination} = \frac{Y}{X}\,; \quad \text{tang inclination} = \frac{Z}{\text{H. F.}}\,; \quad \text{Total force} = \frac{\text{H. F.}}{\text{Cos I}} = \frac{Z}{\text{Sin I}}.$$

PAPER 21.

WAR DEPARTMENT, OFFICE OF THE CHIEF SIGNAL-OFFICER,
Washington, D. C., November 28, 1876.

To the CHIEF SIGNAL-OFFICER, UNITED STATES ARMY:

SIR: In accordance with your letter of instructions, dated December 7, 1875, I have the honor to present herewith a report upon the cyclone of September 8 to 24, 1875. The data collected has been taken from the reports of the Signal-Service observers, from the logs of vessels, from special reports forwarded to this office, and from newspapers. The figures along the left hand of the pages of the data correspond with similar figures upon the chart. The latter has also dates upon which the cyclone was experienced. Along the path of the cyclone is located its center three times daily. The figures above show the day of the month; those below, 1, 2, and 3, indicate, respectively, 7.35 a. m., 4.35 p. m., and 11 p. m., Washington time. From the data extracted it will be seen that a cyclone occurred previous to the one charted. It was first felt in latitude 12° N., longitude 27° W., on September 1, and later to the eastward of the West Indies and the United States. During the 12th, 13th, and 14th a high-pressure area covered the country east of the Rocky Mountains, (highest over New England and the Middle States,) which evidently caused the cyclone to take a westward course into the Gulf of Mexico. It was especially severe and destructive from Navassa, between San Domingo and Cuba, to Texas. The observations taken at Paramaribo, Dutch Guiana, (South America,) and Freetown, Sierra Leone, west coast of Africa, show that there has not been any disturbance at either place during September or the latter part of August. The island of Barbadoes is the point at which it was first felt, so far as known. From Texas to the Middle Atlantic coast, its progress was more rapid and less destructive than before. The points of the arrows are the locations of places. The arrows fly with the wind. The circular arrows show the points to which the wind veered or backed. The heavy swells experienced by the bark Paladin were undoubtedly produced by these two cyclones.

I am, sir, very respectfully, your obedient servant,

ROBERT CRAIG,
First Lieutenant Fourth Artillery, Acting Signal-Officer.

9.—Brig Antilles, at St. Martin's September 28. On the 7th, latitude 27° 20′ N., longitude 58° 20′ W., severe hurricane from S. E. and N. W.; lost sails, and cargo damaged.

12.—Bark Shawmut, of Boston, at Rio Janeiro, November 1. Had severe hurricane September 8, latitude 35° N., longitude 53° W.

11.—Bark John Mathues, at Surinam, September 30, from Boston, took hurricane evening September 7, latitude 32°, longitude 51°, lasting 5 hours; wind backed from N. N. W. to W. S. W.; hove to on her beam ends.

Brig Eureka, from Boston, at Surinam; experienced gale September 7; on beam ends for 5 hours; lost deck-load; hove to on port tack. Wind from N.E. around to W. S. W. by N. Wind terrific, forcing vessel down so that one half of deck-load was under water and yards lying in the sea.

Schooner Kohinoor, Lockport, N. S., for Barbadoes, passed, latitude 23° 15′ N., bottom up.

Schooner Anita, from New York for Angostura, (Venezuela, S. A.,) had a hurricane about middle (?) of September.

1.—Bark Paladin, from Arecibo, P. R., at Baltimore, September 18. September 6, 7, and 8, 1875, latitude 23° to 28° N., longitude 70° to 72° W., heavy swell E. S. E. to S. S. E., and on the 12th and 13th, latitude 33° to 36°, N. N. E. to E., breaking in a calm.

8.—Schooner Athlete, severe hurricane September 8, (? probably 6th,) in latitude 24° 25′, longitude 58° W. Schooner abandoned in a sinking condition. Wind E. to N. E., veering to E. S. E., and back again to former. Gale moderated at midday.

2.—Ship Tautallon Castle, September 1, 1875, latitude 12° N., longitude 27° W., had a heavy gale, accompanied by all the peculiarities of a hurricane, veering from N. W. through W. to S. and S. W.

10.—Bark Relignone Liberta encountered a hurricane September 7, 1875, 30° 30′ N., 57° 20′ W.

7.—Bark Western Sea, from Boston, at Surinam, September 15, 1875; hurricane, latitude 25° N., longitude 55° W., September 5. Wind E. N. E., veered to S. E. while lying to on port tack; vessel damaged.

3. Schooner Paul Seavy, Wilmington, N. C., at Surniam, September 20; latitude 18 N., longitude 52 W. September 3, hurricane N. E.; at 6 p. m. increasing rapidly and

3

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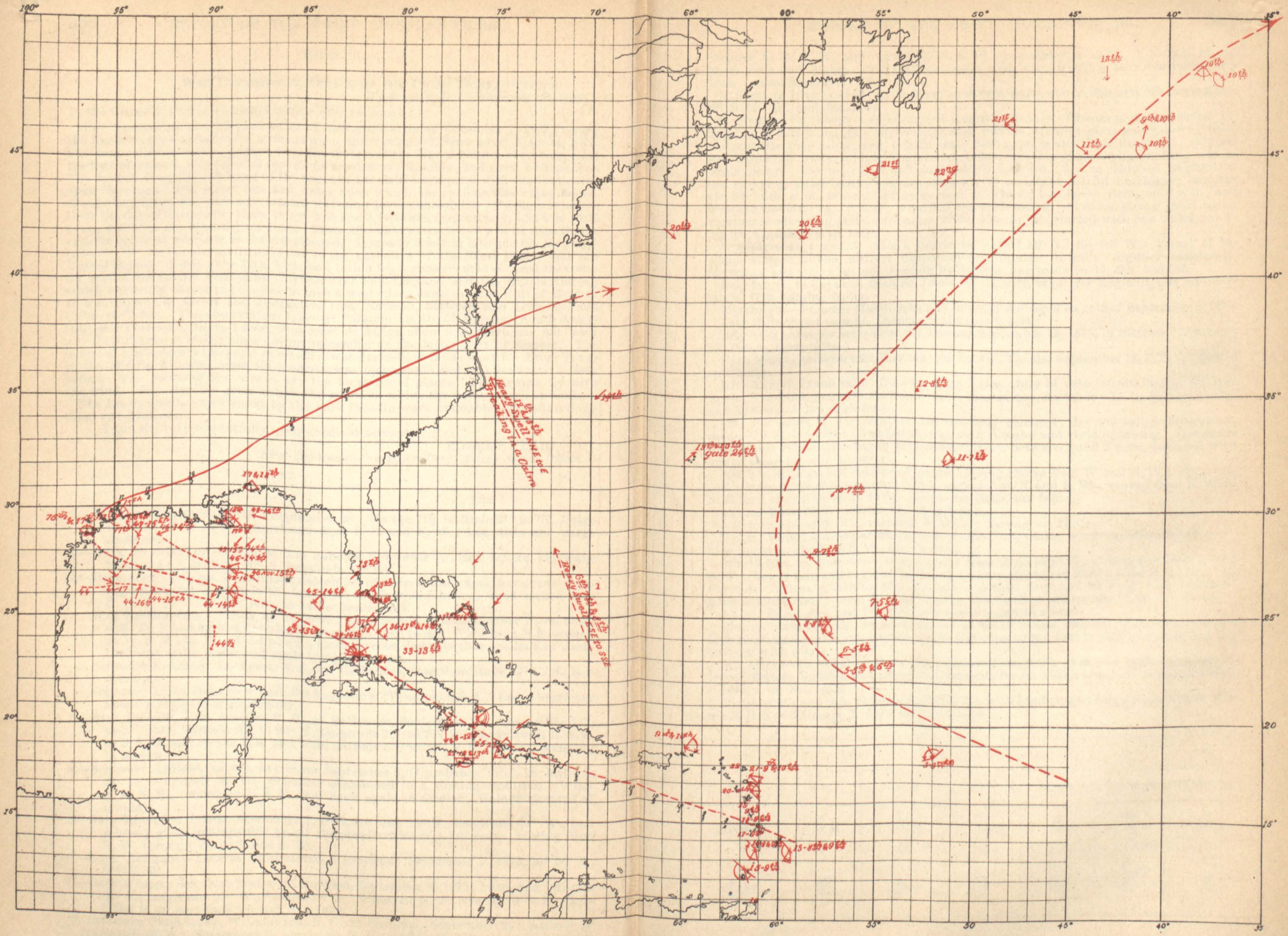

Heavy Swell NNE to E
Breaking in a Calm
Heavy Swell ESE to SSE
gale 24th

backing to N. N. W., and ending at W. S. W.; barometer to 27.70. 8 to 12 p. m., on beam ends, and filling cabin and forecastle with rain, washing movable matter off deck; vessel damaged.

5. Steamer Liverpool at St. Thomas; in severe hurricane on 5th and 6th September, 22° N. 57° W., and damaged.

6. Steamer Caribbean left Liverpool August 20; at St. Thomas a. m. September 11. Sunday, 5, 2.30 p. m., gale increasing, with furious squalls; glass going down; wind and squalls increasing, and terrific sea. 6.30 p. m., tremendous hurricane; shipped sea, knocking away bridge, lamp-room, boats, steering-gear, skylights, &c.; lots of water below. 7 p. m., cargo and coal settled leeward. 9 p. m., shipped tremendous sea, carrying away boats; engines stopped; to midnight fearful hurricane; barometer, 29. 6th, a. m., sea carried away man at wheel; barometer rising at 4 a. m., and weather moderating. 8 a. m., wind and sea moderating. 11 a. m., strong gale; noon, weather moderating fast; barometer, 29.08. On the 8th, started with one boiler, reaching St. Thomas 9 a. m. 11th.

4. September 4 and 5, 1875, a hurricane in 20° 09′ N., 45° 06′ W. Vessel at St. Thomas from Bilbao entirely dismasted and injured in hull. Another vessel from Liverpool lost mainmast and leaking badly from hurricane on 3d, 4th, and 5th.

Brig Ismyr, 14 days out from St. Lucia, W. I., with sugar, for England, put into Bermuda, 17th, leaking badly.

Martinique—Steamer Martinique put in badly damaged in gale of September 5, 1875.

Brig Hunter put into St. Thomas September 6, leaky.

Brig Tres Sabrinos arrived at St. Thomas September 11, 1875, in distress, (Liverpool for Ponce, Porto Rico.)

Bark Maria (Bordeaux for Havana) put into St. Thomas September 12, 1875, dismasted and leaky.

Brig Minnie Traub sailed from St. Mary's, Geo., July 19, with 180,000 lumber for Port Spain, Trinidad, put into Fort de France, Martinique, September 17, in distress, leaky, and lost part of her deck-load.

(13) *Barbadoes, W. I.*—Weather has suddenly changed; dry and sultry atmosphere, succeeded by incessant downfall of rain, with thunder and vivid lightning. Hurricane passed over island morning of September 9, 1875, between 2 and 3 a. m., attended with loss of some life and property.

8th, 2 p. m. First indications of storm; strong breeze from W. and N. W.; sky overcast; large masses of cumulus clouds gathered in N. and N. W.; moved from N. W. to N. E., and then from N. E. to S.; barometer 29.95, and falling.

4 p. m. Wind N. W. strong, and rain began.

5.45 p. m. Wind N. W., variable, 14 miles; barometer, 29.85.

7 p. m. Wind; barometer 29.66; heavy rain; in evening wind variable; by 10 p. m., blowing strongly from S. W., and increasing.

9th, 12.10 a. m. Barometer rose rapidly from 29.66 to 29.86; strong gale from S. and S. W.; heavy rain and thunder by 2 a. m.; barometer fell to 29.67; wind S. W., and raging most furiously, lashing the sea into a perfect fury, and blowing with violence; most damage done; some damage done by the "gulley" above the "Queen's House."

7 a. m. Barometer rose to 29.97, and storm began to abate.

10 a. m. Rain ceased. In some places 13 to 15 inches rain-fall, with great damage. Gale most apparent along harbor and in the careenage; four vessels stranded, and bay covered with *débris*.

9th, afternoon. Wind abated; sea continued to break over pier with greatest violence; sixteen lighters and many smaller craft lie on beach aback of Marshall's Hall.

10th, a. m. Sea calm.

Night of 8th and 9th. Schooner Arthur L., with lumber, and brigs H. M. Norris, Minnie Miller, and George E. Dale driven ashore.

8th.						9th.
7 a. m.	8 45.	2 p. m.	5 45.	9 p. m.	7 p. m. (?)	12 10 a. m.
83 29.98 4 00	87 29.98 6 00	85 29.95 7 00	85 29.85 14 00	80 29.81	80 29.66 15 1.00	81 29.86 ....
←		→		R	R	R Dir.

9th.						10th.
2 a. m.	7 a. m.	8 45 a. m.	2 p. m.	5 45 p. m.	9 p. m.	12 10 a. m.
81 29. 67	77 29. 97 20 8. 00	77 29. 97 15	77 30. 00 2 2. 25	79 29. 97 3	79 30. 05 5	79 30. 04 ....
R	R Heavy wind.	R Thunder and lightning.				(?)

(14) *Saint Vincent.*—The storm which burst over this place this morning (9th) was only indicated yesterday at 5 p. m., by barometer falling and variable.

8th. All day weather cloudy and color bright orange, with occasional shower. N. N.E. light winds and rising, sea rising; intense heat; at 11 p. m. wind S, freshened, and dense masses of clouds in N. and N. E.; at 11.30 p. m. heavy S. W. gale commenced, with torrents of rain and heavy thunder, till 5 p m., 9th.

9th. 1 a. m. barometer had fallen 1½°, (probably inches;) wind to N. W. (?) at 1.30 a. m., and increased, and sea rising higher and breaking with great violence. Heavy rain continued, and at dawn Kingston almost inundated. Bridges undermined and falling, several small houses washed away by mountain torrent, and trees uprooted by the violent wind. Five vessels ashore. Torrents of rain from 3.30 to 7 a. m.; 10 a. m., weather moderated, but heavy rains continued. Much damage to shipping; schooner Water Lily, of Digby, N. S., and brig Devonshire, of Bermuda, driven ashore on Kingston beach.

Calliagua, Saint Vincent.—Vessels ashore, town inundated, &c.

Bequia.—Houses, &c., destroyed.

(15) *Grenada.*—September 9, 1875, 4 a. m., wind N. W., force 8, and to S., 9 a. m. S. E., force 4 to 5, heavy rain and sea; 9.50 a. m. barometer 30.15.

(16) *Trinidad.*—September 8, 1875, very calm and intensely hot.

(19) *Dominica.*—September 9, 1875, heavy gale; all shipping gone adrift west.

(17) *Saint Lucia.*—Severe gale since 8 p. m., Thursday (?) September 9, 1875; 1 p. m., 10th, moderating.

(18) *Martinique.*—September 9, 10 a. m., barometer last night .762 (30.00); wind now N·E. 2.50 p. m.: Barometer 763 (30.04); weather better; vessels driven ashore; gales prevailed; 10th, morning opens fine.

(20) *Guadeloupe.*—September 8, very calm and intensely hot. September 9, 1875, 7.35 a. m., gale; 9.36 a. m., gale continues; storm coming; 6.42 p. m., barometer variable.

Date.	7 a. m.	7.35 a. m.	2 p. m.	4.35 p. m.	9 p. m.	11 p. m.	
September 8	78 29. 96 — .00	83 29. 88 — .00	87 29. 85 — .00	84 29. 82 — .00	80 29. 83 — .00	77 29. 83 — .00 R	Thunder, lightning, and light rain through the night.
September 9	78 29. 93 — — R	80 29. 96 — 0. 320 R	82 29. 85 — 0. 20 R	81 29. 87 — .00	81 29. 93 — .00	77 29. 91 — .00 Fog	Thunder and lightning through the day, and part of evening light rain.
September 10	28 29. 91 — .00	81 29. 94 — 1. 50	89 29. 90 — .00	86 29. 86 — .00	80 29. 93 — .00 Fog	78 29. 92 — .00	

(21) *Antigua.*—September 9, 1875, 9.50 a. m., barometer 30, steady wind, strong, S S. E. 10th. 2.35 p. m., barometer 30, and rising; wind E. S. E., much rain.

(*Bermuda, R. G.*—September 21, 1875.)

(22) *Saint Kitts, (Saint Christopher.)*—Schooners Ann Louise and Zephyr are on shore, latter dashed to pieces.

Schooner Enos Briggs left Navassa, September 12, 1875, (?) for Baltimore; had favorable weather till 20th, (?) then strong gale from N. E. Next day, latitude 27° 20′, longitude 76° 22′, sprung leak and abandoned.

(23) *Hayti, Jacmel.*—Schooner Agnes again stranded at Aux Cayes; two foreign vessels and several coasters blown ashore, and wharf down during hurricane.

(25) *Navassa.*—Latitude 18° 25′ N.; longitude, 75° 5′ W.; 4½ miles long N. E. to S. W., and 2½ miles greatest width.

Hurricane September 12.

Friday, 10th. Schooner Serene sailed for Wilmington, N. C.; never heard from.

Saturday, 11th. Rough sea; no shipping; brig J. W. Spencer sailed for Charleston, S. C.; never heard from; fierce N. E. gale blowing, and developed into a hurricane; British bark Toronto, of Halifax, N. S., brig Nettie Chase, Boston, schooner Moses Patten, Bangor, Me., slipped their moorings 9 a. m., Thursday,(?) (probably Saturday or Sunday,) and put to sea.

12th. Hurricane, N. E., accompanied by deluge of rain; houses commenced to go; trees torn up by roots, and others, 3 feet in diameter, snapped off; quarters, waterhouse, and wharves first destroyed; up to noon; (afternoon, wind suddenly to S. S. E., and terrific;) 2 p. m., wind came from S. S. W.; rest of buildings, wharves, eight lighters, and one gig went; railroad torn up; cars (loaded) blown from the track; one building lifted bodily and smashed; all buildings wood; thermometer 78° all day; about 4.30 p. m. abating; sea broke over cliffs 45 to 75 feet above sea-level; anchor 3,000 pounds, with heavy cable 8 feet above sea, washed overboard into 60 feet deep water; another, 1½ tons, raised out of water and left 20 feet above original place; a flat stone, weighing 25 tons, 60 feet above sea-level, could not be found afterward; boiler and machinery disappeared; bushes and small trees cut down by flying boards; before hurricane, island was in its beautiful vernal covering; after, as if a frost had passed over and blighted everything; men were lying down and holding onto railroad-tracks; also sought shelter in holes, and in some cases were washed out by the sea breaking over them.

Toronto found dismasted and abandoned off north Jamaica coast. Spencer and Serene not yet heard from. Houses were located on a flat 60 feet above sea, on west side. Harbor on west side considered by sea-faring men one of the best in the West Indies. More destructive by far than any since its occupation, 1856.

(29.) *Santiago de Cuba.*—September 12 and 13, visited by very heavy weather from Saturday to Sunday. Falling barometer since Friday, with fresh N. E. wind during Friday and greater part of Saturday. Saturday afternoon, with continued falling barometer, wind changed to S. E., (sea breeze,) but soon fell to calm in consequence of some heavy showers. Toward evening, wind went around to N., and continued fresh all night.

Sunday morning, wind still fresh N. and weather threatening. All day wind varied N. to N. E., with light rain at intervals, barometer falling steadily, and clouds moving very fast from N. E. After dark, wind freshened up. About 8 p. m. rain increased. Up to 1 a. m. wind fresh N. E., and rain constant. Barometer as low as 29.55; temperature, 76. 13th, 1.30 a. m., wind shifted to S. E.; very fresh for some hours, with rising barometer. Towards morning wind abated somewhat. Clearing weather and rapidly rising barometer during Monday.

At Santiago water in bay rose some three feet above usual high-water level during Sunday night. Tuesday morning (14th) thunder-squall passed over the Morro, (entrance to bay,) killing a girl and wounding two men in Schmidt, a fishing-village.

Section of Guantanamo railroad destroyed.

Santiago de Cuba.

11th.	September 12, 1875.			September 13, 1875.		
7.35 a. m.	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.
80 29.70 9.6 0	79 29.59 10.6 0	81 29.46 48	76 29.45 Strong.	77 29.58 19.2	80 29.62 19.2	80 29.76 Light.
		Threatening storm; drizzling all day with intervals.	Raining; very threatening.	Raining all night, with heavy weather from southeast since 1.30 a. m.	Raining in squalls all day.	Showers at long intervals.

Night of 12th and 13th water in bay rose about 3 feet above ordinary high water.

(30) *Portillo*, near Cape Cruz, (west of Santiago de Cuba.)—Prevailing winds N. W. and gale most disastrous, as what was not blown down was washed away.

(27) *Kingston, Jamaica.*—Sunday, September 12, 5 to 10 p. m., tidal wave visited town, and great damage done; sea fearfully high; very little breeze at the time. Wreck of brig Lizzie Virden carried a few feet further inland. Wind for several days afterward almost hurricane, and rain in torrents, with violent storms.

(27) *Kingston, Jamaica, September*, 1875.

Date.	Time.	Bar.	Weather and wind direction.	Velocity, miles.	Rain-fall.	Temperature.
12th	7 35 a. m.	29.93		0	0.00	80°
Do	4 35 p. m.	29.74	T→	1	.....	80
Do	11 00 p. m.	29.89	R	0	.....	81
13th	7 35 a. m.	29.98	R	.....	.....	80
Do	4 35 p. m.	29.98	R	0	.....	80
Do	11 00 p. m.	30.11	R	0	.....	79
14th	7 35 a. m.	30.14	←R	8	4.48	80

12th, 8 p. m., gale, and increasing in vicinity.
13th, night, severe thunder-storm.

(28) *Falmouth, Ja.*—Sunday, September 12, severe blowing from the north. Searose and inundated streets. Soon torrents of rain fell and continued several days.

(29) *St. Thomas.*—Tidende says: September 11, at Holland Bay, (near eastern point of Jamaica,) sea rose 20 yards above high-water mark. 9 a. m., 12th, gale increasing; 7 p. m. river overflowed 10 feet, and sea still rising; hurricane lasted till 2 a. m. 13th.

Heavy gale of 12th at Jamaica caused temporary stoppage of communication between Holland Bay and Kingston, Ja., also between Holland Bay and Santiago de Cuba.

Clifton, Jamaica, 69°; 29.71 inches; R↓, 45 miles; rain, 1.76 inches.

SEPTEMBER.

12.— 7.35 a. m. N. N. W. 45; rainy all day.
12.35 p. m. N. N. W. 35; rainy.
4.35 p. m. N. N. W. 25; rainy.
5.35 p. m. lowest barometer, 27.04; corrected, 29.668. Exposed thermometer, 66°.

13.— 7.35 a. m., 67°, 29.79 inches, (R)→ 10 miles; rain 3.75 inches.

Brig Chieftain, Kingston, Jamaica, for Halifax, returned totally dismasted to Port Royal, Jamaica, 15th.

Schooner Fred. Jackson, St. Jago, Cuba, for Philadelphia, had hurricane September 11.

Brig Devonshire, of Bermuda, ashore on Jamaica.

Schooner Wellington ashore on Jamaica coast.

24.—Brigantine Empress left Kingston September 5 for Inagua. Sunday night, 12th, between St. Domingo and Cuba, off (S.W.) Cape St. Nicholas, latitude 19° 29′/23′, longitude 74°, 8 p. m., heavy gale between N. and E., and continued till Monday; vessel on beam ends, totally dismasted, and drifting before wind and heavy sea; put into Falmouth, Jamaica, 17th.

Brig Chillian, Kingston, Jamaica, September 7, for Inagua, put into Falmouth, September 18, in distress. Off Cape Irois, St. Domingo, gale between N. and W., on Saturday 11th, 4 p. m. 12th, 12.30 p. m., perfect hurricane, lost sails, fell into trough of sea, fell on beam ends, boats, &c., gone. 13th, morning, trimmed ballast, and got more upright, and put for Jamaica.

Steamer Apulco, September 20, 1875, between St. Domingo and Cuba, passed through quantities of drift stuff, consisting of large trees, pieces of wreck, and dead birds.

Jamaica brig Messenger put in, having experienced hurricane, September 12, 1875, off Altavela.

Brig Falcon, Azua, St. Domingo, for Boston, towed into St. Jago, Cuba, September 17, 1875. Dismasted near Navassa.

Brig Cleta, Belize, Honduras, (17° 15′ N., 88° 30′ W.,) 23 days. September 12, latitude 19°, longitude 19 (?), had a hurricane from N. E., veering to S. E., for 36 hours, washing away everything on decks and part of monkey-rail.

23.—Schooner Lizzie Ives, New York, for Aux Cayes, Hayti, found water-logged and abandoned in recent hurricane, 18° 50 N., 75° 50 W., and seen drifting past Navassa previous to September 16.

(31)—Nassau, Bahamas, West Indies.

Washington time.	Date.	Temperature.	Barometer reduced to sea-level.	Wind direction.	Wind force 0 to 10.	Rain fall.	State of weather.	Clouds, scale 0 to 10.
7. 35 a. m	Sept. 12	83°	30. 04	E.	3	.....	Thunder storm .	6.
7. 35 a. m	Sept. 13	81°	29. 99	NE.	5	.....	Heavy rain	10 nim.
7. 35 a. m	Sept. 14	84°	30. 06	SE.	4	.....	.....	8 stratus.

(38) Key West.—13th a. m., light rains, falling barometer, N. E. winds, and little thunder and lightning. Stormy and threatening weather in Cuba; hurricane at Santiago.

4.16 p. m.	29.81	N. E.	22
12 m.	29.67	N. E.	36
14th, 12.45 a. m.	29.63	E.	44
1.15	29.61	E.	48
3.15	29.568	E.	48
4.30	29.622	S. E.	44
6.00	29.705	S. E.	42
8.15	29.817	S. E.	35
10.00	29.878	S. E.	28
12 m.	29.883	S. E.	25
4.16 p. m.	29.86	S. E.	21

(35)—Havana, Sept. 13th. Telegraph reports of a hurricane at the Windward Islands continue to be received. The weather threatening at Havana. A hurricane reported at Santiago de Cuba on the night of the 12th.

September 13.			September 14, 1875.		
7.13 a. m.	4.13 p. m.	10.38 p. m.	7.13 a. m.	4.13 p. m.	10.38 p. m.
82 29.94 2.4 .06	82 29.86 12 00 T Threatening storm.	82 29.52 9.6 — T Threatening storm.	78 29.80 8.4 2.44 R	84 30.01 7.2 .06	80 29.97 3.6 00 Fog

Hurricane Sept. 13th and 14th, 1875.

September 12th and 13th, high, followed by falling barometer, solar and lunar halos. Evening 12th and morning 13th, formation of truncated rainbows about the south points.

(32)—13th, Cienfuegos struck by left wing of cyclone; harbor swept.

(34)—13th, Cardenas, hurricane blowing by the E. (wind from E.) of that town.

Axis came over between Santiago de Cuba and Cienfuegos and nearer Cuba; since there it was felt with more severity.

Cienfuegos did not experience a high N. wind.

The hurricane must have left to the N. and N. W. of—

(35)—Havana.

6 a. m., E. S. E. wind.

7 a. m., veered to S. E., and then to first quadrant, hardly leaving N. N. E., and continued till 10 p. m., then to N. for a few minutes.

11 p. m., to N. N. W.

14th, 12 m. to 1.45 a. m., oscillated about that rhumb.

1.45 a. m. barometric minimum occurred, and wind backed to S. W., S. S. W., S., and S. S. E. Drizzling and pouring almost continuously till 8 a. m.

Rain-fall, 62.70 m. m.

13th,	4.15 p. m	755.33	29.738	E. S. E.
	4.40 p. m	755.20	29.733	E. S. E.
	5.00 p. m	755.00	29.725	E. S. E.
	5.15 p. m	754.9	29.721	E. S. E.
	5.45 p. m	754.85	29.719	E. S. E.
	7.00 p. m	754.7	29.713	E. S. E.
	7.30 p. m	754.45	29.703	E. S. E.
	8.00 p. m	754.3	29.697	E. S. E.
	8.30 p. m	754.1	29.690	E. S. E.
	8.45 p. m	753.82	29.679	E. S. E.
	9.00 p. m	753.5	29.666	E. S. E.
	10.00 p. m	752.25	29.617	E.
	11.30 p. m	748.7	29.477	E. N. E.
14th,	12.30 a. m	745.95	29.369	N. E.
	12.45 a. m	745.45	29.340	E. N. E.
	1.00 a. m	744.95	29.329	E. N. E.
	1.15 a. m	744.45	29.310	E. N. E.
	1.30 a. m	744.3	29.304	E. N. E.
	1.45 a. m	744.18	29.299	N. N. W.
	2.00 a. m	744.2	29.300	N. W.
	2.15 a. m	744.3	29.304	N. W.
	2.30 a. m	744.7	29.319	N. W.
	2.45 a. m	744.95	29.329	W. N. W.
	3.00 a. m	745.6	29.355	W. N. W.
	3.15 a. m	746.2	29.378	W. N. W.
	3.30 a. m	746.6	29.394	W. N. W.
	3.45 a. m	747.1	39.414	W. N. W.
	4.00 a. m	747.61	29.434	W. N. W.
	4.15 a. m	748.14	29.455	W. N. W.

14th,	4.30 a. m.	748.69	29.477	W. N. W.
	4.45 a. m.	749.3	29.501	W. N. W.
	5.00 a. m.	749.8	29.520	W. N. W.
	5.15 a. m.	750.75	29.558	W. N. W.
	5.30 a. m.	651.1	29.571	W. N. W.
	5.45 a. m.	751.5	29.587	W. N. W.
	6.00 a. m.	752.48	29.626	W. N. W.
	6.15 a. m.	752.76	29.636	W. N. W.
	6.30 a. m.	752.86	29.640	W.
	6.45 a. m.	753.32	29.659	W. N. W.
	7.00 a. m.	753.98	29.685	W. N. W.

33. Sagua, Cuba, September 13, heavy gale.

Schooner Tweed, of Nassau, wrecked September 13, 1875, in hurricane off Water-Cay.

35. Letter of Benito Viñez, S. J., published in Diario de la Marina, September 24, 1875.

Hurricane of 13th and 14th: barometer fell less, and velocity of wind more feeble than usual; cyclone entered Cuba little east of Cape Cruz, crossed about Manzanillo and Santa Cruz, and immediately south of Puerto Principe, Santa Clara, Colon, Cardinas, and Mantanzas, and little N. N. E. and N. of Havana; great havoc in Portillo, Manzanillo, and Santa Cruz; Portillo harbor barometer fell to 29.00 at 4 a. m. 13th, with showers and squalls from N. W., and corrected barometer 733.5^{m}; most severe nights of 12th and 13th.

At Havana large cirro-stratus (cock-tails) presented themselves from E. S. E. to W. N. W.; later turned in a whitish and uniform veil of fibrous structure, with circles and solar and lunar halos, and heavy damp weather; at sunset clouds copper-red tinge. Nimbi appeared suddenly; in the east very bad looking barrier of crowded clouds in advance, and in the west, following, then the veil, and later the cirro-stratus from W. N. W. to E. S. E.; on 15th and 16th, the winds variable E. and S. E., and barometer normal height; 17th and 18th and 19th, wind steady S. E. and S., with falling barometer, dark sky, showers and frequent thunder; 20th, wind veered to S. W., and barometer rising; 21st, wind to W. and N., with great rise in barometer.

Observatory, Belen College, Havana.

					M.	
September 13.	4.00	a. m.	756.62		4.0	Rain-fall, 46^{mm}.2 = inches.
	6.00		756.84	4	0.0	
	8.00		757.12		5.0	
	10.00		757. 7		5.5	
	12.00	noon	756.81		5.0	
	2.00	p. m.	755.37		6.5	
	4.00		754.83		4.5	
	6.00		754.29	R	8.0	
	8.00		753.61	R	11.0 9.5	
	10.00		751.56	R	13.0 19.5	
	11.00		749.25	R	10.0 18.0	
	11.30		747.85	1 R	10.0 16.0	
	12.00		746.37	R 3	8.5 13.0	

1.00	a. m.	744.49		2.5	Rain-fall, 10mm.7 = inches.
1.30		743.79			
1.45		743.65	4	4.5	
2.00		743.75	2 R	7.5	
2.15		743. 8	R 3	9.0	
2.30		744.19	R	11.5 7.0 10.0	
2.45		744.51	R	6.0 10.0	
3.00		745.03	R	10.0	
3.15		745.58		14.0 13.0 16.5	
3.30		746.03	R	11.5 16.0	
4.00		747.05		10.5 14.5	
6.00		751.98	R	12. 18.	
8.00		754.54		4.5	
10.00		756.57		6. 10	
12.00	noon.	756.42	R 1	10. 12.5	
2.00	p. m.	756.45	R 2	10. 13.	

41. *Jacksonville, Fla.*—Reported off the coast and south to Mosquito Inlet; wind on September 15th (probably 14th) estimated at sixty miles per hour; most severe at 7 a. m.

38. *Key West.*—Arrived schooner Anne W. Collins, Brewster, master, from Maracaibo to New York; cargo, coffee and hides; broke boom and split mainsail during gale north side of Cuba night of 13th instant; put into Key West 19th.

44½. Arrived brigantine Era, Ed. Welford, master, from Minatilan, Mex., for Hamburg; cargo of mahogany; ran ashore off Key West, and in sight of it, through a misreckoning, at 4.30 a. m., 17th; no damage during gale; was then 23° and 24° N., 90° W.

Reported Cuban or Spanish coaster ashore, without sails, near Antelope Keys, Fla.

Spanish schooner Dos Amigos, José Cordellero, master, Havana to Cienfuegos; encountered gale on south side of Cuba, and was driven to Antelope Keys, Fla.; five days before the wind; cargo, tile; reached Key West 24th.

37. Brig Error ashore on Marquesas Keys, laden with mahogany.

36. Schooner Florence Rogers at New York October 4, from Milk River, Ja.; September 13, North Elbow Key light bearing S. E., distant thirty miles; had hurricane from N. E. and to S. E. suddenly, with heavy rain-squalls, blowing away all sails; heavy sea running; vessel laboring heavily; 11 p. m., wind moderated; morning of 14th, Alligator Reef light bearing N. E. eight miles.

Brig Chillianwallah, with molasses, from Matanzas for New York, put into Key West September 17, 1875, leaking badly. Struck gale 60 miles N. of Matanzas September 13; heavy weather till a. m. 14th; damaged.

40. Schooner Sarah Hall struck gale 8.30 p. m., 13th, 35 miles north from Key West

N. W. light-house; gale moderated 8 a. m., 14th. When she was 20 miles S. of Cape Romano, Fla., barometer fell to 29.50. Wind N. E. and E.; after 4.20 a. m., 14th, from S. E.

Schooner Eva L. Leonard, Mobile for New York, struck gale September 13, Cuba coast; wind N. E. Made Alligator Reef night 13th, 75 miles from Key West; drifted to American Shoals.

Steamship Crescent City, New York to Havana, passed Key West 15th, 3 p. m. No bad weather.

39. Schooner Beauregard left Havana 9 a. m., 12th; wind N. E. by E.; noon, fresh N. E. and heavy sea rest of day. 13th, 6 a. m., E. N. E.; 10.30 a. m., at Tortugas; 2 p. m., E. N. E. squalls; 4 p. m., increasing to gale and to S.; 4 a. m., 14th, blow maximum; 8 a. m., moderating, and to S. S. W.; noon, moderate. Lowest barometer at Tortugas, 28°.

Brig Burham, 30 miles S. E. of Sand Key, a. m. 15th, dismasted, &c.

Ship City of Liverpool, Pensacola to Liverpool, encountered hurricane September 15 in Gulf of Mexico; vessel strained and damaged.

Schooner Village Belle, Port Antonio, Ja., for New York, experienced heavy weather; spoken off Body Island, S. C., September 15.

42. From log steamship St. Mary, Havana to New Orleans, (New Orleans time:) September 12, Havana, barometer 30.05, strong breeze and squally. 13th, barometer 30.00, 24° 18′ N., 85° 42′ W., N.E. strong, and heavy sea. 14th, barometer 29.90, fresh N. E. gales, light rain, and heavy sea; latitude by D.R., 25° 40′ N.; longitude, 89° 19′ W. dist.; 7 a. m., N. E. gale and increasing; 11 p. m., lost smoke-stack and main-sail. 15th, barometer 29.00, begun with heavy N. E. gales; 12.40 a. m., wind to S. E. strong; 2 to 4 a. m., hurricane; 7 a. m., began to moderate; noon, moderating and sea going down; 8 p. m., port wheel-house washed away; day ends with fresh gales. 16th began with freshg ales and cloudy weather; 9.30 a. m. heavy sea running; 11 a. m., made Southwest Pass; day ends with fresh gales and cloudy weather. 17th, arrived at Algiers, La., this p. m.

44. Steamer San Antonio, Captain Rea, from Livepool to Brazos Santiago. September 14, 7 a. m., 90° 8′ W., 25° 25′ N., course W. ½ N., N. N. E. gale, rainy, sea from N. E., rising. 15th, 7 a. m., 93° 16′ W., 25° 50′ N., course W., S. S. westerly gale, rainy, very high cross-sea and tremendous squalls. 16th, 7 a. m., 93° 50′ W. 26° 05′ N., W. N. W., S. S. W. gale, rainy, very high sea; at noon gale slowly moderating. 17th, 7 a. m., 95° 10′ W., 26° 16′ N. W. by S. W., W. N. W. gale, rainy, sea running high, and heavy squalls, with rain. 18th, 7 a. m. 97° 0′ W., 26° N., making harbor, clear, gale moderating, and sea going down; 19th, harbor at Brazos Santiago, near mouth of Rio Grande.

From log steamship Austin, Morgan line, from Indianola to Brashear, and put into Sabine, (New Orleans time.) September 14, a.m., left Indianola. Day began with N. E. winds, and heavy squalls at 2.59 p. m. 15th, 1 a. m., fresh breeze from N. N. E., heavy swell from S. E., sea breaking in four fathoms. 16th, strong gale and heavy cross-seas, barometer falling rapidly; noon, wind N. E., ship laboring much, port paddle-boxes washed away and parted steering-chains, blowing a hurricane with much rain. 17th, began with hurricane and heavy cross-seas, wind S. and heavy rain, ship laboring much and sprung plank-shear on quarter-deck, wind S.W., from which quarter it blew hardest; barometer falling rapidly. 18th, strong W. gales and heavy cross-seas; daylight, N. N. W. moderating; 12 noon, Sabine bore N. 80 miles, moderating and sea going down; midnight, sea smooth. 19th, arrived at Sabine with only 25 out of 388 cattle alive.

46. Steamer State of Texas (from log and captain) left Galveston for Key West 1.25 a. m., September 13. 4 a. m., strong, easterly breezes continued till 12 noon, with heavy squalls of rain, thunder, and lightning. 4 p. m., strong easterly breezes and cloudy. 8 p. m. to midnight, fresh easterly gales and rain-squalls, 28° 39′ N. 14th, course E. S. E; wind, E. N. E.; latitude decreasing from 28° 39′ to 26° 41′ N. at 2 a. m.; longitude 93° 02′ W; day broke with fresh gales and rain-squalls. 8 a. m., wind N. E., course E. S. E; wind has hauled more northerly, with heavy rain-squalls, and had to set all fore and aft-sails; 160 (?) miles off mouth of the Mississippi. Noon, increasing gales and heavy rain-squalls. 1 p. m., wind N. N. E., was obliged to reef main try-sail and set it; stay-sail split. 2 p. m., wind N. E. and gale increasing; had to furl main and fore spankers. 3 p. m., wind N. E. and gale increasing. 4 p. m., blowing fearful gusts, with fast-falling barometer; main stay-sail blown out of bolt-rope. 6 p. m., blowing a complete hurricane; had to slow down engine; kept head to sea and got everything tied down in case of accident to engine; sea running very high; broke over the ship and stove down engine-room sides. 8 p. m., shipped a fearful sea, &c.; saloon, all state-rooms, port-side of engine-room, fire-room, cook's room, completely wrecked fore and aft on port-side; also, upper deck, after-boat, and rails; stove in pilot-house windows and washed overboard everything movable; complete wreck from fore to aft; making a N. N. E. drift about 2 knots an hour; barometer fallen from 29.90 at Galveston to 28.40. 10.30 p. m., wind suddenly from N. E. to S. E., and making fearful sea. 12 m., fearful sea and wind; barometer rose from 28.20 to 28.60; all hands on deck assisting engi-

neers with hurricane bulk-heads, and using every available means to keep water from going below. 15th, 1.30 a. m., making 2 knots by a N. E. drift; wind S. E. and fearful hurricane; sea mountains high and completely breaking over ship; laboring heavily; 2 men at helm, and 3 and third officer at relief-tackles. 2 a. m., barometer still rising and hurricane has broken a little. 4 a. m. and 7 a. m., hurricane to strong gale; sea going down. 8 a. m., one watch went below, as gale had moderated considerably; noon, 26° 33′ N. by observation; moderate gale and heavy swell. 4 p. m., strong breezes and cloudy. 12. m., strong breezes and clouds from S. E., and heavy swell from S. E. 16th, 1 a. m., strong breezes S. E. and cloudy. 4 a. m., gale moderated considerably and clearing. Noon, wind moderated and south; unsteady; weather fine. 4 p. m., strong S. E. wind and cloudy. 12 m., strong wind changed to E. S. E. and heavy swell from S. E. to E., 26° 21′ N. 17th, 1 a. m., wind strong S. E. and cloudy. 4 a. m., weather cleared. 9 a. m., wind S. S. E., and got into white water. Noon, found that a strong current had set the ship to northward, and stood off to S. E. 3 p. m., made Tortugas light-house. Hurricane heaviest from 7 p. m. Tuesday, 14th, to 1 a. m. Wednesday, 15th, in latitude 26° 50′ N. and 89° 20′ W., with wind E. N. E. and barometer 28.40. Barometer commenced to fall 29° 16′ N., 94° 38′ W., D. R.; barometer commenced to rise, 26° N., 86° W., D. R.

47. Brig C. C. Robinson, plying between New York and Galveston. Left 13th; anchored 12 miles off Galveston; heavy weather; weighed anchor and put to sea. 14th, 28° 58′ N., 94° 38′ W.; course, E. by S.; wind N. N. E., high at 4 p. m., and barometer 30.05; 8 p. m., barometer 29.90. 15th, 28° 15′ N., 93° 50′ W.; wind, N. N. E; barometer falling fast; heavy sea; wind E. N. E., and gale; 8 a. m., barometer 29.00, and falling fast; 12.30 p. m., wind and sea frightful; 2 p. m., barometer 29.56 (?); midnight, hurricane, center to E. S. E.; barometer 28.60. 16th, hurricane and heavy sea continued; 2 a. m., barometer 28.01; noon, wind lulled to nearly calm, with tremendous high sea; barometer 28.40 (?); center passing over; distant from Galveston 100 miles S. ½ E.; 2 p. m., barometer 28.00; wind N. W. and N. N. W., with terrific violence; 5 p. m., 27.95; 10 p. m., 27.85. 17th, distant 125 miles S. ½ E. from Galveston; 12 m., wind decreasing; barometer 29.00, and rising fast. 18th, weather moderating; barometer rising; gale N. W.; 4 p. m., 26° 30′ N., 95° 15′ W.; reached Galveston October 2. Barometer coincided with observer's at Galveston.

43. Log of English bark Lorton Vale, Captain Beamer, (nautical time,) September 10th, 8 a. m., wind N. E., variable winds and squally. 12 m., wind N. E.; 24° 18′ N., 85° 59′ W.; barometer 30.20. 2 p. m., wind N. N. E.; light winds and variable. 11th, 8 a. m., wind N. N. E; a current setting N. N. W., 2 miles per hour. 12 m., wind N. N. E.; 26° 18′ N., 87° 22′ W.; barometer 30.06. 2 p. m., wind N., light breeze and fine weather. 10 p. m., wind N., calm all night. 12th, 6 a. m., wind N.; a current setting N. N. W., 1 mile per hour. 12 m., wind N.; 26° 50′ N., 88° 15′ W.; barometer 30.00. 2 p. m., wind N.; variable winds and squally. 13th, 6 a. m., wind N., fresh and squally. 12 m., wind N.; 28° 26′ N.; barometer 30.00. 2 p. m., fresh breeze and squally. 4 p. m., wind N. E.; took in light sails and fore top-gallant sail. 14th, 8 a. m., wind N. E.; took in main top-gallant sail. 12 m., took in main-sail and jibs; 27° 54′ N., 88° 27′ W.; 29.80. 2 p. m., wind N. E., gale increasing with heavy squalls. 8 p. m., wind N. E., main top-sail blew away; blowing a gale; cross-sea; set main top-sail, and in 10 minutes it bursted. 15th, 10 a. m., wind N. E.; heavy thunder and lightning. 12 m., set lower foretop-sail to ware ship; it bursted in a heavy squall, also fore-topmast stay-sail. Laid the ship to under mizzen stay-sail, 28° N., 88° 51′ W.; barometer 29.50. 16th, 8 a. m., wind E. S. E.; ship making water. 12 m., 29° 32′ N., 87° 57′ W.; barometer 29.90. 4 p. m., arrived at mouth of Mobile Bay; no pilot in sight; put out to sea and tacked all night. Gale moderating. 17th, made harbor and anchored at 5 p. m. A very severe gale during the night.

Ship Western Empire, Pensacola for Grimsby, encountered a hurricane September 14; Dry Tortugas, S. E. 80 miles, leaking badly; abandoned, water-logged, September 18, in 28° 53′ N., 87° 54′ W.

Key West, Fla.—Bark Nord-Kyn, Tabasco for Queenstown, with mahogany, was lost on a reef off Key Vacas, Fla., in hurricane, September 14.

Steamer City of Waco, ashore on French reef a. m., 16th; no bad weather, only heavy sea and strong breezes.

From log of steamship Margaret, from New Orleans for Havana: September 17, at Pass à l'Outre, S. S. E., threatening and cloudy; 7 p m., indications of bad weather, barometer falling. September 18, 12.01 a. m., gale W., with occasional rain; 3.40 p. m., wind N. W.

Brig Winfield, at Havana, September 23, from Pensacola; lost deck-load and sails.

Schooner Witch of the Wave, left Tuxpan, Mexico, September 8, for Galveston, and not since heard from.

Brig Cairo, Havana for Pacagoula, arrived at Mobile 21st instant, leaking badly.

Schooner J. Truman, went ashore 15 miles west of Sabine Pass; light during gale also,

Steamer Pelican State, ashore; water high and damaging to crops, &c.

Bark Astrea, at Pensacola, 20th, from Greenock; carried away main-topmast.

Spanish schooner Zorevilla, sailed from Tuxpan, with sugar, for Galveston, September 10, 1875. Reached Brazos Santiago, Texas, October 6, in a disabled condition.

Ship Marcia Greenleaf, from Reval via Delaware breakwater. Terrific hurricane in 25° 28′ N., 84°40′ W., from N. E., ending in S. E.; damaged. Arrived at Southwest Pass, La., September 17, 1875. In gale of 18th dragged ashore on west side of Southwest Pass.

Schooner Mabel left mouth of the Mississippi day before hurricane, and nothing since heard from her.

Schooner Lizzie, Mobile for Honduras, put into Pass à l'Outre, La., September 25, leaky.

Galveston.—Tuesday, September 14, solar halos in a. m., brisk N. E. wind, and threatening at night.

Wednesday, September 15: wind N., 33 miles; 11 a. m. N. E., 41 miles; 4.20 p. m. heavy rain; 9.49 p. m. immense sea. Old captains refused to go to sea. 10 p. m. wind E. N. E., 50 miles and increasing. Several bridges washed away. Water eight feet above mean tide, and higher than in 1867, extending three miles inland.

Thursday, September 16: 2 a. m. quarantine houses on breakwater, and harbor-improvement buildings carried away; wind very light, N. E.; 10.49 a. m., wind to E. Storm continued all day. Water fell in morning, but again rose in evening. Fearful night; water from gulf covering island, except a few spots, and highest ever known.

Friday, September 17: 12 m. to 4 a. m. terrible state of affairs, water on first floors, wind changed toward morning; 4.20 a. m. gale S. E.; at daylight water 6 to 10 feet deep towards fair-grounds, and 30 inches above that of 1867. Between 7 and 10 a. m. wind well toward S. and water fell rapidly; 12.15 p. m. rain ceased; 2 p. m. wind to westward, so that the water from that direction covered everything again, but soon fell; barometer 29.038 and wind S. W.; 4.35 p. m. wind N. W., 60 miles; 9 p. m. wind N. W. at fearful rate; light-ship carried out by current in the evening to the light-house. During night water fell near usual level.

Saturday, September 18: at 6.55 a. m. wind N., 42 miles. Storm lasted from 4.20 a. m. September 15, to 12 m. September 18, 1876.

Trinity River, Texas.—Rough at mouth Wednesday evening, September 15; steamer Fannie ran back to canal. Thursday morning, 16th, wind terrific and water over banks; ran up eight miles to Wallisville; 4 p. m. hurricane, barometer falling, water still rising; held by anchor and a tree during night; houses washing away. Friday morning, September 17, was obliged to run up 28 miles to Moss's Bluffs; 11 p. m. Friday barometer 28.70.

Houston, Texas.—Storm commenced Wednesday night, September 15, wind N. E.; continued during Thursday. Friday, September 17, 11 a. m. wind ceased; at 2 p. m. wind to N. N. W. (destructive) and all afternoon; streets a sheet of water. From Houston to Lynchburg, at Harrisburg, at Midway Landing, and Spring, all under water, &c.

San Antonio.—No damage and very little rain; wind blew a perfect gale.

Indianola.—Wind principally N. E., backing to N. and N. W., maintaining gale and storm velocity nearly two days, and reaching hurricane several hours in night of 16th and 17th. Severe inundation from bay, destructive to life and property. Over fifty bodies buried to date, 20th; loss fully 150. Dead cattle in thousands. Coasting schooners to the south 6 to 10 miles inland; three-quarter of buildings carried away; remaining damaged; $1,500,000 loss estimated. The following table gives the wind direction and velocities in miles per hour, until anemometer was blown away:

Date.	Hours, a. m.											
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
INDIANOLA.												
Tuesday, September 14, midday, to Wednesday, September 15, midday	13	12	N. E. 12	11	15	16	18	20	17	N. E. 15	18	23
Wednesday, September 15, midday, to Thursday, September 16, midday	38	N. 39	N. 39	37	39	41	41	46	N. 54	N. 54	58	59
Thursday, September 16, midday, to Friday, September 17, midday	71	N. E. 68	N. E. 73	75	83	88	....	....	N. W.*	N. W.	....	....

Date.	Hours, p. m.											
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
INDIANOLA.												
Tuesday, September 14, midday, to Wednesday, September 15, midday	23	23	26	26	N. 28	29	31	32	35	33	N. 32	36
Wednesday, September 15, midday, to Thursday, September 16, midday	58	57	65	69	N. E. 68	62	60	59	60	64	N. E. 70	75
Thursday, September 16, midday, to Friday, September 17, midday	....	....	....	....	N. W.†	....	....	....	....	....	....	....

* Hurricane. † Gale.

Sabine Pass, Texas.—Water 6 inches over wharves.

Beaumont, Jefferson County, Texas.—River high and wind furious for two days; dense forest prevented much damage.

Velasco, (mouth of Brazos River,) Texas.—Water 5 feet higher than ever known; 3 a. m. Friday, September 17, storm at its height; town swept away.

Tyler, Smith County, Texas.—Heavy rain and wind-storm for thirty hours.

Lynchburgh, Harris County, Texas.—Sunday evening water above usual tide.

Haltom's, Montgomery County, Texas.—Trains here since Thursday.

Pierce Junction.—Train of cars blown off track.

Brazos Bottom, Brazos County, opposite Bryan.—One-quarter of the cotton destroyed. Thursday night and Friday storm at its height; dwelling blown down and water high.

Hempstead, Austin County, Texas.—Storm lasted sixty hours and very destructive to buildings and crops. No destruction above.

Burton, Washington County, and Cypress, Harris County, Texas.—Storm destructive.

San Bernard, Brazoria County, Texas.—Swept away; wind shifted to W. 3 a. m. 17th.

Saluria, Calhoun County, Texas.—Swept away; 27 persons missing and 13 found. Schooner Pedee totally wrecked September 17.

Cedar Lake.—Swept away.

Matagorda, Matagorda County, Texas.—Swept away.

Corpus Christi, Nueces County, Texas.—Wind comparatively light.

Elkhard, Anderson County, Texas.—Considerable damage to cotton crop.

Jewett, Leon County, Texas.—Considerable damage to cotton crop.

Macy, Brazos County, Texas.—Storm raging and damaging 16th and 17th.

Quintana, Tex.—Much damage.

Corsicana, Navarro County, Texas, September 18.—A wind and rain storm set in at Corsicana on Thursday, September 16, 10 p. m., lasting until dark of the 17th. The rain extended from south of Dallas to the coast. Some cotton was blown out, but no great damage was done in that section. Telegraphic communications with Houston and Galveston broken. Reports from there report the storm still raging.

Hurricane near Galveston.—At Shoal Point, near Galveston, the bark May Queen and schooners Minerva and Amos Houston are high and dry. At Wilcox's Point the schooner Adelaide is ashore. At Edwards's Point the schooner Christiana will prove a total loss.

Steamers report no damage done by the storm at Brazos and Rockport.

Steamship Australian, September 17, 4 a. m., driven ashore at St. Bernard, 60 miles west of Galveston; wind to west at 3 a. m., and gale more violent. Slipped anchors and went to sea from Galveston outer roads during gale night of 16th.

Bark Edward McDowell blown aground on the point of Pelican Island, Galveston Bay, during gale of September 17.

Bark Memory broke from wharf at Galveston, September 17, and drove out of sight.

Schooner Thistle driven ashore at Galveston, September 17.

Schooner Comet, from Pascagoula, driven ashore above Indianola, Tex., 6 miles from water, on September 17.

Schooner Rescue and schooner Rebecca driven ashore near Aransas Pass, Texas, September 17.

September 18, the gale at Brashear, Saint Mary's County, Louisiana, continued all night and still prevailing, the wind having changed to N. W. The water in the streets is 4 feet high. At Lyons, 18 miles west, the country is flooded 3 feet deep.

Ocean Springs, Bay Saint-Louis, Biloxi, Rigolets, and Pascagoula, Miss.—Storm threatening Friday, September 17, but subsided without material damage.

September 17, noon, gale, mouth of the Mississippi.

Mobile, Ala.—September 17, S. E. gale set in at midnight; 1 a. m., 18th, S. 32 miles in strong gusts; 8 a. m., storm highest; 8.30 a. m., wind to S. W. and moderating.

Steamer Knight Templar, from Malaga, at New York September 22. September 18 in 42° 02′ N., 57° 40′ W., heavy N. W. gales, veering around to W., and lasting 48 hours; stove sky-lights, broke steering-gear, &c.

Brig W. D. Andrews, at New York September 30, from Port-au-Prince. From September 20, latitude 27° 35′, longitude 74° 56′, to latitude 35° 21′, longitude 74° 51′, had heavy N. and N. E. gales, with much rain, thunder, and lightning.

Steamer Hudson left New Orleans September 19; had heavy N. E. gales from Cape Florida to Hatteras.

Schooner Harry C. Sheppard left Saint John's River, (Florida?) on the 18th with a heavy sea and strong wind from S. E.; at 6 p. m. wind suddenly changed to W., blowing with great violence, and damaging the vessel extensively. On the 20th was off Charleston Bar dismasted.

Brig Amelia left Brunswick, Ga., Friday, September 17, 1875, for Rio Janeiro. Soon after leaving, weather became heavy, wind S. S. E. to S. S. W., and high, with thunder and lightning. Brig commenced leaking 12 hours after sailing; gale continued on Saturday, 18th; vessel became unmanageable and had to be abandoned 25 miles off Charleston Bar. (5,532 Obs., 1875.)

Steamer Geranium, September 18 and 19, encountered heavy gale, blowing from S. to S. W. Put into Cape Fear River for a harbor.

Schooner Village Belle, from Port Antonio, Jamaica, at New York September 21. September 14, in 34° 40′ N., 70° W., heavy gale from N. E.

September 17, gale from N. W.; barometer 29.05; thermometer 65°; at 11 a. m. the gale increased to a hurricane.

September 19, another heavy gale from N. W., with heavy sea. (1,268 Mis., 1875.)

September 18, Bravo, noon, 37° 24′ N., 67° 23′ W., course N., bound to Halifax.; 1 a. m., wind N., with much swell, making from N. to N. E.; 1 p. m., wind N. E. and quite fresh with heavy rain.

September 19, 4 p. m., 38° 49′ N., 65° 17′ W.; strong and steady S. E. wind, (probably in morning;) 11 a. m., gale S. E., and increasing; 4 p. m., very violent W. S. W. gale; 12 m., moderating; carried storm try-sail several hours while lying hove-to.

Ship Enoch Train, hurricane September 19, 1875, in 42° N., 56° W.

Schooner Sophia and Emilia, from Lisbon, in August, for Halifax. Encountered hurricane September 19 from S. W.; crew taken off September 29 in 40° 30′ N., 54° W.

Bermuda, Wednesday, September 22, 1875.—Showers during day; severe thunder-storms at night, with floods of rain; heavy rains on Thursday and Friday.

Gale at Bermuda September 24, 1875.—(See Original Record of Observations.)

September 19, Punta Rassa, Fla., 3 p. m., lowest barometer 29.82; 9.15 p. m., highest velocity S. W., 54 miles per hour.

Bark Mary McKee dragged on bar, Lewes, Del., night September 18, 1875.

Schooner Adie foundered September 19, 1875, in Annapolis Roads, Md.

Schooner Columbia ran ashore on Goose Island, Del., September 16, 1875, but got off.

Schooner Mabel Thomas ran ashore at Highlands, N. J., September 19, 1875, in morning.

Schooner Eliza A., 2 a. m., September 19, 1875, went ashore 30 miles north of Cape Lookout, N. C.

Schooner May Collins, Bristol, Me., at Charleston, September 23, 1875, damaged in heavy gale of 18th.

WAR DEPARTMENT, OFFICE OF THE CHIEF SIGNAL-OFFICER,
DIVISION OF TELEGRAMS AND REPORTS FOR THE
BENEFIT OF COMMERCE AND AGRICULTURE,
Washington, D. C., November 28, 1876.

To the CHIEF SIGNAL-OFFICER OF THE ARMY:

SIR: The special meteorological observations taken under your direction at stations on Mount Washington, at the base and summit of Mount Mitchell, at Colorado Springs, and Pike's Peak, and published in the annual reports of the Chief Signal-Officer of 1873 and 1874, have been examined, with a view of determining the rate of decrease of temperature, with elevation for each hour of the day, and applying the results thus obtained to the reduction of barometric readings to sea-level.

The observations used in determining the decrease of temperature with altitudes were taken at the following stations: Pike's Peak, altitude, 13,960 feet; Colorado Springs, altitude, 5,880 feet.

Pike's Peak and Colorado Springs, August and September, 1874. Hours of observation: 5.42 a. m.; 7, 8, 9, 10.07, 11 a. m.; 12 midday; 1, 2, 2.42, 4, 5, 6, 7, 8, 9.07 p. m.

Mount Washington, N. H., during May, 1873. Summit and base, during June, 1873. Stations 1, 2, 3, 4. Elevation of station 1, 6,280.4 feet; elevation of station 2, 5,555.3 feet; elevation of station 3, 4,058.7 feet; elevation of station 4, 2,898.3 feet. Hours of observations: a. m., 1, 2, 3, 4, 5, 6, 7, 7.57, 9.10, and 12 midday; p. m., 1, 2, 3, 4, 4.57, 6, 7, 8, 9, 10, 11.22, and 12 midnight.

Mount Mitchell, N. C., during August, 1873. Summit and base. Hours of observation: a. m., 1, 2, 3, 4, 5, 6, 7.10, 8, 9, 10, 11, and 12 midday; p. m., 1, 2, 3, 4.14, 5, 6, 7, 8, 9,

10, 10.39, and midnight. Temperature at base and summit of Mount Mitchell, N. C., with the temperature at sea-level calculated separately from base and summit. Observations from August 8, 9, and 10. Hours of observation: 7 a. m., 12 m., 4 p. m., 9 p. m., and 10.36 p. m.

The result obtained from a careful examination of the above data is the following table, No. 1, showing the decrease of temperature during each hour of the day for each hundred feet of elevation measured from sea-level to 14,000 feet.

Table No. 1, showing decrease of temperature for each 100 feet of elevation.

Stations under 1,200 feet.				Stations over 1,200 feet.			
	°		°		°		°
1 a. m.	0.106	1 p. m.	0.610	1 a. m.	0.262	1 p. m.	0.470
2 a. m.	0.090	2 p. m.	0.545	2 a. m.	0.260	2 p. m.	0.465
3 a. m.	0.073	3 p. m.	0.496	3 a. m.	0.252	3 p. m.	0.462
4 a. m.	0.081	4 p. m.	0.504	4 a. m.	0.245	4 p. m.	0.455
5 a. m.	0.090	5 p. m.	0.415	5 a. m.	0.237	5 p. m.	0.442
6 a. m.	0.163	6 p. m.	0.382	6 a. m.	0.247	6 p. m.	0.407
7 a. m.	0.341	7 p. m.	0.309	7 a. m.	0.306	7 p. m.	0.365
8 a. m.	0.415	8 p. m.	0.252	8 a. m.	0.350	8 p. m.	0.325
9 a. m.	0.504	9 p. m.	0.244	9 a. m.	0.387	9 p. m.	0.305
10 a. m.	0.512	10 p. m.	0.[illegible]79	10 a. m.	0.415	10 p. m.	0.285
11 a. m.	0.553	11 p. m.	0.114	11 a. m.	0.430	11 p. m.	0.272
Noon	0.585	Midnight	0.130	Noon	0.450	Midnight	0.362

Table II shows the weight of a column of air 100 feet high at temperature from — 40° to + 100° Fahrenheit, and at readings of the barometer ranging from 21 inches to 31 inches.

Table III shows a small empirical correction, determined from accurate comparison of reduced readings and actual observations, to be applied to Table II.

In the use of Table II the value of $\frac{t' + t}{2}$ is obtained from Table I, and will therefore depend upon the elevation of the station and the hour of the day at which the observation is taken. When the elevation of the station is known, the correction for elevation is found from the formula $C = (N + N') \times E$, in which C is the correction required, E the elevation of the station, N the number from Table II, and N′ the number from Table III.

EXAMPLE.

At Dodge City, Kans., at an elevation of 2,479 feet above mean tide-water, at 7.35 a. m., Washington time, a reading of the barometer corrected for temperature is 27,516 inches, and the exposed thermometer is + 32°. Supposing the decrease of temperature to be 6°, what would be the correction for elevation?

We have $E = 2{,}479$, $b = 27{,}516$, $t = 32$. $t' = 32.° + 6° = 38°$ $\frac{t + t'}{2} = \frac{38 + 32}{2} = 35°$.

With the argument 35° and 25.516 inches, we find from Table II (,) $N = 0.1039$, from Table III, with 35° and 2479, we have $N' = .0052$. Then $C = (N + N') \times E = (0.1039 + .0052) \times 2479 = 2.705$ inches—the correction required, $27.516 + 2.705 = 30.221$. Table 1 applies specially to the months during which the observations upon which it is based were taken. It is suggested that with a series of hourly observations extending through the entire year a correction might be determined which would render the tables sufficiently accurate for the construction of isobarometric charts from simultaneous observations.

That such empirical correction is necessary is apparent from a comparison of the curves showing the decrease of temperature at the summit of Pike's Peak during the months of August and September.

The accompanying plates exhibit the results obtained from the data above referred to, as follows:

Plate 1. Showing the mean hourly temperature of base and summit of Mount Washington, N. H.; base and summit of Mount Mitchell, N. C.; Burlington, Vt., and Portland, Me.

Plate 2. Mean hourly temperature of Pike's Peak, Colo., and Colorado Springs, August and September, 1874.

Plate 3. Mean hourly difference of temperature between Pike's Peak and Colorado Springs for August and September, 1874; and between base and summit of Mount Mitchell, N. C., for August, 1873.

Plate 4. Exhibits mean difference of temperature for every 100 feet of elevation, calculated for each hour of the day.

Plate 5. Mean hourly difference of temperature between base and summit of Mount Washington for May and June, 1873; between base of Mount Washington, Portland, Me., and Burlington for June, 1873; between base and 1,200 feet above it, 1,200 feet and 2,400 feet, and between 2,400 feet and summit for June, 1873; also, hourly differences of temperature for 4,000 feet difference of height, calculated from observations taken at Mount Washington, Pike's Peak, and Mount Mitchell in 1873 and 1874.

Plate 6. Shows barometer at summit Mount Washington, N. H., Portland, Me., and Burlington, Vt., from observations taken at 7 a. m., 8 a. m., 2 p. m., 5 p. m., 9 p. m., and 11.30 p. m., (barometer reduced to sea-level;) also, shows barometer reduced to sea-level at Knoxville, Tenn.; base and summit of Mount Mitchell, N. C., from observations taken at 7 a. m., 12 m., 2 p. m., 4 p. m., 9 p. m., and 10.30 p. m. This plate also exhibits the temperature of base and summit of Mount Mitchell, with temperature at sea-level, calculated separately from base and summit, for 7 a. m., 12 m., 2 p. m., 4 p. m., 9 p. m., and 10.30 p. m.

The simultaneous barometric observations taken at the stations of the signal-service at 4.35 p. m. of November 23, reduced to freezing and then to sea-level by means of tables 1, 2, and 3, are given below:

November 23, 1874.	Washington time, 4.35 p. m.			
Stations.	Barometer reduced to 32° Fahrenheit.	Exposed thermometer.	Correction for elevation.	Barometer reduced to sea-level.
Albany	28.884	36	0.186	29.070
Alpena	28.298	30	0.663	28.963
Atlantic City	29.210	54	0.019	29.229
Augusta	29.601	70	0.179	29.780
Baltimore	29.207	58	0.047	29.254
Bangor				
Barnegat	29.133	—52	0.021	29.154
Benton, Fort	27.371	— 4	3.132	30.453
Bismarck	28.262	.....	1.990	30.252
Boston	29.014	51	0.082	29.096
Breckenridge	28.899	6	1.140	30.039
Buffalo	28.390	42	0.707	29.097
Burlington, Iowa				
Burlington, Vt	28.955	37	0.224	29.199
Cairo	29.617	52	0.384	30.001
Cape Henry	29.315	60	0.024	29.339
Cape Hatteras	29.506	66	0.008	29.514
Cape May	29.243	54	0.015	29.258
Charleston	29.685	70	0.064	29.749
Cheyenne	23.795	46	5.776	29.571
Chicago	28.886	30	0.733	29.619
Cincinnati	29.071	44	0.649	29.710
Cleveland	28.585	32	0.747	29.332
Colorado Springs	23.851	46	5.563	29.414
Corsicana	29.612	63	0.462	30.074
Davenport	29.223	24	0.688	29.911
Denver	24.552	56.5	4.878	29.430
Detroit	28.559	34	0.717	29.276
Dodge City	27.310	48	2.573	29.883
Dubuque	29.049	23	0.756	29.805
Duluth	28.957	15	0.744	29.701
Eastport	29.623	32	0.069	29.692
Erie	28.496	40	0.723	29.219
Escanaba	28.520	28	0.671	29.191
Fort Gibson	29.521	47	0.559	30.070
Fort Sully	28.401	9	1.970	30.372
Galveston	30.022	69	0.042	30.064
Grand Haven	28.727	31	0.681	29.408
Indianapolis	28.913	37	0.823	29.736
Indianola	30.064	72	0.027	30.091
Jacksonville	29.840	76	0.024	29.864
Keokuk	29.299	29	0.662	29.961
Key West	30.018	83	0.017	30.035
Kitty Hawk				
Knoxville	28.863	52	1.056	29.919
La Crosse	29.036	16	0.794	29.830
Leavenworth	29.183	29	0.921	30.104
Lexington	28.654	48	1.158	29.812
Logansport				
Louisville	29.262	46	0.531	29.793
Long Branch	29.107	52	0.030	29.137
Lynchburg	28.793	55	0.776	29.569
Marquette	28.487	26	0.739	29.226

November 23, 1874.	Washington time, 4 35 p. m.			
Stations.	Barometer reduced to 32° Fahrenheit.	Exposed thermometer.	Correction for elevation.	Barometer reduced to sea-level.
Memphis	29.721	57	0.321	30.042
Milwaukee	28.803	24	0.744	29.547
Mobile	29.956	74	0.043	29.999
Montgomery	29.730	69	0.262	29.992
Morgantown	28.408	44	1.057	29.465
Mount Washington	23.078	20	6.185	29.263
Nashville	29.414	53	0.542	29.953
New Haven	28.961	55	0.012	29.073
New London	29.065	57.5	0.026	29.091
New Orleans	29.956	73	0.059	30.015
New York	28.970	52	0.175	29.145
Norfolk	29.346	61	0.058	29.404
North Platte	27.038	22	3.108	30.146
Omaha	28.934	22	1.194	30.128
Oswego	28.774	45.5	0.320	29.094
Pembina	.....	.....	.....	.....
Philadelphia	29.133	53	0.075	28.208
Pike's Peak	17.518	12	12.065	29.583
Peck's Beach	29.253	53	0.021	29.274
Pittsburgh	28.523	41	0.853	29.376
Port Huron	29.461	36	0.683	29.144
Portland, Maine	29.127	41	0.057	29.184
Portland, Oregon	29.373	58	0.104	29.477
Punta Rassa	30.030	75	0.018	30.048
Rochester	28.491	43	0.623	29.114
Salt Lake City	25.582	44	4.296	29.878
Sandy Hook	29.126	49	0.020	29.146
San Diego	30.240	61	0.067	30.307
San Francisco	29.975	59	0.064	30.024
Santa Fé	23.187	41	6.505	29.692
Savannah	29.736	72	0.073	29.809
Shreveport	29.774	67	0.240	30.014
Saint Louis	29.399	43	0.598	29.997
Saint Marks	29.902	79	0.015	29.917
Saint Paul	28.921	13	0.923	29.844
Springfield	28.999	37	0.031	29.130
Squan Beach	29.194	51	0.021	29.215
Thatcher's Island	.....	.....	.....	.....
Toledo	28.683	35	0.710	29.393
Tybee Island	29.775	72.5	0.030	29.805
Vicksburg	29.831	66	0.297	30.128
Virginia City	23.909	5	5.796	29.705
Washington	29.178	56.5	0.111	29.289
Wilmington	29.520	68	0.032	29.602
Woods Holl	29.134	57	0.026	29.160
Wytheville	27.311	43	2.403	29.714
Yankton	28.799	14	1.486	30.285

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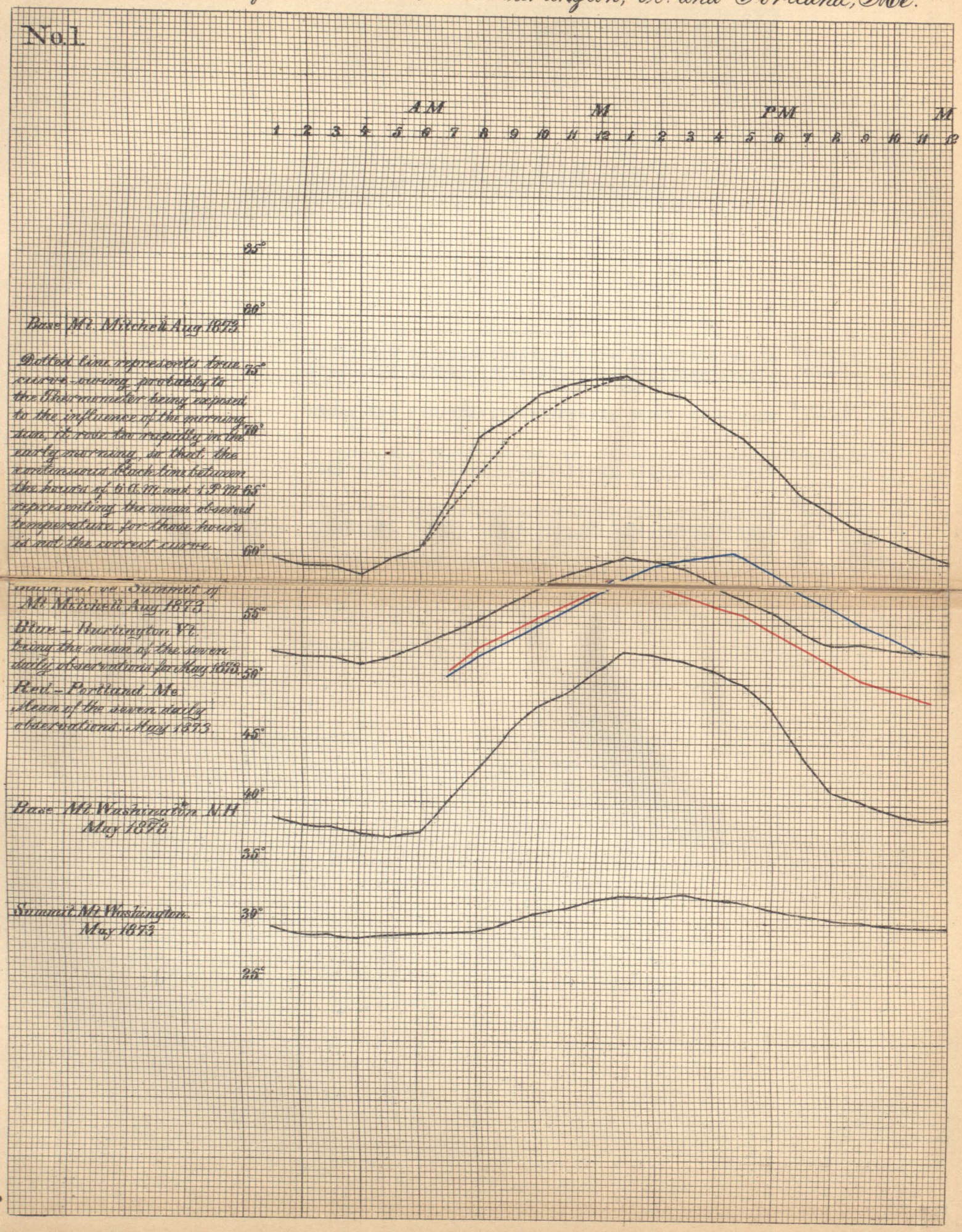
Mean Hourly Temperature of Base and Summit of Mt. Washington, N.H. Base and Summit of Mt. Mitchell, N.C. Burlington, Vt. and Portland, Me.



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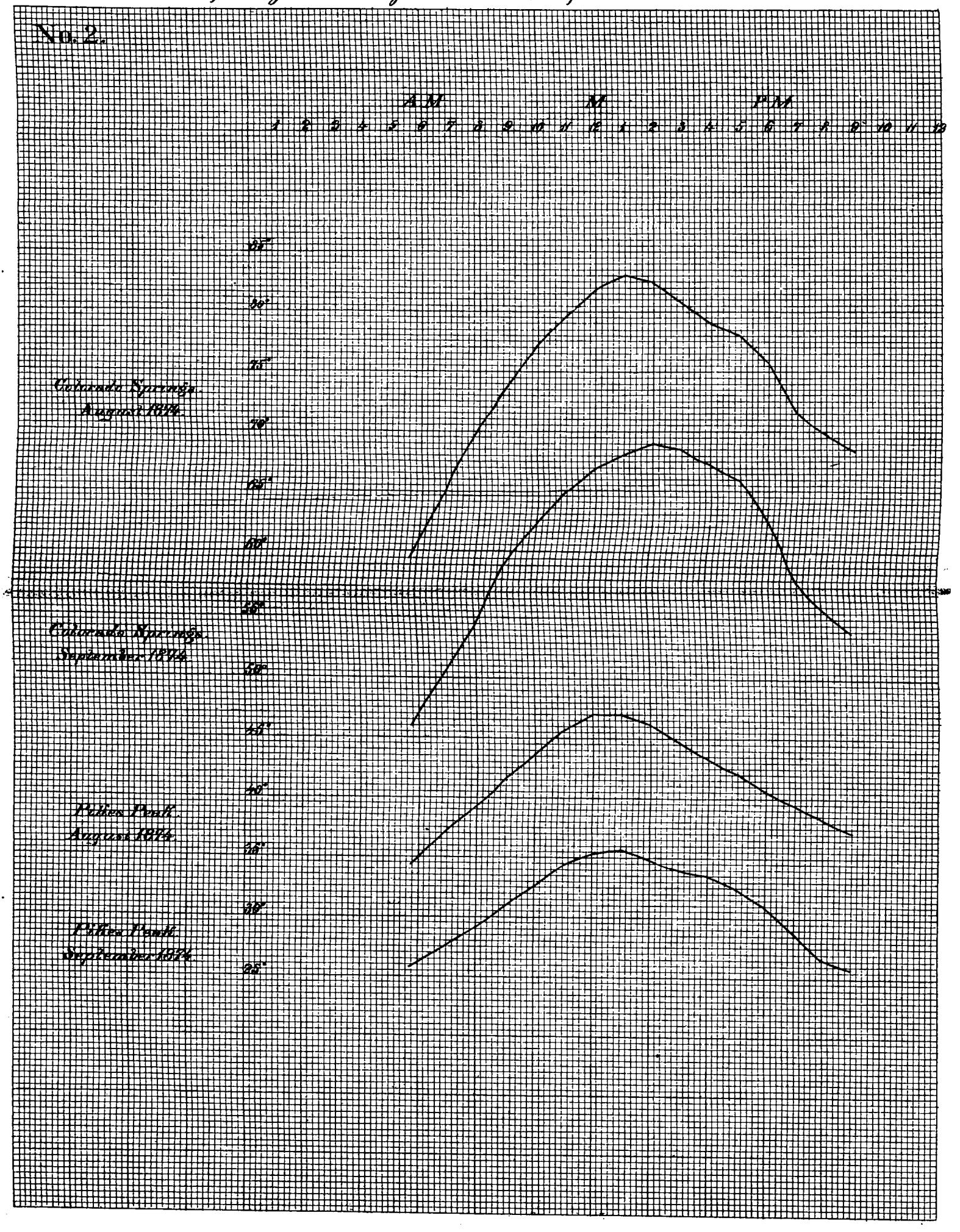
Mean Hourly Temperature of Pikes Peak, Col. Ty. and Colorado Springs. August and September 1874.

No. 2.



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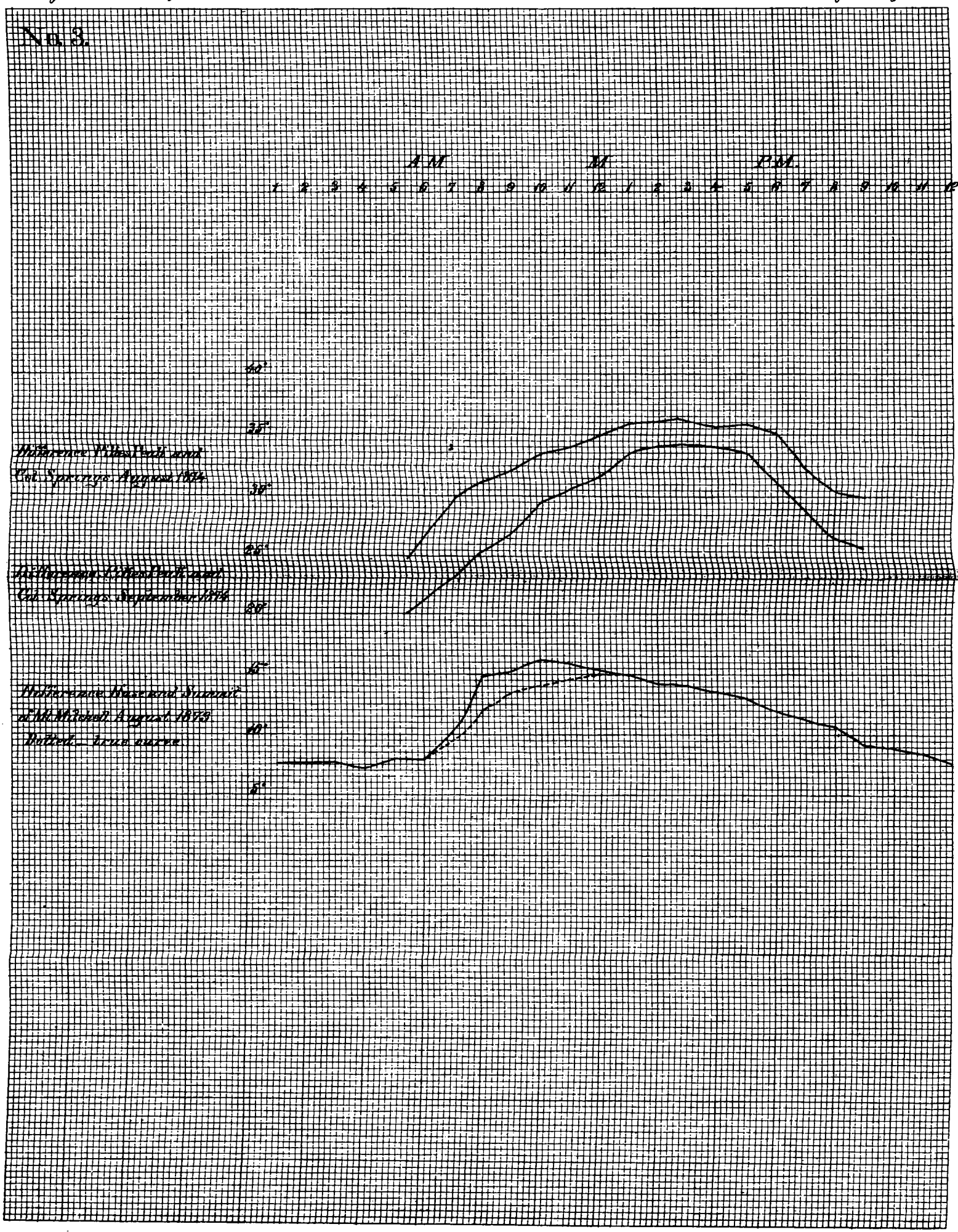
Mean Hourly Difference of Temperature between Pikes Peak and Colorado Springs, for August and September 1874; and between Base and Summit of Mt. Mitchell N.C. for Aug. 1873.

No. 3.



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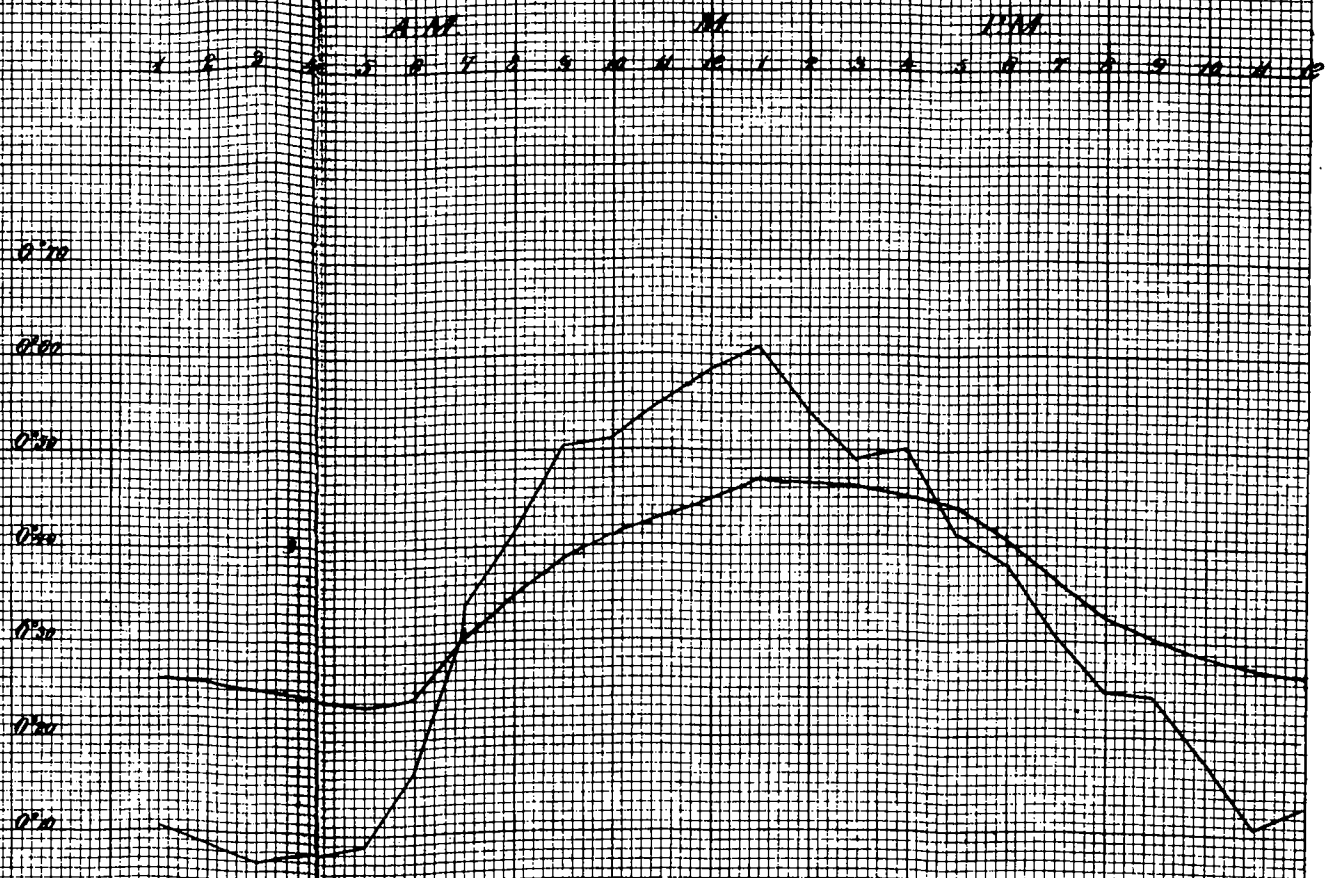
Mean Difference of Temperature for every 100 feet of Elevation, calculated for each hour of the day

No. 4.

Blue – for Elevations under 1200 feet except where it is a large Plateau.

Black – for elevations over 1200 feet and less than 15000 feet and for elevations under 1200 feet where it is a large Plateau.

Time		0 ft. to 1200 ft.	1200 ft. to 15000 ft.
1	A.M.	0°.100	0°.283
2	"	.090	.260
3	"	.073	.252
4	"	.061	.245
5	"	.090	.257
6	"	.165	.247
7	"	.341	.306
8	"	.415	.330
9	"	.504	.387
10	"	.512	.415
11	"	.558	.430
12	M	.565	.450
1	P.M.	.610	.470
2	"	.545	.465
3	"	.496	.462
4	"	.504	.455
5	"	.415	.442
6	"	.382	.407
7	"	.309	.365
8	"	.252	.325
9	"	.244	.305
10	"	.179	.285
11	"	.114	.272
12	"	0°.130	0°.265



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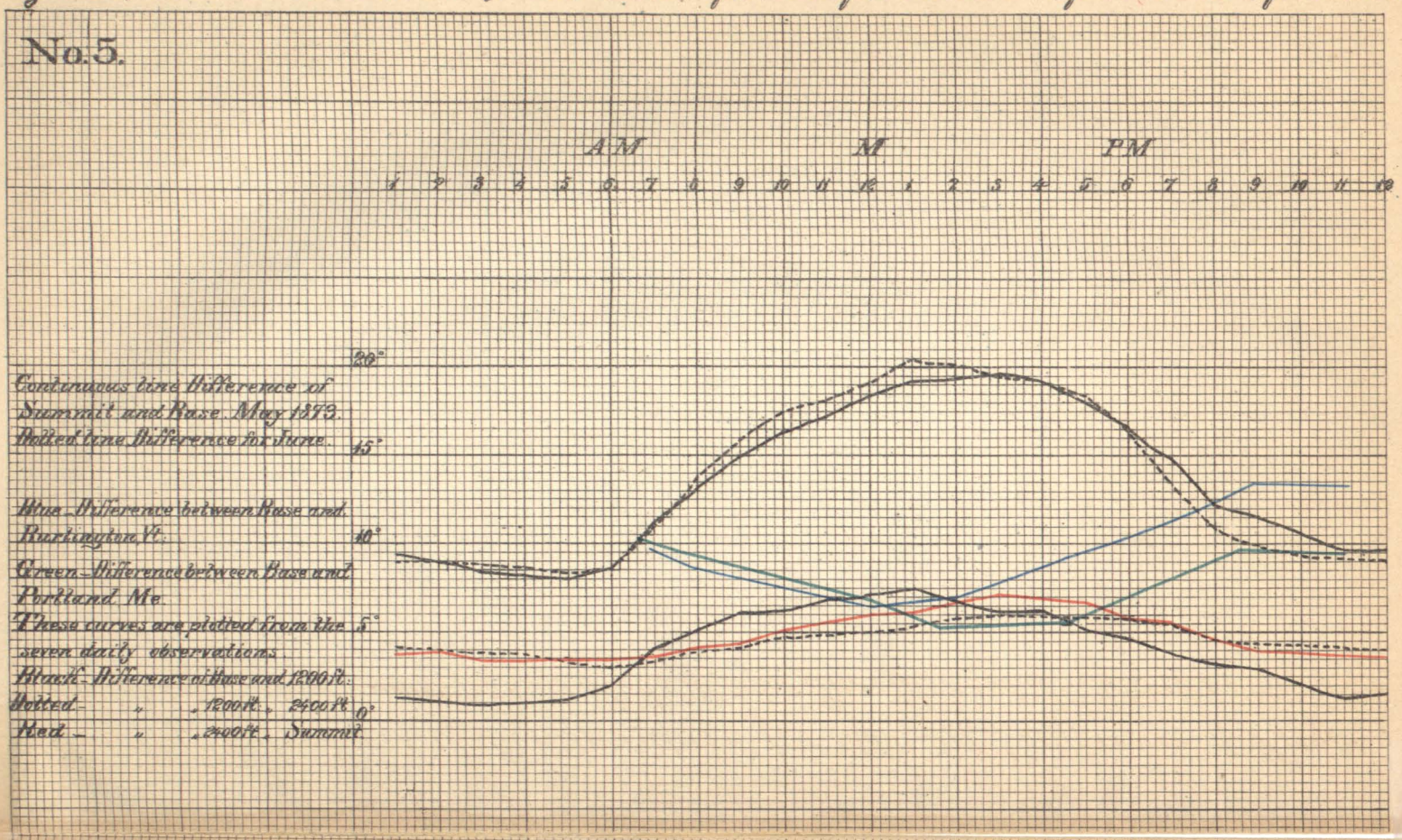
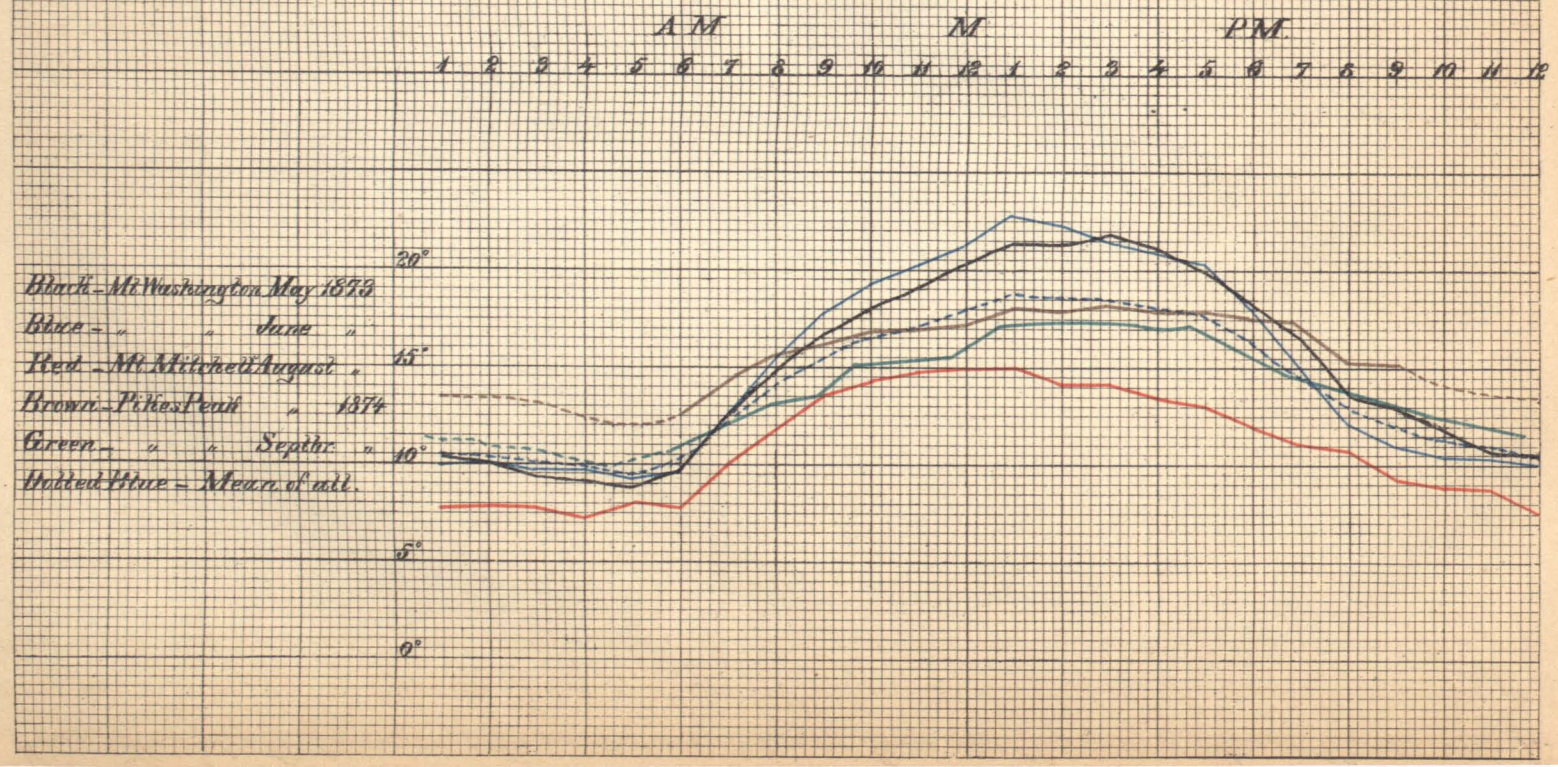
Mean Hourly Difference of Temperature between Base and Summit of Mount Washington for May and June 1873; between Base of Mount Washington, Portland, Me. and Burlington for May 1873; between Base and 1200 ft. above it, 1200 ft. and 2400 ft. and between 2400 ft. and Summit for June 1873.

No. 5.



Hourly Differences of Temperature for 4000 feet Difference of Height. Calculated from observations taken at Mt. Washington, Pikes Peak and Mt. Mitchell in 1873, 1874.



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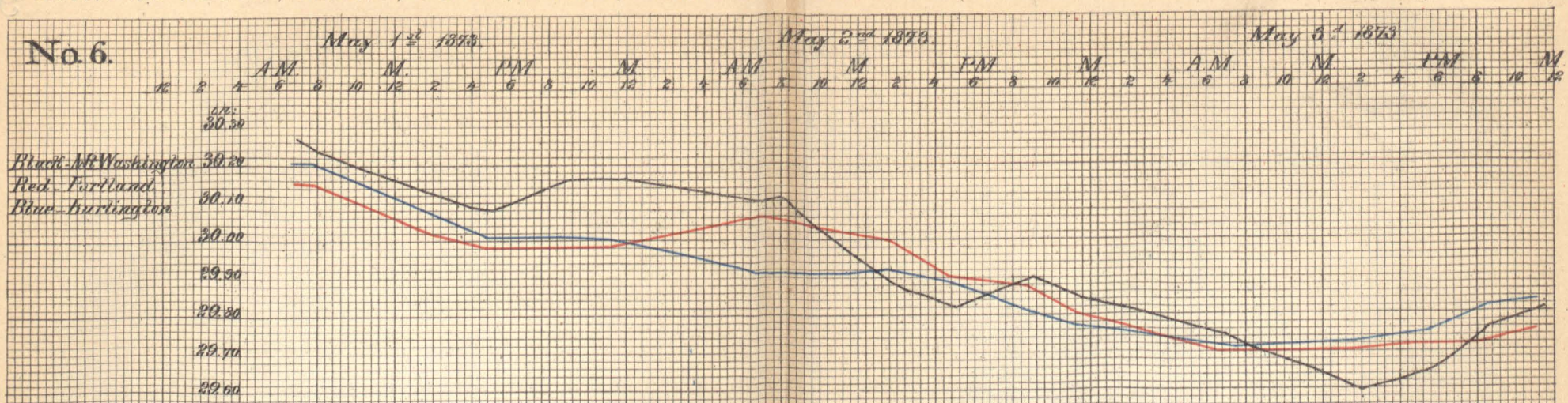
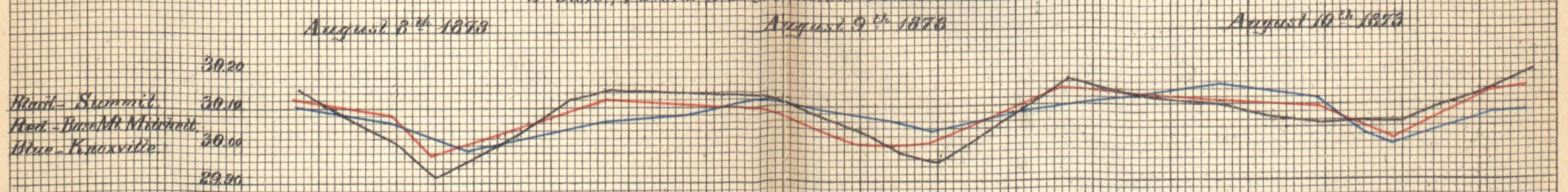
Barometer at Summit Mt. Washington, N. H., Portland, Me. and Burlington, Vt.; From observations taken at 7 A.M., 8 A.M., 2 P.M., 5 P.M., 9 P.M. and 11.30 P.M. (Barometer reduced to Sea-Level.

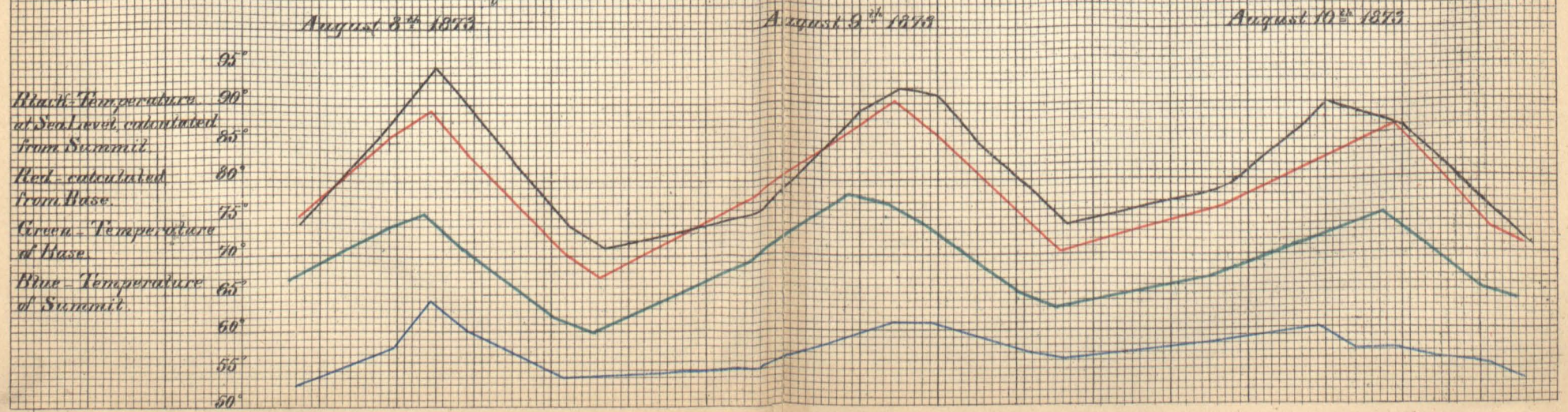
No. 6.



Barometer reduced to Sea Level at Knoxville, Tenn., Base and Summit of Mt. Mitchell N.C. From observations taken at 7 A.M., 12 M., 2 P.M., 4 P.M., 9 P.M. and 10.30 P.M.



Temperature of Base and Summit Mt. Mitchell with Temperature at Sea Level calculated separately from Base and Summit, for 7 A.M., 12 M., 2 P.M., 4 P.M., 9 P.M. and 10.30 P.M.



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NOVEMBER 23RD 1874. 4.35 P.M. Nº VII.

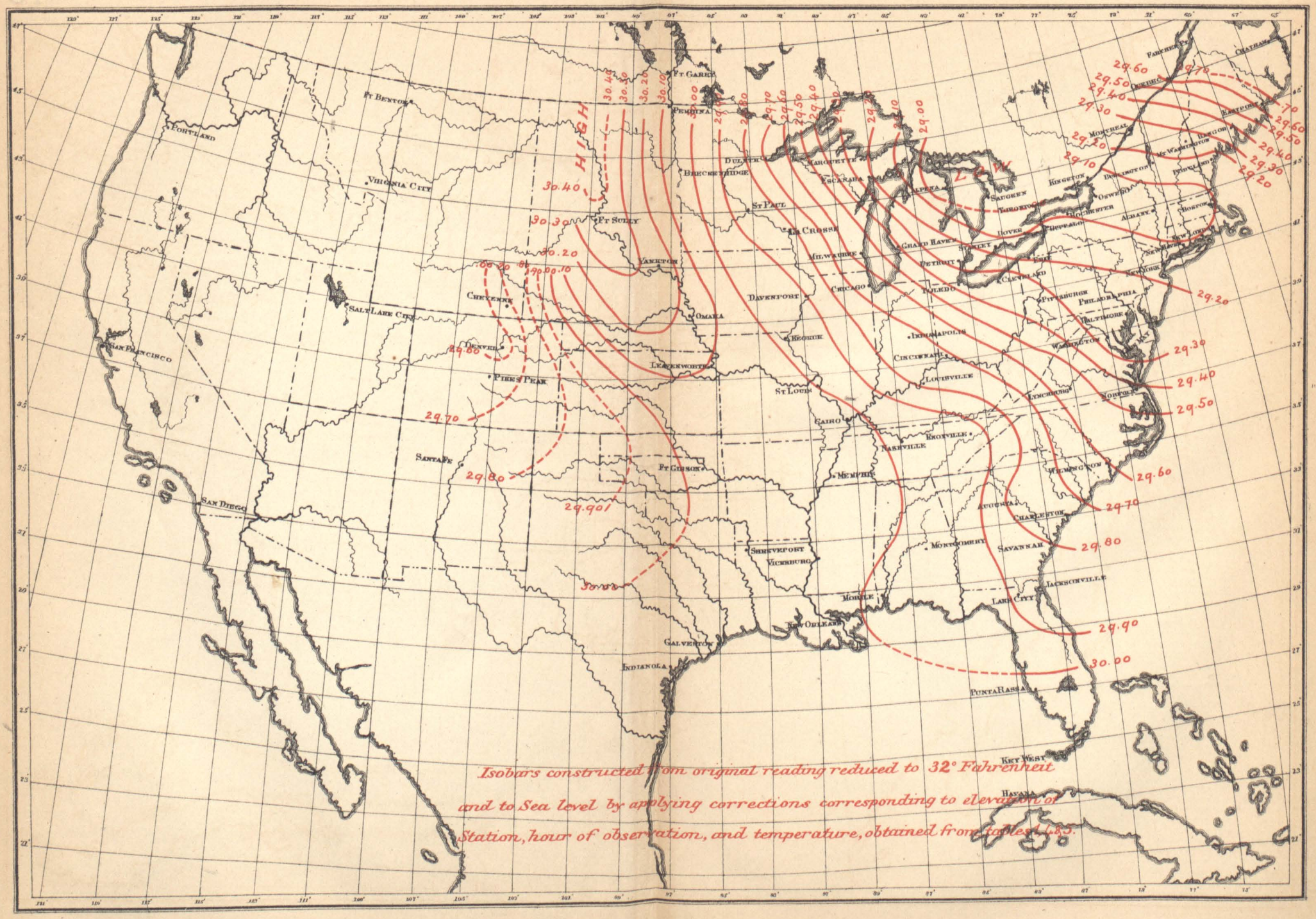

Plate 7 is an isobarometric chart showing the distribution of pressure at the p. m. report (4.35 Washington time) of November 23, 1874. The isobars of this chart are determined from the original readings of the barometer at the stations, reduced to 32° Fahrenheit and corrected for altitudes by the use of tables 1, 2, and 3.

The reading of the barometer at the summit of Mount Washington, on the above date, reduced to sea-level by the proposed method gives a pressure of 29.26, which compares with the reduced readings taken at neighboring stations; the reading at Portland being 29.18, and that at Burlington 29.19. Experiment is necessary to determine whether such coincidence would be constant.

In the execution of this work H. L. Foreman, late private Signal-Service, United States Army, rendered valuable assistance in collecting the data and computing the tables.

Very respectfully,

H. H. C. DUNWOODY,
First Lieutenant Fourth Artillery, Acting Signal-Officer and Assistant.

TABLE II.—*Weight of a column of air 100 feet high, at different barometric pressures.*

Argument $\frac{t'+t}{2}$.

Barometer.	−40°	−35°	−30°	−25°	−20°	−15°	−10°	−5°	0°	5°	10°	15°	20°
Inches.													
22.00	0.0989	0.0977	0.0965	0.0953	0.0941	0.0929	0.0918	0.0907	0.0896	0.0885	0.0875	0.0865	0.0855
.05	.0991	.0979	.0967	.0955	.0943	.0931	.0920	.0909	.0898	.0887	.0877	.0867	.0857
.10	.0994	.0982	.0969	.0957	.0945	.0933	.0922	.0911	.0900	.0889	.0879	.0869	.0859
.15	.0996	.0984	.0972	.0960	.0948	.0936	.0925	.0913	.0902	.0891	.0881	.0871	.0861
.20	.0998	.0986	.0974	.0962	.0950	.0938	.0927	.0915	.0904	.0893	.0883	.0873	.0863
.25	.1000	.0988	.0976	.0964	.0952	.0940	.0929	.0917	.0906	.0895	.0885	.0875	.0865
.30	.1003	.0991	.0978	.0966	.0954	.0942	.0931	.0920	.0909	.0898	.0887	.0877	.0867
.35	.1005	.0993	.0980	.0968	.0956	.0944	.0933	.0922	.0911	.0900	.0889	.0879	.0869
.40	.1007	.0995	.0983	.0771	.0959	.0947	.0936	.0924	.0913	.0902	.0891	.0881	.0871
.45	.1010	.0998	.0985	.0973	.0961	.0949	.0938	.0926	.0915	.0904	.0893	.0883	.0873
.50	.1012	.1000	.0987	.0975	.0963	.0951	.0940	.0928	.0917	.0906	.0895	.0885	.0875
.55	.1014	.1002	.0989	.0977	.0965	.0953	.0942	.0930	.0919	.0908	.0897	.0887	.0877
.60	.1017	.1005	.0992	.0979	.0967	.0955	.0944	.0932	.0921	.0910	.0899	.0889	.0879
.65	.1019	.1007	.0994	.0982	.0970	.0958	.0946	.0934	.0923	.0912	.0901	.0891	.0881
.70	.1022	.1009	.0996	.0984	.0972	.0960	.0948	.0936	.0925	.0914	.0903	.0893	.0883
.75	.1024	.1011	.0998	.0986	.0974	.0962	.0950	.0938	.0927	.0916	.0905	.0895	.0885
.80	.1026	.1014	.1001	.0988	.0976	.0964	.0953	.0941	.0930	.0919	.0908	.0897	.0887
.85	.1029	.1016	.1003	.0990	.0978	.0966	.0955	.0943	.0932	.0921	.0910	.0899	.0889
.90	.1031	.1018	.1005	.0993	.0981	.0969	.0957	.0945	.0934	.0923	.0912	.0901	.0891
22.95	.1034	.1021	.1008	.0995	.0983	.0971	.0959	.0947	.0936	.0925	.0914	.0903	.0893
23.00	.1036	.1023	.1010	.0997	.0985	.0973	.0961	.0949	.0938	.0927	.0916	.0905	.0895
.05	.1038	.1025	.1012	.0999	.0987	.0975	.0963	.0951	.0940	.0929	.0918	.0907	.0897
.10	.1041	.1027	.1014	.1001	.0989	.0977	.0965	.0953	.0942	.0931	.0920	.0909	.0899
.15	.1043	.1030	.1017	.1004	.0992	.0979	.0967	.0955	.0944	.0933	.0922	.0911	.0901
.20	.1045	.1032	.1019	.1006	.0994	.0981	.0969	.0957	.0946	.0935	.0924	.0913	.0903
.25	.1047	.1034	.1021	.1008	.0996	.0983	.0971	.0959	.0948	.0937	.0926	.0915	.0905
.30	.1050	.1036	.1023	.1010	.0998	.0986	.0974	.0962	.0951	.0939	.0928	.0917	.0907
.35	.1052	.1038	.1025	.1012	.1000	.0988	.0976	.0964	.0953	.0941	.0930	.0919	.0909
.40	.1054	.1041	.1028	.1015	.1003	.0990	.0978	.0966	.0955	.0943	.0932	.0921	.0911
.45	.1057	.1043	.1030	.1017	.1005	.0992	.0980	.0968	.0957	.0945	.0934	.0923	.0913
.50	.1059	.1045	.1032	.1019	.1007	.0994	.0982	.0970	.0959	.0947	.0936	.0925	.0915
.55	.1061	.1047	.1034	.1021	.1009	.0996	.0984	.0972	.0961	.0949	.0938	.0927	.0917
.60	.1064	.1050	.1037	.1024	.1011	.0998	.0986	.0974	.0963	.0951	.0940	.0929	.0919
.65	.1066	.1052	.1039	.1026	.1014	.1001	.0989	.0977	.0965	.0953	.0942	.0931	.0921
.70	.1068	.1054	.1041	.1028	.1016	.1003	.0991	.0979	.0967	.0955	.0944	.0933	.0923
.75	.1070	.1056	.1043	.1030	.1018	.1005	.0993	.0981	.0969	.0957	.0946	.0935	.0925
.80	.1073	.1059	.1046	.1033	.1020	.1007	.0995	.0983	.0972	.0960	.0949	.0938	.0927
.85	.1075	.1061	.1048	.1035	.1022	.1009	.0997	.0985	.0974	.0962	.0951	.0940	.0929
.90	.1077	.1063	.1050	.1037	.1025	.1012	.1000	.0988	.0976	.0964	.0953	.0942	.0931
23.95	.1080	.1066	.1053	.1040	.1027	.1014	.1002	.0990	.0978	.0966	.0955	.0944	.0933
24.00	.1082	.1068	.1055	.1042	.1029	.1016	.1004	.0992	.0980	.0968	.0957	.0946	.0935
.05	.1084	.1070	.1057	.1044	.1031	.1018	.1006	.0994	.0982	.0970	.0959	.0948	.0937
.10	.1087	.1073	.1060	.1046	.1033	.1020	.1008	.0996	.0984	.0972	.0961	.0950	.0939
.15	.1089	.1075	.1062	.1049	.1036	.1023	.1010	.0998	.0986	.0974	.0963	.0952	.0941
.20	.1091	.1077	.1064	.1051	.1038	.1025	.1012	.1000	.0988	.0976	.0965	.0954	.0943
.25	.1094	.1079	.1066	.1053	.1040	.1027	.1014	.1002	.0990	.0978	.0967	.0956	.0945
.30	.1096	.1082	.1069	.1055	.1042	.1029	.1017	.1005	.0993	.0981	.0969	.0958	.0947
.35	.1098	.1084	.1071	.1057	.1044	.1031	.1019	.1007	.0995	.0983	.0971	.0960	.0949
.40	.1101	.1086	.1073	.1060	.1047	.1034	.1021	.1009	.0997	.0985	.0973	.0962	.0951
.45	.1104	.1089	.1076	.1062	.1049	.1036	.1023	.1011	.0999	.0987	.0975	.0964	.0953
.50	.1106	.1091	.1078	.1064	.1051	.1038	.1025	.1013	.1001	.0989	.0977	.0966	.0955
.55	.1108	.1093	.1080	.1066	.1053	.1040	.1027	.1015	.1003	.0991	.0979	.0968	.0957
.60	.1111	.1096	.1082	.1068	.1055	.1042	.1029	.1017	.1005	.0993	.0981	.0970	.0959
65	.1113	.1098	.1085	.1071	.1058	.1045	.1032	.1019	.1007	.0995	.0983	.0972	.0961
.70	.1115	.1100	.1087	.1073	.1060	.1047	.1034	.1021	.1009	.0997	.0985	.0974	.0963
.75	.1117	.1102	.1089	.1075	.1062	.1049	.1036	.1023	.1012	.1000	.0987	.0976	.0965
.80	.1120	.1105	.1091	.1077	.1064	.1051	.1038	.1026	.1014	.1002	.0990	.0978	.0967
.85	.1122	.1107	.1093	.1069	.1066	.1053	.1040	.1028	.1016	.1004	.0992	.0980	.0969
.90	.1124	.1109	.1096	.1082	.1069	.1056	.1043	.1030	.1018	.1006	.0994	.0982	.0971
24.95	.1127	.1112	.1098	.1064	.1071	.1058	.1045	.1032	.1020	.1008	.0996	.0984	.0973
25.00	.1129	.1114	.1100	.1086	.1073	.1060	.1047	.1034	.1022	.1010	.0998	.0986	.0975
.05	.1131	.1116	.1102	.1088	.1075	.1062	.1049	.1036	.1024	.1012	.1000	.0988	.0977
.10	.1134	.1119	.1105	.1091	.1077	.1064	.1051	.1038	.1026	.1014	.1002	.0990	.0979
.15	.1136	.1121	.1107	.1093	.1080	.1066	.1053	.1040	.1028	.1016	.1004	.0992	.0981
.20	.1138	.1123	.1109	.1095	.1082	.1068	.1055	.1042	.1030	.1018	.1006	.0994	.0983
.25	.1140	.1125	.1111	.1097	.1084	.1070	.1057	.1044	.1032	.1020	.1008	.0996	.0985
.30	.1143	.1128	.1114	.1100	.1086	.1073	.1059	.1047	.1035	.1023	.1011	.0999	.0987
.35	.1145	.1130	.1116	.1102	.1088	.1075	.1062	.1049	.1037	.1025	.1013	.1001	.0989
.40	.1147	.1132	.1118	.1104	.1091	.1077	.1064	.1051	.1039	.1027	.1015	.1003	.0991
.45	.1150	.1135	.1121	.1107	.1093	.1079	.1066	.1053	.1041	.1029	.1017	.1005	.0993
.50	.1152	.1137	.1123	.1109	.1095	.1081	.1068	.1055	.1043	.1031	.1019	.1007	.0995
.55	.1154	.1139	.1125	.1111	.1098	.1083	.1070	.1057	.1045	.1033	.1021	.1009	.0997
.60	.1157	.1142	.1127	.1113	.1099	.1085	.1072	.1059	.1047	.1035	.1023	.1011	.0999
.65	.1159	.1144	.1130	.1116	.1102	.1088	.1074	.1061	.1049	.1037	.1025	.1013	.1001
.70	.1161	.1146	.1132	.1118	.1104	.1090	.1076	.1083	.1051	.1039	.1027	.1015	.1003
.75	.1163	.1148	.1134	.1120	.1106	.1092	.1078	.1065	.1053	.1041	.1029	.1017	.1005
.80	.1166	.1151	.1136	.1122	.1108	.1094	.1081	.1068	.1055	.1043	.1031	.1019	.1007
.85	.1168	.1153	.1138	.1124	.1110	.1096	.1083	.1070	.1057	.1045	.1033	.1021	.1009
.90	.1170	.1155	.1141	.1127	.1113	.1099	.1085	.1072	.1059	.1047	.1035	.1023	.1011

and temperatures, expressed in decimals of an inch, calculated for north latitude 40°.

degrees Fahrenheit.

25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	100°
0.0845	0.0836	0.0827	0.0818	0.0809	0.0800	0.0791	0.0783	0.0775	0.0767	0.0759	0.0752	0.0744	0.0737	0.0729	0.0722
.0847	.0838	.0829	.0820	.0811	.0802	.0793	.0785	.0777	.0769	.0761	.0754	.0746	.0739	.0731	.0724
.0849	.0840	.0831	.0822	.0813	.0804	.0795	.0787	.0779	.0771	.0763	.0755	.0747	.0740	.0732	.0725
.0851	.0842	.0833	.0824	.0815	.0806	.0797	.0789	.0780	.0772	.0764	.0757	.0749	.0742	.0734	.0727
.0853	.0844	.0835	.0826	.0817	.0808	.0799	.0791	.0782	.0774	.0766	.0759	.0751	.0744	.0736	.0729
.0855	.0846	.0836	.0827	.0818	.0809	.0800	.0792	.0784	.0776	.0768	.0760	.0752	.0745	.0737	.0730
.0857	.0848	.0838	.0829	.0820	.0811	.0802	.0794	.0786	.0778	.0770	.0762	.0754	.0747	.0739	.0732
.0859	.0850	.0840	.0831	.0822	.0813	.0804	.0796	.0788	.0780	.0772	.0764	.0756	.0749	.0741	.0734
.0861	.0852	.0842	.0833	.0824	.0815	.0806	.0798	.0789	.0781	.0773	.0766	.0758	.0751	.0743	.0736
.0863	.0854	.0844	.0835	.0826	.0817	.0808	.0800	.0791	.0783	.0775	.0767	.0759	.0752	.0744	.0737
.0865	.0856	.0846	.0837	.0828	.0819	.0810	.0802	.0793	.0785	.0777	.0769	.0761	.0754	.0746	.0739
.0867	.0858	.0848	.0839	.0830	.0821	.0812	.0804	.0795	.0787	.0779	.0771	.0763	.0756	.0748	.0741
.0869	.0860	.0850	.0841	.0832	.0823	.0814	.0806	.0797	.0789	.0781	.0773	.0765	.0757	.0749	.0742
.0871	.0862	.0852	.0843	.0834	.0825	.0816	.0807	.0798	.0790	.0782	.0774	.0766	.0759	.0751	.0744
.0873	.0864	.0854	.0845	.0836	.0827	.0818	.0809	.0800	.0792	.0784	.0776	.0768	.0761	.0753	.0746
.0875	.0865	.0855	.0846	.0837	.0828	.0819	.0811	.0802	.0794	.0786	.0778	.0770	.0762	.0754	.0747
.0877	.0867	.0857	.0848	.0839	.0830	.0821	.0813	.0804	.0796	.0788	.0780	.0772	.0764	.0756	.0749
.0879	.0869	.0859	.0850	.0841	.0832	.0823	.0815	.0806	.0798	.0790	.0782	.0774	.0766	.0758	.0751
.0881	.0871	.0861	.0852	.0843	.0834	.0825	.0816	.0807	.0799	.0791	.0783	.0775	.0768	.0760	.0753
.0883	.0873	.0863	.0854	.0845	.0836	.0827	.0818	.0809	.0801	.0793	.0785	.0777	.0769	.0761	.0754
.0885	.0875	.0865	.0856	.0847	.0838	.0829	.0820	.0811	.0803	.0705	.0787	.0779	.0771	.0763	.0756
.0887	.0877	.0867	.0858	.0849	.0840	.0831	.0822	.0813	.0805	.0797	.0789	.0781	.0773	.0765	.0758
.0889	.0879	.0869	.0860	.0851	.0842	.0833	.0824	.0815	.0807	.0799	.0791	.0783	.0775	.0767	.0759
.0891	.0881	.0871	.0862	.0852	.0843	.0834	.0825	.0816	.0808	.0800	.0792	.0784	.0776	.0768	.0761
.0893	.0883	.0873	.0864	.0854	.0845	.0836	.0827	.0818	.0810	.0802	.0794	.0786	.0778	.0770	.0763
.0894	.0884	.0874	.0865	.0856	.0847	.0838	.0829	.0820	.0812	.0804	.0796	.0788	.0780	.0772	.0764
.0896	.0886	.0876	.0867	.0858	.0849	.0840	.0831	.0822	.0814	.0806	.0798	.0790	.0782	.0774	.0766
.0898	.0888	.0878	.0869	.0860	.0851	.0842	.0833	.0824	.0816	.0808	.0800	.0792	.0784	.0776	.0768
.0900	.0890	.0880	.0871	.0861	.0852	.0843	.0834	.0825	.0817	.0809	.0801	.0793	.0785	.0777	.0770
.0902	.0892	.0882	.0873	.0863	.0854	.0845	.0836	.0827	.0819	.0811	.0803	.0795	.0787	.0779	.0771
.0904	.0894	.0884	.0875	.0865	.0856	.0847	.0838	.0829	.0821	.0813	.0805	.0797	.0789	.0781	.0773
.0906	.0896	.0886	.0877	.0867	.0858	.0849	.0840	.0831	.0823	.0815	.0807	.0799	.0791	.0783	.0775
.0908	.0898	.0888	.0879	.0869	.0860	.0851	.0842	.0833	.0825	.0816	.0808	.0800	.0792	.0784	.0776
.0910	.0900	.0890	.0881	.0871	.0862	.0852	.0843	.0834	.0826	.0818	.0810	.0802	.0794	.0786	.0778
.0912	.0902	.0892	.0883	.0873	.0864	.0854	.0845	.0836	.0828	.0820	.0812	.0804	.0796	.0788	.0780
.0914	.0904	.0894	.0884	.0874	.0865	.0856	.0847	.0838	.0830	.0821	.0813	.0805	.0797	.0789	.0781
.0916	.0906	.0896	.0886	.0876	.0867	.0858	.0849	.0840	.0832	.0823	.0815	.0807	.0799	.0791	.0783
.0918	.0908	.0898	.0888	.0878	.0869	.0860	.0851	.0842	.0834	.0825	.0817	.0809	.0801	.0793	.0785
.0920	.0910	.0900	.0890	.0880	.0871	.0861	.0852	.0843	.0835	.0827	.0819	.0811	.0803	.0795	.0787
.0922	.0912	.0902	.0892	.0882	.0873	.0863	.0854	.0845	.0837	.0828	.0820	.0812	.0804	.0796	.0788
.0924	.0914	.0904	.0894	.0884	.0875	.0865	.0856	.0847	.0839	.0830	.0822	.0814	.0806	.0798	.0790
.0926	.0916	.0906	.0896	.0886	.0877	.0867	.0858	.0849	.0841	.0832	.0824	.0816	.0808	.0800	.0792
.0928	.0918	.0908	.0898	.0888	.0879	.0869	.0860	.0851	.0843	.0834	.0826	.0817	.0809	.0801	.0793
.0930	.0920	.0910	.0900	.0890	.0881	.0871	.0862	.0853	.0844	.0835	.0827	.0819	.0811	.0803	.0795
.0932	.0922	.0912	.0902	.0892	.0883	.0873	.0864	.0855	.0846	.0837	.0829	.0821	.0813	.0805	.0797
.0934	.0923	.0913	.0903	.0893	.0884	.0874	.0865	.0856	.0848	.0839	.0831	.0822	.0814	.0806	.0798
.0936	.0925	.0915	.0905	.0895	.0886	.0876	.0867	.0858	.0850	.0841	.0833	.0824	.0816	.0808	.0800
.0938	.0927	.0917	.0907	.0897	.0888	.0878	.0869	.0860	.0852	.0843	.0835	.0826	.0818	.0810	.0802
.0940	.0929	.0919	.0909	.0899	.0890	.0880	.0871	.0862	.0853	.0844	.0836	.0828	.0820	.0812	.0804
.0942	.0931	.0921	.0911	.0901	.0892	.0882	.0873	.0864	.0855	.0846	.0838	.0029	.0821	.0813	.0805
.0944	.0933	.0923	.0913	.0903	.0894	.0884	.0875	.0866	.0857	.0848	.0840	.0831	.0823	.0815	.0807
.0946	.0935	.0925	.0915	.0905	.0896	.0886	.0877	.0868	.0859	.0850	.0842	.0833	.0825	.0817	.0809
.0948	.0937	.0927	.0917	.0907	.0898	.0888	.0879	.0870	.0861	.0852	.0843	.0834	.0826	.0818	.0810
.0950	.0939	.0929	.0919	.0909	.0899	.0889	.0880	.0871	.0862	.0853	.0845	.0836	.0828	.0820	.0812
.0952	.0941	.0931	.0921	.0911	.0901	.0891	.0882	.0873	.0864	.0855	.0847	.0838	.0830	.0821	.0814
.0954	.0943	.0932	.0922	.0912	.0903	.0393	.0884	.0975	.0866	.0857	.0848	.0839	.0831	.0823	.0815
.0957	.0945	.0934	.0924	.0914	.0905	.0895	.0886	.0877	.0868	.0859	.0850	.0841	.0833	.0825	.0817
.0958	.0947	.0936	.0926	.0916	.0907	.0897	.0888	.0879	.0870	.0861	.0852	.0843	.0835	.0826	.0818
.0960	.0949	.0938	.0928	.0918	.0908	.0898	.0889	.0880	.0871	.0862	.0854	.0845	.0837	.0828	.0820
.0962	.0951	.0940	.0930	.0920	.0910	.0900	.0891	.0882	.0873	.0864	.0855	.0846	.0838	.0829	.0821
.0964	.0953	.0942	.0932	.0922	.0912	.0902	.0893	.0884	.0875	.0866	.0857	.0848	.0840	.0831	.0823
.0966	.0955	.0944	.0934	.0924	.0914	.0904	.0895	.0886	.0877	.0868	.0859	.0850	.0842	.0833	.0825
.0968	.0957	.0946	.0936	.0926	.0916	.0906	.0897	.0888	.0879	.0869	.0860	.0851	.0843	.0834	.0826
.0970	.0959	.0948	.0938	.0927	.0917	.0907	.0898	.0889	.0880	.0871	.0862	.0853	.0845	.0836	.0828
.0972	.0961	.0950	.0940	.0929	.0919	.0909	.0900	.0891	.0882	.0873	.0864	.0855	.0847	.0838	.0830
.0973	.0962	.0951	.0941	.0931	.0921	.0911	.0902	.0893	.0884	.0874	.0865	.0856	.0848	.0839	.0831
.0975	.0964	.0953	.0943	.0933	.0923	.0913	.0904	.0895	.0886	.0876	.0867	.0858	.0850	.0841	.0833
.0977	.0966	.0955	.0945	.0935	.0925	.0915	.0906	.0897	.0888	.0878	.0869	.0360	.0852	.0843	.0835
.0979	.0968	.0957	.0947	.0936	.0926	.0916	.0907	.0898	.0889	.0880	.0871	.0862	.0854	.0845	.0837
.0981	.0970	.0959	.0949	.0938	.0928	.0918	.0909	.0900	.6891	.0881	.0872	.0863	.0855	.0846	.0838
.0983	.0972	.0961	.0951	.0940	.0930	.0920	.0911	.0902	.0893	.0883	.0874	.0865	.0857	.0848	.0840
.0985	.0974	.0963	.0953	.0942	.0932	.0922	.0913	.0904	.0895	.0885	.0876	.0867	.0859	.0850	.0842
.0987	.0976	.0965	.0955	.0944	.0934	.0924	.0915	.0906	.0897	.0887	.0878	.0869	.0860	.0851	.0843
.0989	.0978	.0967	.0957	.0946	.0936	.0926	.0916	.0907	.0898	.0888	.0879	.0870	.0862	.0853	.0845
.0991	.0980	.0969	.0959	.0948	.0938	.0928	.0918	.0909	.0900	.0890	.0881	.0872	.0864	.0855	.0847
.0993	.0981	.0970	.0960	.0949	.0939	.0929	.0920	.0911	.0902	.0892	.0883	.0874	.0865	.0856	.0848
.0995	.0983	.0972	.0962	.0951	.0941	.0931	.0922	.0913	.0904	.0894	.0885	.0876	.0867	.0858	.0850
.0997	.0985	.0974	.0964	.0953	.0943	.0933	.0924	.0915	.0906	.0896	.0887	.0878	.0869	.0860	.0852
.0999	.0987	.0976	.0966	.0955	.0945	.0935	.0925	.0916	.0907	.0897	.0888	.0879	.0871	.0862	.0854

TABLE II.—*Weight of a column of air* 100 *feet high, at different barometric*

Argument $\frac{t'+t}{2}$

Barometer.	−40°	−35°	−30°	−25°	−20°	−15°	−10°	−5°	0°	5°	10°	15°	20°
Inches.													
25.95	0.1173	0.1158	0.1143	0.1129	0.1115	0.1101	0.1087	0.1074	0.1061	0.1049	0.1037	0.1025	0.1013
26.00	.1175	.1160	.1145	.1131	.1117	.1103	.1089	.1076	.1063	.1051	.1039	.1027	.1015
.05	.1177	.1162	.1147	.1133	.1119	.1105	.1091	.1078	.1065	.1053	.1041	.1029	.1017
.10	.1180	.1165	.1150	.1135	.1121	.1107	.1093	.1080	.1067	.1055	.1043	.1031	.1019
.15	.1182	.1167	.1152	.1138	.1124	.1110	.1096	.1082	.1069	.1057	.1045	.1033	.1021
.20	.1184	.1169	.1154	.1140	.1126	.1112	.1098	.1084	.1071	.1059	.1047	.1035	.1023
.25	.1186	.1171	.1156	.1142	.1128	.1114	.1100	.1086	.1073	.1061	.1049	.1037	.1025
.30	.1189	.1174	.1159	.1144	.1130	.1116	.1102	.1089	.1075	.1063	.1051	.1039	.1027
.35	.1191	.1176	.1161	.1146	.1132	.1118	.1104	.1091	.1078	.1065	.1053	.1041	.1029
.40	.1193	.1178	.1163	.1149	.1135	.1121	.1107	.1093	.1080	.1067	.1055	.1043	.1031
.45	.1196	.1181	.1166	.1151	.1137	.1123	.1109	.1095	.1082	.1069	.1057	.1045	.1033
.50	.1198	.1183	.1168	.1153	.1139	.1125	.1111	.1097	.1084	.1071	.1059	.1047	.1035
.55	.1200	.1185	.1170	.1155	.1141	.1127	.1113	.1099	.1086	.1073	.1061	.1049	.1037
.60	.1203	.1187	.1172	.1157	.1143	.1129	.1115	.1101	.1088	.1075	.1063	.1051	.1039
.65	.1205	.1190	.1175	.1160	.1145	.1131	.1117	.1103	.1090	.1077	.1065	.1053	.1041
.70	.1207	.1192	.1177	.1162	.1147	.1133	.1119	.1105	.1092	.1079	.1067	.1055	.1043
.75	.1209	.1194	.1179	.1164	.1149	.1135	.1121	.1107	.1094	.1081	.1069	.1056	.1044
.80	.1212	.1196	.1181	.1166	.1152	.1138	.1124	.1110	.1097	.1084	.1071	.1058	.1046
.85	.1214	.1198	.1183	.1168	.1154	.1140	.1126	.1112	.1099	.1086	.1073	.1060	.1048
.90	.1216	.1201	.1186	.1171	.1156	.1142	.1128	.1114	.1101	.1088	.1075	.1062	.1050
26.95	.1219	.1203	.1188	.1173	.1158	.1144	.1130	.1116	.1103	.1090	.1077	.1064	.1052
27.00	.1221	.1205	.1190	.1175	.1160	.1146	.1132	.1118	.1105	.1092	.1079	.1066	.1054
.05	.1223	.1207	.1192	.1177	.1162	.1148	.1134	.1120	.1107	.1094	.1081	.1068	.1056
.10	.1226	.1210	.1195	.1180	.1165	.1150	.1136	.1122	.1109	.1096	.1083	.1070	.1058
.15	.1228	.1212	.1197	.1182	.1167	.1153	.1139	.1125	.1111	.1098	.1085	.1072	.1060
.20	.1230	.1214	.1199	.1184	.1159	.1155	.1141	.1127	.1113	.1100	.1087	.1074	.1062
.25	.1233	.1216	.1201	.1186	.1171	.1157	.1143	.1129	.1115	.1102	.1089	.1076	.1064
.30	.1235	.1219	.1204	.1189	.1174	.1159	.1145	.1131	.1118	.1104	.1091	.1078	.1066
.35	.1237	.1221	.1206	.1191	.1176	.1161	.1147	.1133	.1120	.1106	.1093	.1080	.1068
.40	.1239	.1223	.1208	.1193	.1178	.1164	.1150	.1136	.1122	.1108	.1095	.1082	.1070
.45	.1242	.1226	.1211	.1196	.1181	.1166	.1152	.1138	.1124	.1110	.1097	.1084	.1072
.50	.1244	.1228	.1213	.1198	.1183	.1168	.1154	.1140	.1126	.1112	.1099	.1086	.1074
.55	.1246	.1230	.1215	.1200	.1185	.1170	.1156	.1142	.1128	.1114	.1101	.1088	.1076
.60	.1249	.1233	.1218	.1202	.1187	.1172	.1158	.1144	.1130	.1116	.1103	.1090	.1078
.65	.1251	.1235	.1220	.1205	.1190	.1175	.1160	.1146	.1132	.1118	.1105	.1092	.1080
.70	.1254	.1237	.1222	.1207	.1192	.1177	.1162	.1148	.1134	.1120	.1107	.1094	.1082
.75	.1256	.1239	.1224	.1209	.1194	.1179	.1164	.1150	.1136	.1122	.1109	.1096	.1084
.80	.1258	.1242	.1227	.1211	.1196	.1181	.1167	.1153	.1139	.1125	.1112	.1099	.1066
.85	.1261	.1244	.1229	.1213	.1198	.1183	.1169	.1155	.1141	.1127	.1114	.1101	.1088
.90	.1263	.1246	.1231	.1215	.1201	.1186	.1171	.1157	.1143	.1129	.1116	.1103	.1090
27.95	.1266	.1249	.1234	.1218	.1203	.1188	.1173	.1159	.1145	.1131	.1118	.1105	.1092
28.00	.1268	.1251	.1236	.1220	.1205	.1190	.1175	.1161	.1147	.1133	.1120	.1107	.1094
.05	.1270	.1253	.1238	.1222	.1207	.1192	.1177	.1163	.1149	.1135	.1122	.1109	.1096
.10	.1273	.1256	.1240	.1224	.1209	.1194	.1179	.1165	.1151	.1137	.1124	.1111	.1098
.15	.1275	.1258	.1243	.1227	.1212	.1196	.1181	.1167	.1153	.1139	.1126	.1113	.1100
.20	.1277	.1260	.1245	.1229	.1214	.1198	.1183	.1169	.1155	.1141	.1128	.1115	.1102
.25	.1279	.1262	.1247	.1231	.1215	.1200	.1185	.1171	.1157	.1143	.1130	.1117	.1104
.30	.1282	.1265	.1249	.1233	.1218	.1203	.1188	.1174	.1160	.1146	.1132	.1119	.1106
.35	.1284	.1267	.1251	.1235	.1220	.1205	.1190	.1176	.1162	.1148	.1134	.1121	.1108
.40	.1286	.1269	.1254	.1238	.1223	.1207	.1192	.1178	.1164	.1150	.1136	.1123	.1110
.45	.1289	.1272	.1256	.1240	.1225	.1209	.1194	.1180	.1166	.1152	.1138	.1125	.1112
.50	.1291	.1274	.1258	.1242	.1227	.1211	.1196	.1182	.1168	.1154	.1140	.1127	.1114
.55	.1293	.1276	.1260	.1244	.1229	.1213	.1198	.1184	.1170	.1156	.1142	.1129	.1116
.60	.1296	.1279	.1263	.1247	.1231	.1215	.1200	.1186	.1172	.1158	.1144	.1131	.1118
.65	.1298	.1281	.1265	.1249	.1234	.1218	.1203	.1188	.1174	.1160	.1146	.1133	.1120
.70	.1300	.1283	.1267	.1251	.1236	.1220	.1205	.1190	.1176	.1162	.1148	.1135	.1122
.75	.1302	.1285	.1269	.1253	.1238	.1222	.1207	.1192	.1178	.1164	.1150	.1137	.1124
.80	.1305	.1288	.1272	.1256	.1240	.1224	.1209	.1195	.1181	.1167	.1153	.1139	.1126
.85	.1307	.1290	.1274	.1258	.1242	.1226	.1211	.1197	.1183	.1169	.1155	.1141	.1128
.90	.1309	.1292	.1276	.1260	.1245	.1229	.1214	.1199	.1185	.1171	.1157	.1143	.1130
28.95	.1312	.1295	.1279	.1263	.1247	.1231	.1216	.1201	.1187	.1173	.1159	.1145	.1132
29.00	.1314	.1297	.1281	.1265	.1249	.1233	.1218	.1203	.1189	.1175	.1161	.1147	.1134
.05	.1316	.1299	.1283	.1267	.1251	.1235	.1220	.1205	.1191	.1177	.1163	.1149	.1136
.10	.1319	.1302	.1285	.1269	.1253	.1237	.1222	.1207	.1193	.1179	.1165	.1151	.1138
.15	.1321	.1304	.1288	.1272	.1256	.1240	.1224	.1209	.1195	.1181	.1167	.1153	.1140
.20	.1323	.1306	.1290	.1274	.1258	.1242	.1226	.1211	.1197	.1183	.1169	.1155	.1142
.25	.1325	.1308	.1292	.1276	.1260	.1244	.1228	.1213	.1199	.1185	.1171	.1157	.1144
.30	.1328	.1311	.1294	.1278	.1262	.1246	.1231	.1216	.1201	.1187	.1173	.1159	.1146
.35	.1330	.1313	.1296	.1280	.1264	.1248	.1233	.1218	.1203	.1189	.1175	.1161	.1148
.40	.1332	.1315	.1299	.1283	.1267	.1251	.1235	.1220	.1205	.1191	.1177	.1163	.1150
.45	.1335	.1318	.1301	.1285	.1269	.1253	.1237	.1222	.1207	.1193	.1179	.1165	.1152
.50	.1337	.1320	.1303	.1287	.1271	.1255	.1239	.1224	.1209	.1195	.1181	.1167	.1154
.55	.1339	.1322	.1305	.1289	.1273	.1257	.1241	.1226	.1211	.1197	.1183	.1169	.1156
.60	.1342	.1325	.1308	.1291	.1275	.1259	.1243	.1228	.1213	.1199	.1185	.1171	.1158
.65	.1344	.1327	.1310	.1294	.1278	.1262	.1246	.1230	.1215	.1201	.1187	.1173	.1160
.70	.1346	.1329	.1312	.1296	.1280	.1264	.1248	.1232	.1217	.1203	.1189	.1175	.1162
.75	.1348	.1331	.1314	.1298	.1282	.1266	.1250	.1234	.1219	.1205	.1191	.1177	.1164
.80	.1351	.1334	.1317	.1300	.1284	.1268	.1252	.1237	.1222	.1208	.1194	.1180	.1166

pressures and temperatures, expressed in decimals of an inch, &c.—Continued.

degrees Fahrenheit.

25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	100°
0.1001	0.0989	0.0978	0.0966	0.0957	0.0947	0.0937	0.0927	0.0918	0.0909	0.0899	0.0890	0.0881	0.0872	0.0863	0.0855
.1003	.0991	.0980	.0970	.0959	.0949	.0939	.0929	.0920	.0911	.0901	.0892	.0883	.0874	.0865	.0857
.1005	.0993	.0982	.0972	.0961	.0951	.0941	.0931	.0922	.0913	.0903	.0894	.0885	.0876	.0867	.0859
.1007	.0995	.0984	.0974	.0963	.0953	.0943	.0933	.0924	.0915	.0905	.0896	.0886	.0877	.0868	.0860
.1009	.0997	.0986	.0976	.0965	.0955	.0945	.0935	.0925	.0916	.0906	.0897	.0888	.0879	.0870	.0862
.1011	.0999	.0988	.0978	.0967	.0957	.0947	.0937	.0927	.0918	.0908	.0899	.0890	.0881	.0872	.0864
.1013	.1001	.0990	.0979	.0968	.0958	.0948	.0938	.0929	.0920	.0910	.0901	.0891	.0882	.0873	.0865
.1015	.1003	.0992	.0981	.0970	.0960	.0950	.0940	.0931	.0922	.0912	.0903	.0893	.0884	.0875	.0867
.1017	.1005	.0994	.0983	.0972	.0962	.0952	.0942	.0933	.0924	.0914	.0905	.0895	.0886	.0877	.0869
.1019	.1007	.0996	.0985	.0974	.0964	.0954	.0944	.0934	.0925	.0915	.0906	.0897	.0888	.0879	.0871
.1021	.1009	.0998	.0987	.0976	.0966	.0956	.0946	.0936	.0927	.0917	.0908	.0898	.0889	.0880	.0872
.1023	.1011	.1000	.0989	.0978	.0968	.0958	.0948	.0938	.0929	.0919	.0910	.0900	.0891	.0882	.0874
.1025	.1013	.1002	.0991	.0980	.0970	.0960	.0950	.0940	.0931	.0921	.0912	.0902	.0893	.0884	.0876
.1027	.1015	.1004	.0993	.0982	.0972	.0962	.0952	.0942	.0932	.0922	.0913	.0903	.0894	.0885	.0877
.1029	.1017	.1006	.0995	.0984	.0974	.0963	.0953	.0943	.0934	.0924	.0915	.0905	.0896	.0887	.0879
.1031	.1019	.1008	.0997	.0986	.0976	.0965	.0955	.0945	.0936	.0926	.0917	.0907	.0898	.0889	.0880
.1032	.1020	.1009	.0998	.0987	.0977	.0967	.0957	.0947	.0937	.0927	.0918	.0908	.0899	.0890	.0882
.1034	.1022	.1011	.1000	.0989	.0979	.0969	.0959	.0949	.0939	.0929	.0920	.0910	.0901	.0892	.0884
.1036	.1024	.1013	.1002	.0991	.0981	.0971	.0961	.0951	.0941	.0931	.0922	.0912	.0903	.0894	.0885
.1038	.1026	.1015	.1004	.0993	.0983	.0972	.0962	.0952	.0943	.0933	.0924	.0914	.0905	.0896	.0887
.1040	.1028	.1017	.1006	.0995	.0985	.0974	.0964	.0954	.0944	.0934	.0925	.0915	.0906	.0897	.0888
.1042	.1030	.1019	.1008	.0997	.0987	.0976	.0966	.0956	.0946	.0936	.0927	.0917	.0908	.0899	.0890
.1044	.1032	.1021	.1010	.0999	.0989	.0978	.0968	.0958	.0948	.0938	.0929	.0919	.0910	.0901	.0892
.1046	.1034	.1023	.1012	.1001	.0991	.0980	.0970	.0960	.0950	.0940	.0930	.0920	.0911	.0902	.0893
.1048	.1036	.1025	.1014	.1003	.0992	.0981	.0971	.0961	.0951	.0941	.0932	.0922	.0913	.0904	.0895
.1050	.1038	.1027	.1016	.1005	.0994	.0983	.0973	.0963	.0953	.0943	.0934	.0924	.0915	.0906	.0897
.1052	.1040	.1028	.1017	.1006	.0996	.0985	.0975	.0965	.0955	.0945	.0935	.0925	.0916	.0907	.0898
.1054	.1042	.1030	.1019	.1008	.0998	.0987	.0977	.0967	.0957	.0947	.0937	.0927	.0918	.0909	.0900
.1056	.1044	.1032	.1021	.1010	.1000	.0989	.0979	.0969	.0959	.0949	.0939	.0929	.0920	.0911	.0902
.1058	.1046	.1034	.1023	.1012	.1001	.0990	.0980	.0970	.0960	.0950	.0941	.0931	.0922	.0913	.0904
.1060	.1048	.1036	.1025	.1014	.1003	.0992	.0982	.0972	.0962	.0952	.0942	.0932	.0923	.0914	.0905
.1062	.1050	.1038	.1027	.1016	.1005	.0994	.0984	.0974	.0964	.0954	.0944	.0934	.0925	.0916	.0907
.1064	.1052	.1040	.1029	.1018	.1007	.0996	.0986	.0967	.0966	.0956	.0946	.0936	.0927	.0918	.0909
.1066	.1054	.1042	.1031	.1020	.1009	.0998	.0988	.0978	.0968	.0958	.0948	.0938	.0929	.0919	.0910
.1068	.1056	.1044	.1033	.1022	.1011	.1000	.0990	.0979	.0969	.0959	.0949	.0939	.0930	.0921	.0912
.1070	.1058	.1046	.1035	.1024	.1013	.1002	.0992	.0981	.0971	.0961	.0951	.0941	.0932	.0923	.0914
.1072	.1060	.1048	.1037	.1025	.1014	.1003	.0993	.0983	.0973	.0963	.0953	.0943	.0934	.0924	.0915
.1074	.1062	.1050	.1039	.1027	.1016	.1005	.0995	.0985	.0975	.0965	.0955	.0945	.0936	.0926	.0917
.1076	.1064	.1052	.1041	.1029	.1018	.1007	.0997	.0987	.0977	.0967	.0957	.0947	.0938	.0928	.0919
.1078	.1066	.1054	.1043	.1031	.1020	.1009	.0999	.0988	.0978	.0968	.0958	.0948	.0939	.0930	.0921
.1080	.1068	.1056	.1045	.1033	.1022	.1011	.1001	.0990	.0980	.0970	.0960	.0950	.0941	.0931	.0922
.1082	.1070	.1058	.1047	.1035	.1024	.1013	.1003	.0992	.0982	.0972	.0962	.0952	.0943	.0933	.0924
.1034	.1072	.1060	.1049	.1037	.1026	.1015	.1005	.0994	.0984	.0974	.0964	.0954	.0945	.0935	.0926
.1086	.1074	.1062	.1051	.1039	.1028	.1017	.1007	.0996	.0986	.0975	.0965	.0955	.0946	.0936	.0927
.1088	.1076	.1064	.1053	.1041	.1030	.1018	.1008	.0997	.0987	.0977	.0967	.0957	.0948	.0938	.0929
.1090	.1078	.1066	.1055	.1043	.1032	.1020	.1010	.0999	.0989	.0979	.0969	.0959	.0950	.0940	.0931
.1091	.1079	.1067	.1056	.1044	.1033	.1022	.1012	.1001	.0991	.0980	.0970	.0960	.0951	.0941	.0932
.1093	.1081	.1069	.1058	.1046	.1035	.1024	.1014	.1003	.0993	.0982	.0972	.0962	.0953	.0943	.0934
.1095	.1083	.1071	.1060	.1048	.1037	.1026	.1016	.1005	.0995	.0984	.0974	.0964	.0955	.0945	.0936
.1097	.1085	.1073	.1062	.1050	.1039	.1027	.1017	.1006	.0996	.0985	.0976	.0966	.0957	.0947	.0938
.1099	.1087	.1075	.1064	.1052	.1041	.1029	.1019	.1008	.0998	.0987	.0977	.0967	.0958	.0948	.0939
.1101	.1089	.1077	.1066	.1054	.1043	.1031	.1021	.1010	.1000	.0989	.0979	.0969	.0960	.0950	.0941
.1103	.1091	.1079	.1068	.1056	.1045	.1033	.1023	.1012	.1002	.0991	.0981	.0971	.0962	.0952	.0943
.1105	.1093	.1081	.1070	.1058	.1047	.1035	.1025	.1014	.1004	.0993	.0983	.0973	.0963	.0953	.0944
.1107	.1095	.1083	.1072	.1060	.1049	.1037	.1026	.1015	.1005	.0994	.0984	.0974	.0965	.0955	.0946
.1109	.1097	.1085	.1074	.1062	.1051	.1039	.1028	.1017	.1007	.0996	.0986	.0976	.0967	.0957	.0948
.1111	.1099	.1087	.1075	.1063	.1052	.1040	.1030	.1019	.1009	.0998	.0988	.0978	.0968	.0958	.0949
.1113	.1101	.1089	.1077	.1065	.1054	.1042	.1032	.1021	.1011	.1000	.0990	.0980	.0970	.0960	.0951
.1115	.1103	.1091	.1079	.1067	.1056	.1044	.1034	.1023	.1013	.1002	.0992	.0982	.0972	.0962	.0953
.1117	.1105	.1093	.1081	.1069	.1058	.1046	.1035	.1024	.1014	.1003	.0993	.0983	.0975	.0964	.0955
.1119	.1107	.1095	.1083	.1071	.1060	.1048	.1037	.1026	.1016	.1005	.0995	.0985	.0977	.0965	.0956
.1121	.1109	.1097	.1085	.1073	.1062	.1050	.1039	.1028	.1018	.1007	.0997	.0987	.0977	.0967	.0958
.1123	.1111	.1099	.1087	.1075	.1064	.1052	.1041	.1030	.1020	.1009	.0999	.0989	.0979	.0969	.0960
.1125	.1113	.1101	.1089	.1077	.1066	.1054	.1043	.1032	.1021	.1010	.1000	.0990	.0980	.0970	.0961
.1127	.1115	.1103	.1091	.1079	.1067	.1055	.1044	.1033	.1023	.1012	.1002	.0992	.0982	.0972	.0963
.1129	.1117	.1105	.1093	.1081	.1069	.1057	.1046	.1035	.1025	.1014	.1004	.0994	.0984	.0974	.0965
.1131	.1118	.1106	.1094	.1082	.1071	.1059	.1048	.1037	.1026	.1015	.1005	.0995	.0985	.0975	.0966
.1133	.1120	.1108	.1096	.1084	.1073	.1061	.1050	.1039	.1028	.1017	.1007	.0997	.0987	.0977	.0968
.1135	.1122	.1110	.1098	.1086	.1075	.1063	.1052	.1041	.1030	.1019	.1009	.0999	.0989	.0979	.0970
.1137	.1124	.1112	.1100	.1088	.1076	.1064	.1053	.1042	.1032	.1021	.1011	.1001	.0991	.0981	.0972
.1139	.1126	.1114	.1102	.1090	.1078	.1066	.1055	.1044	.1033	.1022	.1012	.1002	.0992	.0982	.0973
.1141	.1128	.1116	.1104	.1092	.1080	.1068	.1057	.1046	.1035	.1024	.1014	.1004	.0994	.0984	.0975
.1143	.1130	.1118	.1106	.1094	.1082	.1070	.1059	.1048	.1037	.1026	.1016	.1006	.0996	.0986	.0977
.1145	.1132	.1120	.1108	.1096	.1084	.1072	.1061	.1050	.1039	.1028	.1017	.1007	.0997	.0987	.0978
.1147	.1134	.1122	.1110	.1098	.1085	.1073	.1062	.1051	.1040	.1029	.1019	.1009	.0999	.0989	.0980
.1149	.1136	.1124	.1112	.1100	.1087	.1075	.1064	.1053	.1042	.1031	.1021	.1011	.1001	.0991	.0981
.1151	.1138	.1125	.1113	.1101	.1089	.1077	.1066	.1055	.1044	.1033	.1022	.1012	.1002	.0992	.0983
.1153	.1140	.1127	.1115	.1103	.1091	.1079	.1068	.1057	.1046	.1035	.1024	.1014	.1004	.0994	.0985

TABLE II.—*Weight of a column of air 100 feet high, at different barometric*

Argument $\frac{t'+t}{2}$

Barometer.	−40°	−35°	−30°	−25°	−20°	−15°	−10°	−5°	0°	5°	10°	15°	20°
Inches.													
29.85	0.1353	0.1336	0.1319	0.1302	0.1286	0.1270	0.1254	0.1239	0.1224	0.1210	0.1196	0.1182	0.1168
.90	.1355	.1338	.1321	.1305	.1289	.1273	.1257	.1241	.1226	.1212	.1198	.1184	.1170
29.95	.1358	.1341	.1324	.1307	.1291	.1275	.1259	.1243	.1228	.1214	.1200	.1186	.1172
30.00	.1360	.1343	.1326	.1309	.1293	.1277	.1261	.1245	.1230	.1216	.1202	.1188	.1174
.05	.1362	.1345	.1329	.1311	.1295	.1279	.1263	.1247	.1232	.1218	.1204	.1190	.1176
.10	.1365	.1348	.1331	.1314	.1297	.1281	.1265	.1249	.1234	.1220	.1206	.1192	.1178
.15	.1367	.1350	.1333	.1316	.1300	.1283	.1267	.1251	.1236	.1222	.1208	.1194	.1180
.20	.1370	.1352	.1335	.1318	.1302	.1285	.1269	.1253	.1238	.1224	.1210	.1196	.1182
.25	.1372	.1354	.1337	.1320	.1304	.1287	.1271	.1255	.1240	.1226	.1212	.1198	.1184
.30	.1374	.1357	.1340	.1323	.1306	.1290	.1274	.1258	.1243	.1228	.1214	.1200	.1186
.35	.1377	.1359	.1342	.1325	.1308	.1292	.1276	.1260	.1245	.1230	.1216	.1202	.1188
.40	.1379	.1361	.1344	.1327	.1311	.1294	.1278	.1262	.1247	.1232	.1218	.1204	.1190
.45	.1382	.1364	.1347	.1330	.1313	.1296	.1280	.1264	.1249	.1234	.1220	.1206	.1192
.50	.1384	.1366	.1349	.1332	.1315	.1298	.1282	.1266	.1251	.1236	.1222	.1208	.1194
.55	.1386	.1368	.1351	.1334	.1317	.1300	.1284	.1268	.1253	.1238	.1224	.1210	.1196
.60	.1389	.1371	.1354	.1336	.1319	.1302	.1286	.1270	.1255	.1240	.1220	.1212	.1198
.65	.1391	.1373	.1356	.1339	.1322	.1305	.1288	.1272	.1257	.1242	.1228	.1214	.1200
.70	.1393	.1375	.1358	.1341	.1324	.1307	.1290	.1274	.1259	.1244	.1230	.1216	.1202
.75	.1395	.1377	.1360	.1343	.1326	.1309	.1292	.1276	.1261	.1246	.1232	.1218	.1204
.80	.1398	.1380	.1363	.1345	.1328	.1311	.1295	.1279	.1264	.1249	.1234	.1220	.1206
.85	.1400	.1382	.1365	.1347	.1330	.1313	.1297	.1281	.1266	.1251	.1236	.1222	.1208
.90	.1402	.1384	.1367	.1350	.1333	.1316	.1299	.1283	.1268	.1253	.1238	.1224	.1210
30.95	.1405	.1387	.1370	.1352	.1335	.1318	.1301	.1285	.1270	.1255	.1240	.1226	.1212
31.00	0.1407	0.1389	0.1372	0.1354	0.1337	0.1320	0.1303	0.1287	0.1272	0.1257	0.1242	0.1228	0.1214

pressures and temperatures, expressed in decimals of an inch, &c.—Continued.

degrees Fahrenheit.

25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	100°
0.1155	0.1142	0.1129	0.1117	0.1105	0.1093	0.1081	0.1070	0.1059	0.1048	0.1037	0.1026	0.1016	0.1006	0.0996	0.0986
.1157	.1144	.1131	.1119	.1107	.1094	.1082	.1071	.1060	.1049	.1038	.1028	.1018	.1008	.0998	.0988
.1159	.1146	.1133	.112	.1109	.1096	.1084	.1073	.1062	.1051	.1040	.1029	.1019	.1009	.0999	.0989
.1161	.1148	.1135	.1123	.1111	.1098	.1086	.1075	.1064	.1053	.1042	.1031	.1021	.1011	.1001	.0991
.1163	.1150	.1137	.1125	.1113	.1100	.1088	.1077	.1066	.1055	.1044	.1033	.1023	.1013	.1003	.0993
.1165	.1152	.1139	.1127	.1115	.1102	.1090	.1078	.1067	.1056	.1045	.1035	.1024	.1014	.1004	.0994
.1167	.1154	.1141	.1128	.1116	.1103	.1091	.1080	.1069	.1058	.1047	.1036	.1026	.1016	.1006	.0996
.1169	.1156	.1143	.1130	.1118	.1105	.1093	.1082	.1071	.1060	.1049	.1039	.1028	.1018	.1008	.0998
.1170	.1157	.1144	.1132	.1120	.1107	.1095	.1083	.1072	.1061	.1050	.1040	.1029	.1019	.1009	.0999
.1172	.1159	.1146	.1134	.1122	.1109	.1097	.1085	.1074	.1063	.1052	.1042	.1031	.1021	.1011	.1001
.1174	.1161	.1148	.1136	.1124	.1111	.1099	.1087	.1076	.1065	.1054	.1044	.1033	.1023	.1013	.1003
.1176	.1163	.1150	.1137	.1125	.1112	.1100	.1089	.1078	.1067	.1056	.1045	.1035	.1025	.1015	.1005
.1178	.1165	.1152	.1139	.1127	.1114	.1102	.1090	.1079	.1068	.1057	.1047	.1036	.1026	.1016	.1006
.1180	.1167	.1154	.1142	.1129	.1116	.1104	.1092	.1081	.1070	.1059	.1049	.1038	.1028	.1018	.1008
.1182	.1169	.1156	.1143	.1131	.1118	.1106	.1094	.1083	.1072	.1061	.1051	.1040	.1030	.1020	.1010
.1184	.1171	.1158	.1145	.1133	.1120	.1108	.1096	.1085	.1074	.1063	.1052	.1041	.1031	.1021	.1011
.1186	.1173	.1160	.1147	.1134	.1121	.1109	.1097	.1086	.1075	.1064	.1054	.1043	.1033	.1023	.1013
.1188	.1175	.1162	.1149	.1136	.1123	.1111	.1099	.1088	.1077	.1066	.1056	.1045	.1035	.1025	.1015
.1190	.1176	.1163	.1150	.1138	.1125	.1113	.1101	.1090	.1079	.1068	.1057	.1046	.1036	.1026	.1016
.1192	.1178	.1165	.1152	.1140	.1127	.1115	.1103	.1092	.1081	.1070	.1059	.1048	.1038	.1028	.1018
.1194	.1180	.1167	.1154	.1142	.1129	.1117	.1105	.1094	.1083	.1072	.1061	.1050	.1040	.1030	.1020
.1196	.1182	.1169	.1156	.1143	.1130	.1118	.1106	.1095	.1084	.1073	.1063	.1052	.1042	.1032	.1022
.1198	.1184	.1171	.1158	.1145	.1132	.1120	.1108	.1097	.1086	.1075	.1064	.1053	.1043	.1033	.1023
0.1200	0.1186	0.1173	0.1160	0.1147	0.1134	0.1122	0.1110	0.1099	0.1088	0.1077	0.1066	0.1055	0.1045	0.1035	0.1025

TABLE III.

Argument $\frac{t'+t}{2}$

Elevation.	−40	−30	−20	−10	0	10	20	30	40	50	60	70	80	90	100
100	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2
200	6	6	6	5	5	5	5	4	4	4	4	4	4	3	3
300	10	9	8	8	7	7	7	7	6	6	6	6	5	5	4
400	13	12	11	10	10	10	9	9	8	8	8	8	7	7	6
500	16	15	14	13	13	12	12	11	11	10	10	10	9	9	8
600	19	18	17	16	15	15	14	13	13	12	12	11	11	10	10
700	22	21	20	18	17	17	16	15	15	14	14	13	13	12	11
800	25	24	22	21	20	19	18	18	17	16	16	15	14	14	13
900	28	27	25	23	22	22	21	20	19	18	18	17	16	15	15
1,000	31	29	28	26	25	24	23	22	21	20	19	18	18	17	17
1,500	46	44	41	39	37	36	34	33	31	30	28	27	27	26	25
2,000	61	57	54	51	49	47	45	43	41	39	37	36	35	34	33
2,500	75	71	67	64	61	58	56	53	51	48	46	45	43	42	41
3,000	89	83	79	76	72	69	66	63	60	57	54	53	51	49	48
3,500	102	97	92	88	83	80	76	73	69	66	63	61	58	57	55
4,000	116	110	104	99	94	90	86	82	78	74	71	68	66	64	62
4,500	129	122	116	110	105	100	96	91	87	82	79	76	74	71	69
5,000	142	134	127	121	115	110	105	100	95	90	87	84	81	78	75
5,500	154	146	138	131	125	119	114	108	103	96	95	91	88	85	81
6,000	166	157	149	141	134	128	122	116	111	106	102	98	95	91	87
6,500	177	168	140	151	144	137	130	124	119	114	109	105	101	97	93
7,000	187	179	170	161	153	145	138	132	126	121	116	112	107	103	98

To be used with Table (2) II. The numbers are given in units of the fourth decimal.

The formula for finding the correction to sea-level is, $C = (N + N') \times E$, where C is the correction required; E, the elevation; N, the number from Table II (2) (,) and N', the number from Table (3) III.

PAPER 22.

Recapitulation of disasters on the lakes from July 1, 1875, *to June* 30, 1876.

	1875.						1876.						Total.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Sunk	10	15	22	17	9	1	....	2	3	8	12	3	102
Damaged, disabled, &c	63	107	92	101	43	4	....	3	4	19	60	40	536
Ashore and aground	17	31	47	69	60	12	....	....	2	20	17	18	293
Sprung a leak	6	10	17	15	11	1	....	....	1	6	9	3	79
Collisions	25	31	28	27	14	...	....	1	....	7	23	18	174
Damaged by fire	1	....	1	4	1	....	....	....	1	2	....	2	12
Destroyed by fire	3	1	2	3	10	1	...	....	1	1	....	1	23
Water-logged	1	5	6	6	9	....	....	....	1	....	1	1	30
Struck by lightning	....	1	....	....	....	....	....	....	....	....	....	....	1
Dismasted	....	4	7	3	....	....	....	....	....	1	....	1	16
Exploded boiler	1	....	....	1	1	....	....	....	....	....	....	....	3
Lives lost	15	15	46	17	33	....	....	....	....	8	8	2	144

JULY, 1875.

1.—Schooner Journeyman arrived at Buffalo leaking.
Tug Bruce knocked off her shoe at Buffalo.
Tug Victoria struck a rock and sunk at Montreal.

2.—Schooner Montpelier had her bowsprit and jib-boom carried away by a collision with the schooner Davidson at Chicago.
Schooner H. Fitzhugh had her bobstays broken by being towed against the dock at Milwaukee.
Scow Painter lost her jib-boom, and the schooner Flora her mizzen rigging, by collision at Chicago.

2.—Schooners Montcalm and Reindeer arrived at Chicago leaking.
Peter Hilts, sailor, fell from pier at Carlton, Wis., and was drowned.
Propeller Prussia near Kingston in a helpless condition, the stem of her main valve being broken.
3.—The canal-boat Prairie Queen collided with a schooner at Cleveland, and sustained damages, from which she sank; loss: boat and 75 tons coal.
Propellor Atlantic aground in Sault River; released.
4.—Michael McGarran, a sailor, fell from schooner Lear at Sandusky, and was drowned.
Propeller B. W. Blanchard ran ashore at Waugoshance light, but was released without much damage.
Schooner Oneonta grounded at Port Huron.
A propeller of the Union Line aground in the straits near Waugoshance light.
5.—Michael Rome, sailor on schooner Perry Hannah, drowned on Lake Michigan.
6.—Schooner Senator damaged by collision with steam barge Annie Laura at Chicago.
Tug William Livingstone lost her raft of logs in Saint Clair River.
George Kastner, deck-hand on propeller Badger State, drowned in Lake Erie.
7.—Propellor China ashore near Kingston.
8.—Tug Daisy Lee sank at Benton Harbor.
Schooner Harvest Home aground in the Neebish.
Propeller R. C. Stanley damaged by collision with bridge at Toledo.
9.—Steamship Ballentine damaged by collision with bridge at Chicago.
Steamer Eighth Ohio damaged her machinery on Lake Michigan.
The propeller Winslow damaged her machinery in the straits.
Schooner I. F. King aground in Saint Clair Flats.
10.—Steam-barges V. H. Ketchum and H. H. Brown aground at Lime-Kilns Crossing.
Tug Maytham ran ashore on Isle Royale, Lake Superior.
11.—Steamship I. S. Fay returned to Port Huron with her machinery slightly damaged.
Propeller Seymour ashore on the rocks at French River, Saginaw Bay.
12.—W. F. Ring, with cargo of salt and shingles, struck a pier in Saginaw River, and sank; vessel and cargo total loss.
13.—Propeller Caldwell and schooner B. F. Wade damaged by collision at Chicago.
14.—Propeller Pacific ashore at Point Iroquois, Lake Superior.
Kund Oleson, seaman on schooner Oneonta, drowned in Lake Erie.
Steamer Dove broke her shaft *en route* from Malden to Detroit.
When steamer Northwest was 45 miles out from Cleveland her cylinder exploded, blowing off her piston-head; damage, $3,000.
15.—Unknown fisherman drowned at Petowsky, Mich.
Schooners Frank Perew and C. J. Magill damaged by a collision in Waisha Bay, Lake Michigan.
Schooner William Jones considerably damaged in her rigging by a gale on Lake Michigan.
16.—Schooner McDonald lost her jib-boom on Lake Michigan.
Schooner Myrtle lost her foresail on Lake Michigan.
Scow Morning Lark, laden with stone, struck a rock, and sank near Malden.
Tow-barge Eureka, lumber-laden, water-logged on Lake Erie,
17.—Schooner Conquest damaged by a collision with Walters Point Bridge, Milwaukee.
Schooner J. E. Gilmore lost her maintop-mast head on Lake Michigan.
Scow Juno sank on Lake Erie.
A lumber-scow sank at Two Rivers, Wis.
18.—Propeller Winslow returned to Port Huron with crank-pin loose.
Tug Kate Williams, while on Lake Huron, broke her cylinder and piston-rod.
Steam-barge Henry Howard returned to Port Huron, her heater having given out.
Schooner Breeden lost her maintop-mast on Lake Michigan.
The schooner Skylark lost her jib-boom by collision with a bridge at Chicago.
Schooner Elva, bark laden, filled with water and capsized on Lake Michigan, near Milwaukee.
Scow-schooner J. B. Prime lost her jib and main gaff-topsail in a squall on Lake Erie.
19.—Steamer Peerless lost her cylinder-head at Marquette.
Scow Sea-Bird damaged by a collision with scow Skinner at Michigan City.
Patrick Kearnes, fireman, drowned off the tug Pierce at Port Colborne, Lake Erie.
20.—Scow Dixie burnt below Saint Clair.
Steam-barge Saint Clair broke her machinery on Lake Erie.
21.—Schooner Inez slightly damaged by a collision with a ferry-boat at Detroit.
Schooner Dan Marble sprang a leak and sank near Long Point, Lake Erie.
Schooner J. B. Weber sprang a leak on Lake Erie and was run ashore.

23.—James Conners, fireman, fell overboard from tug Kate Moffat at Port Huron, and was drowned.
Propeller Russia exploded her upper port cylinder sixty miles off Milwaukee.
Schooners Sasco and Hutchinson collided at Buffalo. The Sasco was damaged to the amount of $500.
24.—Bark Woodruff broke from her mooring in the river at Chicago and drifted against the schooners Emma A. Mayes and Little Belle, damaging their rigging considerably. The Woodruff escaped without injury.
Emile Gohms, sailor, fell from schooner L. C. Woodruff at Chicago, and was drowned.
Schooners Groton and Siberia damaged by a collision near Niagara, Lake Ontario.
Hugh McDonald, sailor, drowned at Chicago.
25.—Schooner H. C. Heg lost her jib in a squall on Lake Michigan.
Capt. James Crowley, of tug Brothers, fell overboard and was drowned off Chicago.
Unknown sailor lost overboard from barge in Mills on Lake Huron.
Tug Cygnet exploded her boiler near Bad River, severely injuring the captain and completely wrecking the boat. Damage $2,500.
Tug Waters burnt at Manistee. Loss $1,000.
Schooners Berriman, China, and Senator collided on Saint Clair River, and each sustained serious injuries. Total damage $2,000.
26.—Bark Masten badly damaged by collision with a bridge at Chicago.
Schooner C. P. Williams and tug Mary McLane collided in river at Chicago; both received slight injuries.
Schooner D. P. Dobbins lost her yawl-boat in a collision at Chicago.
Tug Zouave broke her shaft and lost her wheel in Saginaw Bay.
Schooner Lena Johnson collided with a bridge in the river at Chicago.
Charles Barnes, deck-hand, on the steam-barge W. S. Irelan, fell overboard and was drowned near Kincardin, Lake Ontario.
27.—Schooner Danford lost her fore-sail on Lake Huron.
Propeller Bradbury damaged by fire at Alabaster.
Tug James Sheriff broke her piston and cylinder-head at Michigan City.
Schooner Ida Keith lost her main-sail on Lake Huron.
Sloop Donelly and barge Clark collided at Toledo. The Clark received serious injuries.
Paul Carmichael, sailor on barge William Treat, drowned in Saginaw Bay.
28.—Steamer Gen. Dix ran against a pier at Whitehall, Mich. Damage $2,500.
Propeller Japan slightly damaged by colliding with a bridge at Chicago.
Tug Moore broke her machinery on Lake Huron.
Harry Mason, sailor on schooner Nellie Wilder, fell overboard and was drowned off Chicago.
29.—Schooner Tremble ashore at Peche Island.
Steam-barge Abercorn ashore near Port Colborne.
Schooner Hubbard sprang a leak on Lake Michigan.
30.—Canal-steamer Advance ran into the schooner Melvin S. Bacon at Chicago, and damaged the latter slightly.
Schooner Elvina and barge City of Grand Haven damaged by collision at Chicago.
Schooner W. S. Bacon lost her mizzen rigging by a collision with the schooner Sea Bird at Chicago.
Barge Prairie State grounded on Fighting Island, near Detroit.
Schooner Monticello ashore near Harbor Piers, Chicago.
Charles Lennan, sailor on schooner Victor, had his leg cut off by a line fouling.
Schooner Reuben Dowd struck the pier at Racine Harbor, and damaged her head-gear.
31.—Propeller Scotia aground at Saint Clair.
Steamer Dominion burned near Chatham. Loss, $14,000.
Schooner Ishpenning ashore on Stony Island, Detroit River.
Tug Joe Mack sunk by a collision with the propeller East, near Brockville.
Steamer Magnet damaged by striking a pier at Oswego.
Barge Eliza arrived at Buffalo leaking.

AUGUST, 1875.

1.—Schooner Lawrence arrived at Milwaukee with a broken mainmast.
Barge Dreadnought lost a portion of her cargo in a gale on Lake Erie.
Barge Brayley ashore at Point au Pellee, Lake Erie.
Steam-barge Alleghany lost her smoke-stack in a gale on Lake Erie.
Tug Owen lost her raft on Lake Erie.
Barge Trader lost tow of barges on Lake Erie.
Tug Ontario sunk at Waterville, Canada.
Several vessels lost their anchors in a gale on Lake Erie.

1.—Tug Joe Mack run into and sunk by propeller East in the Saint Lawrence River at Brockville.
2.—Schooner Robert B. Campbell broke her main boom off Chicago.
Schooner Margaret Dall and tug Van Shaick damaged by collision at Chicago.
Schooner Jennibell arrived at Milwaukee minus her main topmast.
Schooner Levi Grant lost her jib-boom by collision at Chicago.
Tug James Amadeus lost her pilot-house in a heavy sea off Cleveland.
Schooner Elm damaged by a gale on Lake Michigan.
John Hill, drowned off propeller America, at Niagara.
W. H. Carey, sailor on schooner Willie Keller, drowned in the Welland Canal.
William Walsh, sailor on schooner Evaline, suffocated by smoke at Toronto.
3.—Henry Martin, porter on steamer Saginaw, drowned in Lake Michigan.
Tug Mosher carried away the rudder of the barge City of Grand Haven, at Chicago.
Schooner Pride of America dismasted and water-logged on Lake Erie.
The Lady Franklin had her wheels broken on Lake Huron.
Scow Nellie Church arrived in Milwaukee with her topmast gone.
Schooner P. Hayden lost her jib-boom and bowsprit by collision with the Lew Elsworth, at Chicago.
4.—Scow C. G. Weisel water-logged on Lake Huron.
Steam-barge Cowie grounded at Oswego.
Schooner Driver damaged by collision with schooner D. K. Cliret, at Port Huron.
5.—Green Bay dredge sunk at Green Bay, Wisconsin.
Schooner Penoka broke her center-board at Twin River Point.
Ferry-boats Fortune and Hope damaged by collision in Detroit River.
Loyd Miller drowned by the sinking of the yacht Lulu, off Chicago.
Schooner C. Harrison water-logged and damaged by a gale on Lake Michigan.
Scow Banner driven ashore near Holland, Mich., by a gale.
Sailor on schooner Bessie Boalt fell from aloft during a gale on Lake Michigan, and was severely injured.
Schooners Toledo, Buena Vista, and Conquest badly damaged by a gale at Perry's pier, east shore Lake Michigan. The Toledo was completely wrecked.
Augustus Politte, seaman on barge Montreal, fell into the hold and was killed, at Kingston.
Yacht Dolly Varden was capsized and wrecked in Sturgeon Bay.
6.—Scow Nellie Church lost a jib in a gale on Lake Michigan.
Scow Banner beached near Holland, Mich., in a badly damaged condition.
Schooner Blake water-logged and sunk in a gale on Lake Michigan.
Schooner Bessie Boalt water-logged and capsized near little Point Sable.
Tug Parker and schooner Herald damaged by collision with a bridge, at Chicago.
Schooner Rosa Belle ashore at Grand Haven—total wreck—loss, $6,500. John Holmes, her steward, drowned, and Captain Peterson severely injured.
Schooner Hero driven on the beach at Holland, Mich., and became a total wreck.
Propeller Newburg ashore at Middle Island Reef, Lake Huron.
Scow Eagle beached at Holland, Mich., while trying to enter the harbor.
Schooner Joe Silas lost her mainmast at Manitowoc.
Steam-barge New Era lost a raft of 720,000 feet of logs, at Whitehall, Mich.
Schooner Woodruff arrived at Buffalo leaking badly.
Unknown vessel foundered with all hands, off Muskegon.
Scow Mona lost her mainsail on Lake Erie.
Schooner Dick Somers struck by lightning and otherwise damaged in a squall near Point au Pellee, Lake Erie; damage, $1,000.
7.—Schooner David A. Wells ashore at Sheboygan.
Schooner Golden Fleece reached Chicago minus her fore-gaff.
Two dredge-scows beached at Grand Haven.
Schooner Mary Elizabeth lost a boom on Lake Erie.
Schooner Josephine sprung a leak and sunk at Buffalo.
Bark J. S. Austin ran ashore at Leland, Mich., and became a total wreck.
Schooner Antaunto ashore in a badly damaged condition at Leland, Mich.
Tug Vulcan lost a raft of 2,000,000 feet of pine timber on Lake Erie.
Scow, name unknown, ran ashore and went to pieces at Point au Pellee.
Sloop Jewell wrecked at Escanaba.
Propeller Winona broke her valve-stem on Lake Huron.
Barge Pittsburg grounded at Algonac.
Schooner Wells Burt lost her mainboom on Lake Erie.
Schooner J. F. Card badly damaged by a gale on Lake Superior.
Schooner Annie Vought damaged by a gale on Lake Michigan.
Scow W. B. Sloan damaged by collision with propeller Montauk.
Scow Ida H. Bloom reached Milwaukee minus her stay-sail.
Schooner Michigan lost her mainboom on Lake Erie.
Schooner Ardent arrived at Milwaukee minus a portion of her deck-load of lumber.

7.—Schooner Breden wet 200 bushels of wheat; schooner Acorn, 400 bushels; schooner Montauk, 546 bushels; schooner Czar, 60 bushels; and schooner Mary Elizabeth a large portion of her cargo, in a gale on Lake Erie.
Schooner Gibson lost her jib-boom at Buffalo.
Schooner Princess Alexandria sunk while moored at Waterville, above Windsor.
9.—Schooner A. B. Moor returned to Buffalo leaking.
Scow Ella Doak went ashore on the rocks at Death's Door, Lake Michigan, and soon became a total wreck.
Scow Alaska badly damaged by striking a pier at Racine.
Schooner Walhalla damaged by striking a pier at Kewaunee.
Joseph Woods, cook on steam-barge Burlington, drowned at Sandusky.
Barge Eldorado damaged by collision with a bridge at Chicago.
Schooners Narragansett and P. Hayden damaged by collision at Chicago.
10.—Schooner Guido lost her mainsail on Lake Michigan.
Schooner Guiding Star and Propeller Scotia damaged by collision at Chicago.
Propeller Missouri sprung an arch in a heavy sea on Lake Michigan.
Steamer Northwest damaged her rudder on Lake Erie.
Schooner H. B. Buger had her rigging damaged by a gale on Lake Michigan.
Scow Menomonee ashore on Oconto Bar, Green Bay.
11.—Schooner Imperial ashore in Rowley's Bay, near Death's Door, Lake Michigan.
Scow Black Hawk ashore near Stony Creek, Michigan.
Scow Uncle Sam struck on Point aux Barques, Lake Huron.
Schooner C. I. King damaged by collision with a bridge at Chicago.
Propeller Philadelphia ran ashore near Sleeping Bear, Lake Michigan.
Tug Forest City lost her stern-post at Cleveland.
Schooner C. I. Roeder damaged by collision with the steam canal-boat Traveler.
Steamer Algerian struck on Split Rock Rapids, near Montreal, and sunk.
Steamer Acorn passed Detroit with her bulwarks badly damaged.
Schooners H. C. Richards and Jessie Hoyt collided near Beaver Light, Lake Michigan; both vessels damaged their hulls and lost all their rigging.
Steamer damaged by collision with a bridge at Manistee, Mich.
12.—Schooner Emeline arrived at Chicago leaking.
Schooner Whirlwind had her bows stove in by collision with canal-boat Two Nellies at Chicago.
Tug Crowell broke her wheel at Buffalo.
13.—Schooner C. A. King arrived at Chicago leaking.
Schooner Barbarian arrived at Milwaukee leaking badly.
Steamship Mary Jerecki disabled in her machinery on Lake Superior.
14.—Steam-barge Two Nellies, tugs Crawford and Willie Brown, and propeller Nevada damaged by collision in the river at Chicago.
Schooner Algerine arrived at Erie, leaking.
Scow, name unknown, sunk in a squall on Lake Erie.
Steam-barge Saxon blew her cylinder-head off near Wassassaga Point, Bay of Quinte.
15.—James Hanson, sailor on schooner Saveland, struck by the mainboom and severely injured, at Port Huron; died from his injuries.
16.—Steamer Rothsay Castle struck a snag and sunk in Toronto Harbor.
Tug Crusader disabled in her machinery on Lake Michigan; damage, $1,000.
Schooner B. F. Bruce arrived at Chicago minus her jib-boom.
17.—Schooner Ardent damaged in her hull by collision with tug Maxon in Milwaukee Bay.
Steamer Hattie Smallman damaged by striking a snag in the river at Grand Haven.
Steam-scow Omaha sunk at Green Bay.
18.—Schooner Gesine damaged by collision with railroad-bridge in the river at Milwaukee; damage, $200.
Schooner Newcastle ashore at False Ducks.
Schooners Ithaca and Metropolis arrived at Chicago leaking.
Schooner Live Oak lost her mainsail off Chicago.
Schooner Mariner struck a rock near Centerville, Lake Michigan.
19.—Schooner C. C. Barrels and Julia B. Merrell damaged by collsion at Chicago.
20.—Steam-barge Potter ran into the schooner St. Peter, damaging her badly.
Steam-barge Mills arrived at Port Huron with a loose wheel.
22.—Schooner Belle McPhee aground in the river at Port Huron.
Schooner Morning Star passed Port Huron minus her mizzenmast.
Schooner W. H. Hawkins damaged by collision with a pier on east shore Lake Michigan.
Schooner Royal Oak dismasted by a gale near Burlington Bay.
23.—Propeller Scotia arrived at Chicago with a broken wheel.
Steam-barge Trader and tow grounded on Stag Island, Detroit River.
Scow May Breeze lost her head-gear by a collision with a canal-boat at Cleveland.

24.—Schooner Mayflower sunk off Kelly's Island, Lake Erie.
Schooner Active arrived at Kenosha leaking.
Steamer City of Toronto broke her crank near Niagara.
25.—Schooner Mont Blanc damaged by a gale on Lake Ontario.
Barge Contest damaged by a collision at Chicago.
Schooner Rob Roy arrived at Grand Haven minus her foremast.
26.—Steamer Manitoba ran into the propeller Comet and sunk her off Whitefish Point, Lake Superior. Two lives lost; value of Comet, $25,000.
Barge Lillie May damaged by being crowded ashore by a raft at Port Huron.
Schooners Annie Laurie and Clara Parker damaged by collision at Chicago.
Steamer Phoche broke her shaft in the river at Grand Haven.
Schooner H. Rand lost her fore gaff in Lake Michigan.
27.—Steamship Persian burned near Long Point, Lake Erie; loss, $25,000.
Schooner W. B. Phelps aground in Detroit River.
Tug River Queen blew out a joint near Saint Clair, Michigan.
Ferry-boat Sarnia damaged by collision with a scow at Port Huron.
Schooner Jason Park damaged by collision with the propeller Waverly at Chicago.
Schooners S. L. Watson, Turner, and Keller damaged by a collision near Presque Island, Lake Huron.
Daniel McCormick, sailor on schooner Empire State, fell overboard in Saint Clair River and was drowned.
28.—Schooners Racine and Emma A. Mays damaged by collision at Chicago.
Schooners Montauk and W. H. Hawkins damaged by collision at Chicago.
Schooner Montauk badly damaged by collision with a tug at Chicago.
29.—Barge Two Nellies and brig Essex damaged by collision at Chicago.
Propeller Antelope at Charity Islands with her machinery disabled.
Schooners Grace Murray and A. Rust damaged by collision at Chicago.
Steamer Carrie H. Blood badly damaged by collision with propeller Benton at Marine City.
30.—Scow Jennie Lind ashore at Cedar point near Sandusky.
Schooner Saginaw ashore at Death's Door, Lake Michigan.
Scow M. Wilcox damaged by collision with scow Mary and Lucy at Port Huron.
Schooner Golden West damaged by collision with Grand Trunk dock at Port Huron.
Albert Johnson, sailor on schooner Sumatra, fell overboard and was drowned at Erie.
Scow Maple Leaf arrived at Milwaukee leaking badly.
31.—Schooners Stockbridge and Helvetia damaged by collision at Chicago.
Schooner Saginaw ran ashore on Sand Point, Lake Michigan.
Thomas McDonald, a lake captain, drowned off the schooner Knight Templar in the Welland Canal.
William Graham, a sailor on schooner David A. Wells, fell overboard and was drowned at Milwaukee.

SEPTEMBER, 1875.

1.—Scow Maple Leaf arrived at Milwaukee leaking.
William Le Force, captain schooner Smater, fell overboard in Detroit River and was drowned.
2.—Tug Union damaged by collision at Chicago.
Schooner D. B. Martin arrived at Chicago leaking.
Schooner Mary Nau lost her foremast by collision with a bridge at Chicago.
Schooner J. D. Samer severely damaged by being run into by the propeller Asia in the Saint Clair River.
Schooner C. H. Johnson ran ashore on Green Island Shoal, Straits of Mackinaw.
3.—Schooner H. D. Root lost her two jibs, the George Worthington lost her foresail and all her jibs in a squall on Lake Huron, and the Ottawa lost her foresail and all her jibs.
Propeller Annie L. Craig ran into and sunk the schooner Ottawa near Port Huron.
Steam-scow Josephine broke both her wheels at Milwaukee.
Bark Peshtigo lost her foretop-mast, topsail, and mainsail in a squall on Lake Huron.
4.—Barge Globe sprung a leak and waterlogged near Dunkirk, Lake Erie.
Schooner Moonlight lost her jib-boom and head-gear on Lake Huron.
Schooner Honest John damaged by collision with a tug at Chicago.
Schooner City of Chicago damaged to the amount of $3,500 by a squall on Lake Erie.
Tug U. S. Grant burned near the mouth of the Fox River, Lake Michigan. Loss, $8,000. Three of the crew were injured.

5.—Propellor Commodore ran into a bridge at Milwaukee.
Scow Cobb damaged by striking a lumber-pile at Chicago.
Schooners J. C. Cooper and Colonel Ellsworth lost each a portion of their rigging on Lake Michigan.
Steam-barge Fred Kelly broke her piston-rod and cylinder-head on Lake Superior.
Schooner I. L. Gilmore damaged by collision with a yacht at Cleveland.
Steam-barge McGregor ran aground at Cleveland.
6.—Schooner Melvin S. Bacon passed Port Huron minus her jib-boom.
Steamer Winslow broke her wheel on Lake Superior.
Schooner Homer stripped of her canvas in a squall on Lake Michigan.
6.—Schooner Charles Luling fouled with schooner H. A. Kent and had her maintop-mast broken.
7.—The scow Rowena collided with the scow Felicitous near Chicago and lost her main-mast.
8.—Steamer Saginaw broke her wheel on Lake Michigan. Schooner Pandora damaged by collision with the steamer Great Western at Detroit.
Tug Dobbins had her smoke-stack and pilot-house carried away by collision with a schooner in the Sault River.
Schooner Tom Martin lost her jib-boom and head-gear at Detroit.
9.—Ella Jackson, cook on the tug Ontario, fell overboard at Port Huron and was drowned.
Schooner A. C. Keating lost her rudder and a portion of her canvas in a gale on Lake Michigan.
Three yachts sunk at Chicago during a gale.
Tug Annie Dobbins disabled on Lake Huron.
Scow E. F. Grain driven against the breakwater at Chicago and sunk.
Schooners Hegg and Baldwin broke from their moorings at Kenosha, the latter being a good deal damaged before they could be secured.
10.—Bark Tanner completely wrecked in a gale at Milwaukee and her captain drowned.
Schooner John Dunn went ashore at Chicago and became a total wreck. Loss, $22,000.
Scow M. J. Gaines went ashore near Chicago and became a total wreck. Loss, $7,000.
Schooner L. G. Farewell sunk in the rapids at Port Huron.
Barge Dreadnought sunk in Saint Clair River.
Barges Sophia Smith, E. P. Sheldon, E. S. Gould, and Merrimac in tow of the tug Mayflower water-logged and went ashore at Port Austin, Lake Huron.
Schooner Selkirk lost all her masts and rigging during the gale on Lake Huron.
Schooner Onondaga driven on the sunken cribs of north pier, Chicago, and became a total wreck. Loss, $20,000.
Bark City of Toledo sprung a leak on Lake Huron and was beached near the harbor of refuge.
Scow Baltic driven ashore near Holland, Michigan.
Steamers Alpena and Flora damaged by gale on Lake Michigan.
Schooner H. N. Perry driven ashore at Chicago.
Schooner J. S. Hill driven ashore at Big Sodus Bluffs, Lake Ontario.
Propeller Mendota sunk on Lake Michigan, and thirteen persons lost.
Schooner Evening Star sunk on Lake Michigan.
Steam-barge Equinox foundered and sunk on Lake Michigan, and twenty-five lives lost.
Bark City of Buffalo sunk at the Harbor of Refuge, Lake Huron.
Schooner Monitor lost her masts and steering-gear on Lake Erie; brought into Cleveland, leaking badly.
Scow Dunham ashore near Calumet, Lake Michigan.
Schooner Gifford had to have her bulwarks cut away to free her decks from water, on Lake Huron.
Brig J. M. Hill collided with schooner James D. Sawyer, off Grosse Point, and lost her bowsprit and jib-boom.
1.—Schooner Major Thos. W. Perry ashore at Milwaukee.
Scow Thos. Richards ashore near Sand Beach, Lake Huron.
Barge Jessie Linn and schooner Jessie Philips damaged by collision at Chicago.
Schooner A. Rust lost her masts and rigging during a gale off Chicago.
Schooner Grace Murray ashore on South Manitou Island.
Barge C. L. Young lost two anchors off Cleveland.
Barge C. G. Lestor lost an anchor and cable at Cleveland.
Schooner H. D. Moore lost an anchor at Calumet, Michigan.
Tug Dudley damaged by fire at Marquette.
Joseph Johns, sailor on schooner M. J. Wilcox, drowned at Port Colborne.
Schooner Montana arrived at Cleveland with her rigging damaged and her fore-boom broken.

12.—Barge St. Clair ashore at Fairport.
Bark Elizabeth Jones arrived at Buffalo with 500 bushels of her grain-cargo wet.
Brig Roscius and schooners Harvest Queen and John Wehn damaged by collision in Detroit River.
Barge William Burns water-logged on Lake Michigan.
Schooner Sexton, wheat-laden, arrived at Buffalo leaking badly.
Steam-barge Orontes collided with schooner Pierrepoint and carried away her jib-boom and head-gear.
Schooner Oak Leaf went ashore in a fog near Sandusky, Lake Erie.
Tug Bismarck broke her steam-pipe on Lake Michigan.
13.—Schooner G. D. Morris ashore at Good Harbor, Lake Michigan, with main-mast gone and leaking badly.
Schooner Gem ashore near Grosse Point.
Tug Alert collided with schooner Adriatic, carrying away her stern, at Chicago.
Bark Archie ashore near Sarnia.
Steamer Flora broke her shaft outside of Milwaukee.
15.—Schooner Niagara ashore at Northport, Grand Traverse Bay.
Steam-barge East Saginaw arrived at Saint Clair, disabled in her machinery.
Canal-boat Ontario severely damaged by collision with steam-barge Ohio at Chicago.
Scow J. M. Hill and schooner Lake Forrest damaged by collision at Chicago.
Scow Humming-Bird ran ashore at Port Hope.
16.—Schooner Richards damaged by collision with a bridge at Green Bay during a gale.
Schooner Joseph Page lost her jib on Lake Michigan.
Barge Harmony driven on the pier at Chicago and totally wrecked; loss, $10,000.
Schooner L. B. Coates had her center-board broken; the Sturges her fore-sail split; the Reciprocity her rudder broken and fore-sail split; and the Tricolor sprung a leak and lost her small-boat during a gale on Lake Michigan.
17.—Schooner Sweden ashore on Point au Pellee Island.
Schooner Gallatin arrived at Milwaukee, leaking badly.
Schooner H. Fitzhugh and scow D. R. Owen arrived at Milwaukee in leaky condition.
Schooners N. Anderson, Ada Medora, and Knight Templar damaged by collision at Chicago.
Schooner John Hibbard lost her bowsprit, jib-boom, and fore-topmast by striking the pier while entering the harbor at Chicago.
Schooner William Young lost her foretop-mast and sprung her foremast on Lake Michigan.
Propeller Ballintine and schooner H. W. Sage ran aground at Saint Clair Flats.
Schooners Jennie Mathews and Bertie Calkins damaged by collision at Chicago.
Schooners Waliska and Riverside had their rigging badly damaged by a gale on Lake Michigan.
Schooners Hoboken and Queen of the West had their rigging damaged by a gale on Lake Michigan.
18.—Schooner Watertown lost her jib-boom, the propeller Milwaukee shifted her boiler, and schooner Great Western lost 5,000 feet of lumber in a squall on Lake Ontario.
Bark City of Buffalo sunk at Sand Beach; loss, $12,000. Propeller Hurd ran aground in the Sault Saint Marie River.
19.—Propeller Manistee had 400 barrels of flour damaged by a gale on Lake Superior.
Schooner Lotus lost her center-board near the Manitous. Tug L. P. Smith damaged by collision with schooner Willie Piddington, of Cleveland.
Scow Sutler Girl lost both her anchors and went ashore near Port Stanley.
Propeller Ohio went ashore at Two Rivers.
20.—Schooner Czar wrecked on False Presque Isle, Lake Huron; loss, $12,500.
Schooner Kate Darley ashore in the Sault River.
Schooner Harry Bissel arrived at Manitowoc with nearly all her rigging gone.
Schooner Hoboken arrived at Milwaukee with her fore-gaff broken.
Schooner Havana arrived at Racine minus her jib-boom and two jibs.
Scow Harriet Annie lost her deck-load and staysail in a gale on Lake Michigan.
Schooner William Jones lost the greater portion of her canvas in a gale on Lake Huron; loss, $1,000.
Brig Roscius arrived at Chicago leaking badly and minus a portion of her deck-load of lumber.
Schooner Prince Edward damaged by colliding with a pier at Port Stanley
21.—Propeller Scotia ashore at Presque Harbor.
Barge N. T. Goodell ashore on Sand Beach, Harbor of Refuge.
Scow Coaster beached near Grand Haven during a gale.
Schooner China lost her mainsail on Lake Huron.

21.—Propeller Cormorant disabled in her machinery on Lake Huron.
Scow Sea Star sprung a leak and lost her deck-load in a gale on Lake Michigan.
Schooner O. Shaw lost her jib-boom by collision with schooner H. A. Richmond at Port Huron.
22.—Schooner Trader, stone-laden, ashore near Grand Haven.
Bark Jennie Graham went ashore during a storm in Georgian Bay.
Steam-barge Pundiville ran ashore on Racine Reef, Lake Michigan.
Schooner Hannah Perry damaged by collision with canal-boat at Chicago.
Schooner Marion Egan sunk by collision with schooner E. R. Williams in Thunder Bay. The captain's son and a seaman of the Eagan were drowned.
24.—Schooner Pilgrim lost a portion of her deck-load in a squall on Lake Michigan.
Ferry-steamer Detroit burned at Detroit; loss, $20,000.
25.—Schooner Harriet Ross went ashore during a gale at Ashtabula Harbor.
Schooner Mary Booth arrived at Milwaukee leaking badly.
Propeller Japan and schooner Rush severely damaged by collision on Lake Saint Clair.
26.—Schooner Mary E. Perew lost her yawl and had her main gaff broken in a gale on Lake Erie.
Schooner Dakotah ran into schooner Monjuajon in Saint Clair River, and damaged her to the amount of $400.
Schooner Luzerne collided with a canal-boat at Chicago, and was badly damaged.
Schooner Emma sprang a leak and sank; Towas Bay, Lake Huron.
27.—Schooners John O'Neil and John Breden and tug Tonam aground on Elk Island, Saint Clair River.
Schooner Alva Bradley had her squaresail-yard broken in a gale on Lake Michigan.
Schooner P. S. Marsh ran on the breakwater at Buffalo.
Schooner M. J. Merrick lost her bowsprit, jib-boom, and head-gear by colliding with propeller Roanoke off Little Point, Lake Erie.
Steam-barge Tecumseh ran aground at Port Colborne.
Schooner Kate Kelly ran ashore at Oswego.
28.—Schooner Fulton arrived at Kingston with her cargo of corn damaged.
Bark Nelson and schooner Alice B. Norris arrived in Milwaukee with their rigging badly damaged from the effect of a gale on Lake Huron.
Schooners A. G. Money and Hamlet injured by a collision at Chicago.
Steam-barge Graves considerably damaged by collision with schooner Charles Hinckley, at Chicago.
29.—Propeller Newburgh broke cylinder on Lake Michigan.
Scow American Champion sank near the north shore of Lake Erie.
Schooners Falcon and G. Barber ran ashore at Holland, Michigan.
Schooner Tempest lost her mizzen-mast off Ludington.
Schooner Sweepstakes lost her jib-boom and bowsprit by collision with propeller Annie L. Craig, at Cleveland.
30.—Schooner S. L. Watson arrived at Buffalo with cargo of 43,000 bushels of wheat wet through.
Propeller H. C. Schnoor and barges Charles Cash and Hanaford ashore on Long Point.
John Carroll, sailor on schooner T. R. Merritt, knocked overboard and drowned at Cleveland.
Schooner Garibaldi went ashore off Lighthouse Point, Toronto.

OCTOBER, 1875.

1.—Schooner Clara Youell ashore at Limekiln Crossings.
Steam-barge Abercorn lost her cabins by fire at Marine City; loss, $1,000.
Schooner John Schett damaged by collision with barge Argonaut at Chicago.
2.—Schooner Peerless ashore at Nine-mile Point, Lake Ontario; all hands but mate lost.
Schooner James Couch arrived at Detroit, leaking.
Schooner N. M. Blake sprang a leak on Lake Erie.
Steam-barge Concord and barges Shiwassi and Banner ashore at Bar Point.
Barges Rio Grande and Dakotah aground at entrance to Detroit River.
Schooner Belle Sheridan arrived at Oswego with foresail gone and leaking badly.
Schooner Madona ran ashore at South Manitou.
Barge Warner ran on the rocks at Nebish Rapids, Sault Ste. Marie River.
3.—Schooners Rival and Frank Perew damaged by collision in Detroit River.
Schooner Tempest lost her mizzen-mast in a gale on Lake Michigan.
Brig N. M. Standart damaged by gale on Lake Huron.
Schooner W. H. Willard beached at Grand Haven.
Schooner Boag had her jib-boom carried away by a collision with the Buena Vista, at Turner's Pier, Lake Michigan.

3.—Schooner Lavina driven ashore at Ludington.
Schooner Sandy Morrison damaged by collision at Milwaukee.
Charles Decator washed overboard at Grand Haven and drowned.
Schooner Clara damaged by collision with bridge at Chicago.
4.—Schooner St. Andrews sank near Port Colborne.
Robert Miller, captain of fishing-boat, drowned off Saint Joseph by boat capsizing.
Schooner J. B. Wilber went ashore at Escanaba in a snow-storm.
Schooner B. F. Bruce lost her jib-boom outside Milwaukee Bay.
Schooner Champion driven into Milwaukee Bay with her rigging damaged.
5.—Schooner Maid of the Mist arrived at Detroit minus her foresail, staysail, jib, and deck-load.
Schooner John Weber sprang a leak and sank at Escanaba.
Schooner J. W. Adams struck a snag in Lake Saint Clair and sprang a leak.
Scow Asa Childs beached and sunk at Port Hope.
6.—Schooner Jennie Mullen ashore in Little Sturgeon Bay.
Tug Robert Tarrant damaged by fire at Chicago.
Schooner Fisher arrived at Chicago in a water-logged condition, and minus a portion of her deck-load, (lumber.)
Schooner P. Hayden damaged by running into a pier at Holland, Michigan.
7.—Schooner Cossack broke her rudderpost at Oswego.
Brig Mary Buttle and barge Shiwassa ashore at Au Sable, Lake Michigan.
Propeller Merchant struck on Racine Reef and sank.
Schooner L. B. Shepherd lost her jib-boom by collision with a bridge at Milwaukee.
Schooner Woodstock damaged by collision with schooner Moore at Chicago.
8.—Schooner Typo arrived at Milwaukee minus her squaresail-yard.
Schooner John B. Noyes lost her bowsprit and jib-boom in Saginaw Bay.
Schooner Japan damaged by collision with a bridge at Chicago.
Propeller Portage aground at Peche Island.
Schooner John Ralston lost both her fore and main booms on Lake Erie.
Schooner Halstead damaged to the amount of $2,000 by collision with schooner J. M. Scott in the Straits of Mackinaw.
Propellers R. W. Standly and Bristol burned to the water's edge at Hamilton, Ontario; loss, $30,000. The propeller Leland was damaged at the same time to the amount of $1,000.
9.—Scow Palmer ashore at Marblehead.
Tug Bismarck and schooner Queen of the West damaged by collision at Chicago.
Schooner General Sigel arrived at Chicago leaking badly.
10.—Schooner Eclipse arrived at Chicago leaking.
Schooner Wm. Grundy returned to Chicago with her canvas damaged.
Henry Glass, mate of propeller Commodore, severely injured by falling into the hold.
Bark Nelson put into Port Huron with her topsail-yard broken.
Schooner J. J. Hill ran ashore at the entrance to the Niagara River.
Schooner Gorman ran ashore at Marblehead.
11.—Schooner Laura arrived at Milwaukee leaking badly.
Schooner Zach. Chandler lost the greater portion of her canvas during a squall on Lake Huron.
Schooners Little Belle, Ostrich, and Dayspring, and scow Success damaged by collision in Chicago River.
Schooner Mary Copley damaged by striking a wreck at Bar Point.
Schooner Ketchum broke her center-board at Chicago.
12.—Schooner Pathfinder arrived at Chicago with her jibs torn.
Steam-barge Jas. Davidson lost her foretopmast by collision at Chicago.
Schooner Michigan lost her bobstays by collision with a bridge at Cleveland.
Barge City of Grand Haven water-logged off Racine, Lake Michigan.
Schooner C. Harrison ran ashore at Whitehall.
13.—Tug E. H. Miller exploded her boiler in Thunder Bay, Lake Huron.
14.—Canal schooner P. B. Locke ashore at Ashtabula.
Schooner R. B. King ran ashore at Whitewater, Mich.
Tug Crusader broke her wheel at Chicago.
Steam-barge Ballintine grounded in the river at Chicago.
Schooner St. Lawrence broke her main-gaff, off Au Sable.
15.—Tug Miller damaged by collision with steamship Chauncey Hurlburt at Chicago.
Schooner Itaska ran ashore at Duncan Light.
Schooner R. P. Mason damaged by collision with schooner Lincoln Dall at White Lake Harbor.
Schooner Frank Crawford arrived at Chicago minus her jib-boom.
Schooner Narragansett damaged by collision at Chicago.
John Leonard, sailor on schooner Levi Grant, fell overboard and was drowned in Lake Michigan.
Schooner J. E. Gilmore ran ashore on Belle Island.

16.—Bark Crossthwaite ashore at North Bay, leaking badly.
Tug Macon unshipped her rudder and broke her wheel at Milwaukee.
Schooner Malvina severely damaged by collision with a pier at Chicago.
Steamer Marine City damaged by a gale off Sturgeon Point.
Schooner Prince Edward lost her foremast and topmast on Lake Erie.
Schooner Richmond sprang a leak and sank in a squall on Lake Ontario.
17.—Schooner Twilight ran ashore on Fighting Island, Detroit River.
Schooner Jennie Mullan beached at Sturgeon Bay.
Schooners Golden Fleece and King Sisters had their rigging badly damaged by a gale on Lake Huron.
Schooner Francis Berriman split her mainsail and flying jib, stove in her bulwarks, and lost her small boat on her way from Chicago to Manistee.
Tug Harrison badly damaged by collision with the schooner E. M. Portsch, at Chicago.
18.—Barge Wolverine near Lakeport in a water-logged and dangerous condition.
Schooner Hoboken lost her anchor and thirty fathoms of chain in Sarnia Bay.
Schooner Annie Vought arrived at Erie with some of her canvas split.
Schooner Joseph Devall lost her jib-boom by collision with tug Dick Davis, at Milwaukee.
Schooner Pulaski lost her anchor at Cleveland.
Schooner Frank C. Leighton ran ashore at Detour, Lake Huron.
Steam-barge Annie Laurie ran ashore on Plum Island, Green Bay.
Scow Planet arrived at Manistee in a leaky condition.
19.—Schooner Milan lost her jib-boom by collision with scow Minnie Wing, at Chicago.
Steamer Toledo and schooner Senator Blood damaged by collision at Buffalo.
Steam-barge J. S. Hay ran aground in Detroit River.
Schooner John Jewett lost both her anchors and ran ashore in Detroit River.
20.—Scow Louise storm-driven on the beach at Frankfort; loss, $1,200.
Tug Sarah E. Bryant damaged by fire at Buffalo.
Steamer Keweenaw damaged by collision with schooner Southwest, at Cleveland.
Schooner Canton broke her center-board on Lake Ontario.
22.—Steam-barge Nellie Hampton wrecked at North Point, Port Huron.
Schooner Three Bells damaged by collision with tug Music, at Detroit.
Schooner Francis Palmer lost an anchor at Limekiln Crossing.
Barge Rio Grande broke her rudder on Lake Huron, and became disabled.
23.—Steam-barge C. J. Kirshaw ran aground at Grosse Isle.
Propeller City of Du Luth ran on an island below Marion City.
24.—Schooner Jennie Graham, barley-laden, sank in the Welland Canal at Allanburg.
Schooner John Wesley ran ashore at Alabaster.
Schooner Athenian ran aground in the Saint Clair River.
Propeller Commodore ran aground at Peche Island.
25.—Schooner Queen of the West damaged by running into the harbor-pier at Milwaukee.
Steamer Geo. S. Frost water-logged and capsized on Lake Saint Clair.
Schooner C. A. King ran ashore in the Straits of Mackinaw.
Schooner Saveland struck on a reef at South Manitou Island and lost both her anchors and sprang a leak.
Schooners Peoria, North Cape, and Belle Walbridge damaged by collision at Chicago.
Schooner C. L. Johnson lost her jib-boom, and schooner Julia B. Merrill lost her main-boom, by collision at Chicago.
Schooner Alvin Bronson driven ashore near Cedar River, Green Bay.
26.—Schooner E. M. Davidson damaged by collision with barge Fannie Gardner, at Milwaukee.
Schooner Oscar beached at Grand Haven.
Schooner Kingfisher had her mizzen-sail blown away at Milwaukee.
Schooner Elva arrived at Grand Haven in a water-logged condition.
Ferry-boat Sea Gulf damaged by collision with schooner China, at Sarnia.
Schooner Mears lost her mizzen-mast at the Manitous.
Schooner W. F. Allen wrecked near Sheboygan; loss, $36,000.
Propeller Cuyboga bent her rudder-post, at Milwaukee.
Tug Griffin capsized and sank in Mud Lake.
Schooner Whirlwind lost her foretop-mast and steamer Florence her jib-boom, at Chicago.
Brig Commerce lost her main-rigging by collision, at Chicago.
Schooner Madura split the fore-sail of brig Sodus.
Schooner Emen ran ashore on Stowe Island, near Sandusky.
Schooner Kate driven ashore at Grimsby, Ontario.
Schooner Florence arrived at Chicago minus her jib-boom.
Schooner Watson and steamer Col. Campbell ran ashore at Bailey's Harbor.

26.—Schooner Sea-Bird beached at Horn's pier.
Schooner Lasalle ran ashore near Two Rivers.
Barge Abigail arrived at Grand Haven in a water-logged condition.
Tobias Thian, mate of schooner Stampede, drowned off Long Point, Lake Ontario.
Propeller City, of Owen's Sound, damaged by gale on Lake Michigan.
Schooner Minnie Williams and a crew of eight persons lost in a gale on Lake Michigan.
Schooner Great Western struck the harbor-pier and sank, at Port Hope.

27.—Schooner E. F. Judd ran ashore on reefs at Point aux Barques.
Schooner Sylvester Nelson ran ashore at Point au Pellee.
Schooner P. J. Cleveland sprang a leak and lost all her canvas, in the Straits of Mackinaw.
Schooners Minerva and Mary Nan damaged by collision at Chicago.
Schooner Zac. Chandler arrived at Port Huron with mainsail split.
Schooner St. Lawrence arrived at Port Huron with two jibs gone.
Propeller Phil. Sheridan at Sand Point, Lake Superior, in a snow-storm.
Scow Granger ashore at South Haven, Lake Michigan.
Scow Seabird, schooners Beloit and Whirlwind, and tug Burton injured by collision at Chicago.
Steam-barge Enterprise damaged to the extent of $900 on Lake Huron.
Schooner Erie Belle ran ashore at Port Colborne.
Schooner J. O. Thayer lost her jib-boom by collision with propeller Scotia at Malden.

28.—Schooner Golden Rule, of Kewaunee, in a disabled condition.
Propeller Elmira foundered near Long Point, Lake Ontario.
Schooner Danforth dismasted in Mackinaw Straits.
Schooner C. H. Hackley had her canvass blown away coming into Chicago.

29.—Schooner Montana ashore on South Manitou.
Schooners James Wade, Blazing Star, and New Dominion ashore at Point au Pellee.
Schooner Young America ran ashore and sank at Dunkirk.
Propeller Toledo ran ashore at Fish Creek, Lake Michigan.
Schooner Ontario lost her foresail and two jibs on Lake Michigan.
Schooner Delos DeWolf ran ashore at Long Point.
Tug Sill had her forecastle stove in by a gale on Lake Erie.
Tug Cromwell damaged by a gale on Lake Erie.
Steam-barge W. H. Barnum lost her mainmast in a gale on Lake Huron.
Schooner Three Friends sprang a leak and sank in Lake Ontario.
Tug Swan destroyed by fire near Saginaw; loss $2,700.
Scow Sea Bird lost on Lake Erie.
Schooner Forest Queen driven ashore near Oswego.
Schooner Wollen ran ashore at Black Lake.

30.—Schooner Thistle, wheat-laden, ran ashore in Beaver Harbor.
Steam-barge Havana arrived at Port Huron leaking.
Schooner Z. C. Simmons arrived at Chicago minus a portion of her deck-load of lumber.
Schooner Typo arrived at Milwaukee damaged in her rigging.
Schooner Gem, lumber-laden, beached near Saint Joseph, Mich.
Schooner Hubbard went ashore near Muskegon and became a total wreck; loss $10,000.
Schooner David Andrews driven ashore near Mill Point, Bay of Quinte, during a gale.
Schooner R. J. Gibbs lost her anchor at Point au Pellee during a gale.
Schooner Vision ran ashore at Salmon River.
Schooner D. S. Moore had her bowspirt and jib-boom carried away by collision with unknown vessel off Erie.
Bark Mary E. Pereno broke her main-boom off Milwaukee.
Schooner Cape Horn ran back to Buffalo with her foresail split.
Propeller City of Concord ran aground at Erie.
Schooner Ashtabula lost part of her deck-load, split her jibs, and sprang a leak on Lake Michigan.
Bark Baldwin broke her fore-boom, and schooners Annie Vought, J. G. Masten, Maria Martin, and J. B. Newland lost portions of their canvas on Lake Michigan.

31.—Schooner Gibson went ashore in a gale near Port Colborne.
Schooner A. P. Rice lost her mizzen-mast at Chicago.
Schooner F. W. Gifford lost her bulwarks in a gale on Lake Michigan.
Schooner P. S. lost her jib-boom in a gale on Lake Huron.
Schooner Corsican ran upon the rocks at South Bay Point, Lake Ontario, and sank.
Schooner Queen City, corn-laden, ran ashore and sank at Wangoshance Point; loss, $35,000.

NOVEMBER, 1875.

1.—Schooner Kate ashore at Grimsby, Ontario.
Barge Venice seriously damaged by collision with a dock at Detroit.
Scow Two Katies and schooner Conquest damaged by collision in Manitowoc Harbor.
Schooner Marengo ashore near Erie, Pa.
Tug Jennie Griffin burned at Welland.
Schooners E. P. Royce and Albatross damaged by collision at Chicago.
2.—Propeller Evergreen City ashore at Port Roman, Lake Erie.
Schooner George Worthington ashore at Saint Helena Island, and a total wreck.
Schooner H. M. Score arrived at Erie minus all her spars.
Steamer Milton D. Ward disabled on Lake Huron.
3.—Schooner Sardinia ashore at South Haven.
Schooner John Jewett ran into and damaged the schooner Republic at Malden.
Schooners Margaret A. Muir and Senator Blood damaged by a collision off Point au Pellee.
Schooner Stafford ran ashore on Pigeon Island, Lake Ontario.
4.—Schooner Blazing Star badly damaged by collision with steamer R. W. Rice in Detroit River.
Tug Swan burned at East Saginaw; loss, $2,700.
Schooners Sunnyside and C. L. Johnson damaged by collision at Chicago.
5.—Schooner Cecelia lost her jib-boom at Chicago by collision with a bridge.
Schooner Milwaukee foundered and sunk in Lake Huron; loss, $12,000.
Schooner Jennibel damaged by striking the pier at Manitowoc.
Schooner William Lewis put into Alpena leaking badly, and minus her big anchor.
6.—Ferry-steamer Clara burned at Detroit; loss, $4,000.
Second mate of schooner John M. Burt drowned in Lake Superior.
Schooner Fearless badly damaged by collision with unknown vessel near Manitowoc.
7.—William Barry, sailor on barge J. H. Rutter, fell overboard and was drowned off Grand River, Ontario.
Tug J. B. Manning and barge Admiral burned at Charlotte.
8.—Tug Little Giant broke her crank-pin at Chicago.
Schooner Conrad Reed and scow Sutler Girl lost on Lake Erie, with all hands. The Reed had on board eight persons and the Sutler Girl four or five.
9.—Frank Heath, cook on tug Charles W. Parker, fell overboard at Chicago and was drowned.
Schooner John S. Kolfage on the rocks in Michael's Bay, Lake Huron, leaking badly.
Tug Louis Dale lost her smoke-stack by running into the schooner Topsy at Chicago.
10.—Canadian schooner Queen of the North ashore at Long Point, Lake Erie.
Schooner Wauconsta water-logged near the Manitous.
Steam-barge Trader disabled by breaking her machinery in Lake Huron.
11.—Bark A. H. Vanderbilt and schooner Sardinia damaged by collision at Chicago.
12.—Barge F. A. George broke her anchor in the river at Chicago.
Schooner Cascade ashore near Detroit River, Lake Erie.
Propeller Dean Richmond aground at Limekiln Crossing; released.
Unknown schooner at anchor off Kewaunee minus her topmasts and rigging.
13.—Schooner Pandora, grain-laden, struck a rock at the entrance to the Welland Canal and damaged 3,000 bushels of her cargo by leakage.
14.—Schooner Vannetta put into Danville in a water-logged condition.
Schooner Olive Branch driven ashore near Eastern Gap, Lake Ontario, and totally wrecked.
15.—Unknown schooner anchored near Kewaunee in a disabled condition.
Schooner Lucerne driven ashore at Cleveland; released in badly damaged condition.
Schooner J. T. Mott ashore at Point au Pellee.
Schooner Mary Foster and two unknown vessels ashore at South Bay Point.
Captain Ferguson, of schooner Fearless, drowned in Lake Erie.
Three sailors on bark Maria Martin washed overboard and drowned off Port Stanley, Lake Erie.
Steam-barge Antelope put into Buffalo in a leaking condition.
Schooner O. M. Bond ran ashore at Chippewa Point, Saint Lawrence River.
16.—Schooner Corsican ashore at Point Moulin, Lake Erie.
Schooner Arundal broke her center-board on Lake Michigan.
Schooner Vannetta sprang a leak and water-logged on Lake Erie.
Schooner Annie Sherwood broke her anchor at False Presque Island, Lake Huron.
Barge C. N. Ryan ran aground at Port Huron.
Schooner Four Brothers ran ashore at Holland Harbor during a fog.

16.—Schooner Potomac lost her foremast off Chicago.
17.—Propeller Empire State aground near Saint Clair Flats.
Propeller Mohawk burned on Lake Ontario. Loss, $35,000.
James Russell, sailor on schooner Summer Cloud, fell overboard at Chicago, and was drowned.
Schooner Rouse Simmonds had her foresail blown away off Manitowoc.
18.—Schooner Penshee ashore on Point Clark.
Barge Parana beached at Grand Haven; released.
Schooner Herald ashore near Grand Haven.
Harry Spark, captain of scow Margaret Dad, drowned off Ludington, Mich.
Scow Owen ashore near Ludington, Mich.
Steam-barge S. S. Ellsworth struck a rock, sprang a leak, and was beached near West Point, Ontario.
Steamer John Egan struck a rock and sank near Pembroke.
19.—Tug Goodnow broke her shaft on Lake Huron.
Schooner A. M. Burs struck the pier at Manistee, Mich., and sank.
20.—Schooner Wancausta water-logged on Georgian Bay.
Schooner Thomas C. Wilson ashore at Saugatuck.
Steam-barge Fred Kelly aground on Grand Island, Lake Superior.
Schooner Sea Gem lost 200,000 shingles overboard, and water-logged in a gale on Lake Michigan.
Schooner Chenango wrecked at Grand Island, Lake Superior, in a gale; total loss.
Scow S. B. Wilson ran ashore at South Haven during a gale.
Schooners Abigail and Nabob ashore at Muskegon.
21.—Barge Genoa, laden with pig-iron, ashore at the Beavers, and in bad shape.
Schooners J. O. Thayer and Provost damaged by collision in Saint Clair River.
Schooner Cornelia B. Windiate lost her jib-boom by collision with schooner San Jacinto on Lake Huron.
Steam-barge Trader ran ashore at Port Huron.
Bark Cavalier lost nearly all her canvas by a blow on Lake Erie.
Schooner C. Worth ran on the beach at Muskegon.
22.—Schooner G. Merriman at Traverse City with her steering-gear gone.
Schooner Jennie ashore and full of water near Sheboygan.
Schooner Lizzie McDonald and propeller Cleveland collided in the river at Milwaukee. Damage slight.
Lighter Gildersleeve with 3,000 bushels of wheat sunk at Kincardine. Total loss.
Steamer Queen City burned on Lake Michigan. Loss $8,000.
Schooner Lake Forest had her mizzen-mast carried away by a collision with the H. W. Sage.
Scow Senator ran ashore at Peche Island.
Schooner B. Windiate damaged by collision with the barge Sandusky at Chicago.
23.—Schooner Bessie Bealt arrived at Chicago with her fore-mast sprung.
Schooners Ira Lawson and Gracie M. Filer arrived at Chicago with center-boards broken.
Schooner U. S. Grant ashore at Pilot Island.
Scow Mary Lydia ashore at Bar Point.
Schooner Wayne ashore at Au Sable, Lake Huron.
Schooner Iroquois ashore at Manistee, Mich.
Schooner Richard Mott struck against a pier at Chicago and lost her jib-boom.
24.—Schooner Twin Sisters in Sturgeon Bay leaking badly.
Brigantine Pamlico collided with the schooner James Couch and lost her boom and head-gear.
25.—Schooner Groton was run into by schooner Lucy I. Clarke at Waugoshance, and damaged so badly that she had to be beached to prevent her sinking.
Canal-steamer Novelty burned at Marseilles, on the Illinois and Michigan Canal.
26.—Schooner Mary L. Higgie ran ashore on Fisherman's reef, Pilot Island.
Albert Edwards, mate of schooner Higgie and Jones, fell overboard and was drowned at Bailey's Harbor.
27.—Bark Two Fannies went ashore in a snow-storm near Kewaunee.
Schooner Davis ashore at Two Creeks, with canvas gone.
Schooner Grenada ashore at Duncan City light; a total loss.
Henry Hillock, a sailor on schooner Active, fell overboard 10 miles off Toronto and was drowned.
28.—Schooner Martin lost her main-top-mast, jibs, and jib-boom in a gale on Lake Michigan.
Schooner Saginaw went ashore at Ashtabula; total loss.
Barge Waureau waterlogged and went ashore at Little Traverse.
Schooner Gold Hunters ashore at Beaver Island.
Schooner D. R. Martin ashore at Muskegon.

28.—Propeller St. Paul arrived at Marquette with her cargo adrift, and badly damaged by breakage.
Schooner L. M. Mason ashore at Michigan City.
Scow Mary Ann Scott ran ashore at Manitowoc, and became a total loss.
29.—Schooner Exile damaged to the amount of $4,000 or $5,000, by fire, at Cleveland.
Schooner Bridgewater ashore at Point Wangoshance.
Propeller Ballentine aground in river at Milwaukee; released.
Schooner Arendel arrived at Milwaukee covered with ice and minus the greater portion of her rigging.
Tug Samson burned at Cleveland; loss $15,000.
Schooner I. M. Wilcox ran ashore at Port Colborne.
Bark T. C. Street ran ashore on Racine Point, Lake Michigan, during a gale; total loss.
Bark Parana water-logged and abandoned on Lake Michigan.
Schooner St. Lawrence ashore at Black River, Lake Huron.
Steamer Minneapolis damaged by striking the pier while entering the harbor at Grand Haven.
Schooner Adra ashore near Point Rowan; released.
Tow-barge Island Queen water-logged on Lake Huron.
30.—Schooner J. G. Jenkins foundered in a gale on Lake Ontario and sank with a crew of nine persons; loss on vessel and cargo $34,000.
Steamer Phil Sheridan burned on Lake Erie; total loss.
Schooner J. R. Benson ran ashore on Sum's Island, Lake Ontario.
Schooners I. M. Hutchinson and Glad Tidings arrived at Chicago with their riggings badly damaged.
Tug Mary McLain burst her boiler and sunk at Chicago.

DECEMBER, 1875.

1.—Schooners Sweetheart, Mary E. Perem, and Francis Palms ashore at Cheboygan, Mich. The Perem is a total loss.
Propeller S. D. Caldwell ashore at Bois Blanc Island, Straits of Mackinaw.
Barge Oliver Cromwell ashore in the straits.
Schooner C. I. Wells at Goodrich in a damaged condition from the effects of a gale on Lake Huron.
Tug Loui Dole broke her wheel at Chicago.
2.—Steamer Mary Ireki and consort ashore on Fox Islands, Lake Michigan.
Brig Roscius frozen in at Saint Helena, and canvas gone.
Schooners Inter-Ocean and Argonaut frozen in at East Saginaw.
Schooner I. M. Forrest ashore at Evanston, Lake Michigan.
4.—Propeller Roanoke aground on Rock Island, Lake Saint Clair.
6.—Schooner Blanche, wheat-laden, ashore at Pultneyville, N. Y.
Schooner Guido Pfisten arrived at Milwaukee with center-board broken.
7.—Barge Lillie May ran on a reef at Marblehead.
Schooner M. R. Warner ran ashore at Fox Island.
9.—Steamer Minnie scuttled and sunk at Grand Haven.
14.—Schooner David A. Wells arrived at Milwaukee in a leaky condition.
17.—Steamer Jamison burned at Grand Rapids; loss, $12,000.

JANUARY, 1876.

No disasters were reported during this month.

FEBRUARY, 1876.

9.—Schooner Wanconna and bark Aquarita injured by collision in Detroit River.
11.—Tug Maria Melvin sunk at Oswego.
Propeller Dapere disabled at Frankfort, Mich., by the breaking of her steam-pipe.
Tug Livingston sunk at Sandwich Point, Detroit River.

MARCH, 1876.

4.—Schooner Harvest Queen sunk at Detroit.
5.—Scow Henry Young sunk at Port Huron.
13.—Tug Caroline disabled in her machinery near Manitoe.
20.—Milwaukee Bay blocked by ice.
24.—Scow Flora water-logged and lost her deck-load in a gale on Lake Michigan.
Steamer City of Sandusky burnt and schooner William Elgin slightly damaged at Port Stanley Loss $50,000.

27.—Tug Willie Richards ran ashore at Manitowoc, in a leaky condition, to prevent sinking.
28.—Scow Blue Bell struck the pier at Kenosha and sank.
Schooner Henry Brand driven against a pier at Chicago during a gale and damaged to the extent of $1,000.
Schooners Newland and Ludington and scow Forest broke from their moorings at Racine and were slightly damaged.
30.—Barge Wolverine ashore near South Haven, Lake Michigan.

APRIL, 1876.

4.—Schooner J. S. Wallace driven ashore and wrecked near Sheboygan.
Scow Home lost her main-top-mast in a gale on Lake Michigan.
5.—Scow Hercules sunk near Kewaunee.
8.—Propeller R. G. Holland became disabled in her machinery and drifted ashore near Woodtie Island.
12.—Schooner Mariner disabled by striking a pier while leaving Kenosha Harbor.
13.—Steamer Saginaw damaged by collision with schooner H. G. Cleveland in river at Milwaukee.
14.—Scow Salma ashore and full of water at Bailey's Harbor.
Tug Tarrant damaged by collision with schooner Perry Hannah at Chicago.
Schooner Live Oak sunk by an ice-shove at Kingston.
15.—Tug Constitution damaged at Chicago by catching a log in her wheel.
Scow Evergreen lost her anchor and was driven ashore at Kelley's Island.
16.—Schooner Yankee Blade sprung a leak at Chicago.
17.—Steamer Herald sank at Port Stanley.
Scow D. R. Owen arrived at Chicago leaking.
Ferry steamers Victoria and Evening Star damaged by collision at Detroit.
18.—Schooner Eclipse ran aground at Waukegan.
Schooner Harriet Ross ran ashore at Middle Sister Island.
Canal-boat Cuba, corn-laden, sprung a leak at Chicago.
19.—Schooner Wm. Shupe ran ashore at North Harbor Reef, Lake Erie.
Steam-barge Morning Star ran ashore at North Bass Island.
20.—Scow Wm. Bates damaged by striking the pier at Port Washington.
Steamer Egyptian ran aground at Saint Clair Flats.
Propeller Winona ran aground near Saint Clair.
Scow Silver Cloud sunk at Horn's Pier, Lake Michigan; raised; damage $500.
21.—Tug S. S. Coe destroyed by fire at Port Austin, Mich.; loss, $3,000.
22.—Scow Charles sunk at Middle Bass Island.
Schooner Denmark sprung a leak at Port Colborne.
23.—Schooner Lucien grounded on Saint Clair Flats and was run into by schooner Goshawk and damaged considerably.
Scow Louisa went ashore in a fog near Lexington and was scuttled.
Schooner L. A. Simpson stove a hole into her bow and damaged her rigging by striking a pier at Milwaukee.
Schooner Wallin sprung her rudder-post by striking a rock at the entrance to Holland Harbor.
24.—Steamer Peerless sunk at Kingston by an ice-jam.
Tug Noton disabled by ice at the entrance to Niagara River.
25.—Steamer Cuyahoga damaged by fire at Chicago.
26.—Captain Owen J. Davis and three sailors drowned by swamping of yawl while trying to land near North Monostique, Mich.
27.—Scow Champion struck a pier at Manistee Harbor and sunk; her cargo of hay and oats a total loss.
Disabled schooner Falcon in tow of tug Ben Drake filled with water and sunk in Chicago Harbor; loss, $6,000.
Schooner Black damaged by collision with a tug at Chicago.
Four fishermen lost in a gale off Michigan City.
William Hayden severely injured by line fouling on wrecking-tug Leviathan.
Propeller Montgomery ran ashore at Graham Shoals, Straits of Mackinaw.
Propeller Bruno badly damaged by fire while lying at Chatham.
Propeller Champlain damaged by ice in the straits.
28.—Steam-barge Edward Kelly ran ashore in the straits, near Cheboygan.
Steam-barge Oscar Townsend ran ashore at Old Mackinaw Point.
Schooner Goshawk ran ashore at Graham Shoals, Straits of Mackinaw.
29.—Schooner Planet, lumber-laden, sprung a leak and was run ashore near harbor-pier, Milwaukee.
Steam-barge Raleigh ran aground in Saint Clair River.
Steam-barge Robertson driven ashore by a gale in Saint Clair Lake.
Schooner Emerald lost her mizzen-mast at Port Colborne.

29.—Schooner Mary Jane lost her jib-boom by collision at Port Colborne.
30.—Schooner Scotia lost her top-sail yard and broke her jib-boom in a gale on Lake Michigan.
Schooner Mary Amanda damaged by collision with Jessie Linn at Chicago.
Schooner George Suffie lost her jib-boom by collision with a lumber-pile at Oswego.
Schooner Potomac sprung a leak and was obliged to put into Chicago for repairs.
Schooner Cecelia damaged by collision with bridge at Chicago.

MAY, 1876.

1.—Steam-barge Henry Ward Beecher sprung aleak and sunk in Spring Lake, Grand Haven, Mich.; raised.
Propeller Argyle damaged by a collision with the propeller Montgomery in the straits.
Tug Mystic damaged while trying to raise a wreck at Middle Bass Island.
2.—Schooners Challenge and Napoleon arrived at Milwaukee in a leaky condition.
Scow Adair aground on Middle Ground, Saint Clair River.
4.—Schooner Wawanosh ran ashore on Sand Point, Lake Huron; released.
Schooner O. M. Bond lost her jib-boom and bowsprit on Lake Erie.
5.—Scow Mermaid ran upon a pile in Grand River, Michigan, and water-logged.
Scow Annie Thorne lost her jib-boom and foremast by a collision off Racine, Lake Michigan.
Steamship Ketchum damaged by collision with a bridge at Chicago.
6.—Propeller Calabria, grain-laden, and schooner Mary Grower sunk near Port Maitland.
7.—Propeller Cuyahoga broke her steam-pipe and sprung aleak on Lake Michigan, and was towed to Chicago by a tug.
Schooner Perokee and tug John Owen badly damaged by a collision in a fog on Lake Huron.
Schooner Belle McFee, wheat-laden, crushed by an ice-shove, and sunk in Lake Huron; loss, $30,000.
8.—Tug Rebel was damaged by collision in the river at Chicago.
Schooner J. V. Jones lost her jib-boom by collision in the river at Chicago.
9.—Schooner Australia struck the pier while entering Muskegon Harbor and sunk; raised.
Schooner Arctic, grain-laden, arrived at Detroit leaking; cargo badly damaged.
10.—Propeller Gordon Campbell and schooner Jane Bell damaged by collision off Thunder Bay Light, Lake Huron.
11.—Schooner Mediterranean cut down by the ice and sunk in Niagara River; raised.
Schooner Joses damaged by collision with tug Van Dalson in the river at Chicago.
12.—Schooner M. W. Jones lost her jib-boom by a collision in the river at Milwaukee.
14.—Schooner Thomas Quagle grounded on Belle Island; released.
Tow-barge Belle Stevens ashore near Put-in-Bay, Lake Erie.
15.—Sloop Rap dragged her anchor and went ashore in a gale near Manitowoc, Lake Michigan.
Schooner Pathfinder, while entering Cleveland Harbor, damaged her side by striking the pier.
Barge Lightning sunk in 30 feet of water at Montreal.
Propeller California and tug Robb damaged by collision on Saint Lawrence River.
Schooner J. Maria Scott lost her jib-boom and had her rigging damaged by a collision with the propeller Scotia in the straits.
16.—Schooner Kate Howard, while entering Grand Haven Harbor, struck the pier and broke her jib-boom, split the cap of her bowsprit, and damaged her head-gear.
Tug Agate capsized off Ontonagon, and two persons (Michael Herbert and William Hela) were drowned.
17.—Schooner Thomas C. Street struck by a squall and capsized near Long Point, Lake Erie; six of the crew drowned.
Bark Sunnyside ashore on Bois Blanc Island; released.
18.—Propeller Georgian ran ashore, in a fog, on Morgan's Point, Lake Erie; released.
19.—Steam-barge Ohio ashore on Peche Island, Saint Clair River; released.
20.—Schooner Isabella Sands badly damaged by a collision with the schooner Daniel E. Bailey off Point au Bees Scies.
Schooners American and Marysburg damaged by collision off Braddock's Point.
Steamer Kincardine aground near Kingston; released.
Steamer Flora broke her rudder at Pent Water.
21.—Schooner Perry Hanna ashore on Plum Island, Death's Door, Lake Michigan.
Schooner Potomac broke her anchor and went ashore at mouth of Little Traverse Harbor; released.
Schooner Franz Sigel lost her jib-boom by being run into by the propeller Vanderbilt at Cleveland.

22.—Scow Minnie Corlette lost her jib-boom by a collision with schooner Alleghany in the river at Milwaukee.
Schooner Clipper City, while entering Chicago Harbor during a gale, struck the pier and lost her fore-mast, jib-boom, bowsprit, and damaged her bows.
Schooner Sarnia damaged by striking the pier while entering Chicago Harbor during a gale.
Tug Burton damaged by shipping a sea in a gale off Chicago.
Schooner Persia had her jib-boom broken in a gale off Chicago.
Scow Supply, while trying to enter Kenosha Harbor during a gale, was driven ashore south of the pier.
Scow Hunter damaged by collision with a bridge at Racine.
The following vessels arrived at Chicago damaged: Bark Jane Bell and schooner Blackhawk leaking; Lyman Davis minus a small boat; steamer Nahant and schooners Great West No. 2 and Two Charlies, portions of deck-loads gone; scow Four Brothers, with rudders unshipped, center-board jammed, and yawl gone, and schooner Ada Medora minus both anchors and main-boom broken; schooners Z. G. Simmonds, Ella Scoville, and C. L. Johnson damaged by collision in Chicago River.
Scow Sea Star, brig Commerce, and schooner Cornelia sprung leaks on Lake Michigan in a gale.
Scow Emily lost her foremast in a gale on Lake Saint Clair.
Schooner Thomas Wilson lost her deck-load in a gale on Lake Michigan.
Schooner Kate Kelly damaged by collision with steam-barge Lothair at Oswego.
23.—Schooner Mocking Bird lost her jib-boom and had her small boat smashed by collision with brig Ketchum at Chicago.
Schooner Zach. Chandler aground in the river near Port Huron.
Schooners Lady Dufferin, Brooklyn, Clara White, and Ben. Franklin damaged by a squall at Kingston.
Schooner Mary Battle ashore at Amherst Island; released.
24.—Schooners Guiding Star and Speedwell severely damaged by collision two miles off Oswego Harbor.
Schooner Thomas Quagle and barge A. C. Keating damaged by collision on Lake Huron.
25.—Schooner Gazelle, lumber-laden, struck the island in Oswego Harbor and sank.
26.—Tug Nellie Cotton lost her rudder, and other damage in the ice at Duluth.
Propeller Sovereign damaged by the ice at Duluth.
27.—Barge Rosabell damaged by collision with the schooner Niagara in the river at Chicago.
Tug A. B. Ward broke her connecting-rod and cylinder-head while towing in the river at Chicago.
29.—Schooner Dawn lost her jib-boom and head-gear by collision with the tug Black Ball at Chicago.
Schooner Grace M. Filer damaged by collision with barge Emma Mayes in Chicago River.
Steam-barge Alice arrived at Cleveland in a disabled condition.
30.—Schooner Dick Somers arrived at Chicago minus her jib-boom.
Tug Charles Nelson sunk in 6 feet of water at Chicago; raised.
Schooner Pulaski damaged by collision with schooner J. J. Case in river at Milwaukee.
31.—Tug O. B. Greene bent her shaft and broke her shoe at Chicago.
Schooner J. A. Holmes damaged by collision with a bridge at Chicago.
Schooners Three Brothers and Thos. Gawns with tug Dudley ashore in Mud Lake; released.
Propeller Annie L. Craig damaged by ice coming out of Marquette Harbor.
Tug Mystic broke her shaft on Lake Superior.

JUNE, 1876.

1.—Schooner Vermont damaged by collision with a bridge at Chicago.
Schooner Grace Whitney broke her rudder by collision with a tug at Saint Clair Flats.
2.—Steamship Minneapolis ran ashore in a fog two miles north of Grand Haven; released.
Bark Nelson lost her jib-boom by collision with schooner J. J. Case, in Straits of Mackinaw.
3.—Steamer Keweenaw damaged by ice at Marquette.
4.—Tug H. P. Clinton badly damaged by striking a pier near mouth of Detroit River.
Propeller Elmira arrived at Detroit in a badly-damaged condition.
Tug Ocondra ran ashore upon the rocks in Port Elgin Harbor.
5.—Schooner Mead ran ashore at Stony Point, Saint Clair Lake.
Tug A. Miller damaged by collision with schooner Dolphin at Chicago.

6.—Tug Alice A. Gitly burned at Muskegon.
Schooner Queen of the West sunk at Chicago.
Propeller City of Fremont damaged by ice at Duluth.
7.—Propeller Montreal ran ashore near Duluth.
Tug Tillinghast damaged by fire to the amount of $5,000 off Erie.
Steam-barge Superior broke her crank off Sand Beach, Lake Huron.
Barge Milwaukee, grain-laden, sunk near Alexandria Bay.
Schooner Albacom ran ashore at Pinconning.
Propeller New York and two barges went ashore on Snake Island, Georgian Bay, during a fog.
Schooner R. J. Skidmore damaged by collision with canal-steamer at Chicago.
8.—Schooner Libbie Nan became water-logged off Menomville.
Propeller Nashua arrived at Duluth with a broken wheel.
Schooner Dane had a hole stove in her port-bow by collision in Chicago River.
Schooner Rouse Simmons lost some of her canvas in a squall off Crosse Point, Lake Michigan.
Schooner Maggie damaged by collision with schooner Oriental near Fighting Island.
Schooner Raleigh damaged by collision at Chicago.
Steam-barge Tempest damaged by collision at Chicago.
10.—Steamer Marine City ran ashore near Presque Island.
Schooner Ella Spry damaged by collision off Chicago.
Captain J. H. Crosby, of Tug Queen, fell overboard in Oconto Bay and was drowned.
11.—Propeller Robert Holland driven ashore at Grindstone City.
Bark Great West sprung a leak and sunk at Chicago.
12.—Steamer Chicago and schooner Leo damaged by collision off Chicago.
13.—Tug May Queen damaged by fire at Oswego to the amount of $1,200.
Captain George Pierce, of steamer Simcoe, fell overboard and was drowned at Gravenhurst.
14.—Tug Urania disabled by getting a snag in her wheel on Lake Huron.
15.—Propeller Winona ran ashore in a fog near Point Sanilac; released.
16.—Schooner Guido ran ashore near Sheboygan in a fog.
Propeller Dean Richmond ran aground in a fog near McGulpin's Point, Straits of Mackinaw.
Schooners Cossack and Victor damaged by collision at Port Colborne.
17.—Scow Gladiator and brig Fashion arrived at Chicago leaking.
Schooner C. C. Barnes dismasted in a squall off North Manitou Island, Straits of Mackinaw.
Schooner Saint Andrews went ashore on South Manitou Island, Straits of Mackinaw.
20.—Tug Alert broke her cylinder-head at Chicago.
22.—Schooner Alpha damaged by collision with schooner Cossack at Port Colborne.
23.—Tug Louisa Dale broke her crank-pin off Chicago.
Scow H. Wilson lost her top-sail yard in a squall in Lake Michigan.
Scow Radical badly damaged by collision with schooner David Vance, during a fog, near Sheboygan, Lake Michigan.
Schooners Lone Star and Ithaca lost some of their canvas in a gale on Lake Michigan.
Scow D. R. Holt and schooner Elizabeth Jones damaged by collision at Chicago.
Schooner Grace Ellen lost her fore-boom in a squall on Lake Michigan.
24.—Tug Bryant ran on Horseshoe Reef, north of Niagara River, during a fog.
25.—Schooner Cynthia Gordon arrived at Milwaukee minus her jib-boom.
Tug Cromwell had her stem broken by collision with schooner G. W. Adams off Buffalo.
27.—Tug Johnson broke her wheel at Chicago.
Schooners Charles Luling and S. Bates damaged by collision at Chicago.
Propeller City of Port Huron and consort ran ashore at Au Sable, Lake Superior.
28.—Schooner Wm. Aldrich ran ashore at Egg Harbor.
29.—Schooner Cuyahoga and steam fishing-smack damaged by collision off Chicago.
30.—Steam-barge Tempest had her stem broken by collision with the propeller Peerless at Chicago.

PAPER 23.

INDIANOLA, TEX., *September* 25, 1875.

To the CHIEF SIGNAL-OFFICER OF THE ARMY:

SIR: I have the honor to submit the following report of the disastrous storm which visited this town and vicinity on the 15th and 16th instant. The weather had been

cloudy during the preceding three days, with easterly to northeasterly winds, and a notable sprinkling of cirro-stratus clouds from the same directions. The first decided indication of a change of weather was noticed on the night of the 14th, when the barometer, which had been about normal, began falling steadily, with brisk northeasterly winds and threatening weather overhead. During the night the wind backed to north, gradually increasing to "high" by daylight of the 15th, the steadily-falling barometer which accompanied it contradicting the otherwise delusive appearance of an ordinary "norther." Soon after noon the wind increased to a "gale," with still rapidly-falling barometer, and by 2 p. m. the indications were so unusually threatening that special hourly observations were begun and continued until 5 p. m. of the 16th, when the increased force in the storm and tide necessitated their discontinuance for prudential reasons. The results of the observations are as follows:

Time.	Barometer.	Thermometer.	Direction.	Velocity.	Weather.
15th.		°			
2 p. m	29.60	84	N. E.	40	Threatening.
3 p. m	29.73	83	N.	36	Do.
4 p. m	29.70	82	N.	40	Do.
5 p. m	29.70	76	N.	38	Light rain.
6 p. m	29.68	76	N.	41	Do.
7 p. m	29.70	75	N.	40	Do.
8 p. m	29.68	75	N. N. E.	48	Do.
9 p. m	29.66	75	N. N. E.	53	Do.
10 p. m	29.63	74	N. N. E.	56	Do.
11 p. m	29.59	74	N. N. E.	58	Do.
12 midnight	29.56	74	N. N. E.	60	Do.
16th.					
1 a. m	29.52	74	N. N. E.	56	Do.
2 a. m	29.46	74	N. N. E.	60	Heavy rain.
3 a. m	29.39	74	N.	66	Light rain.
4 a. m	29.36	74	N. N. E.	68	Heavy rain.
5 a. m	29.35	74	N. E. E.	64	Do.
6 a. m	29.36	74	N. E.	58	Light rain.
7 a. m	29.34	75	N. E.	66	Heavy rain.
8 a. m	29.33	75	N. E.	56	Light rain.
9 a. m	29.31	75	N. E.	64	Do.
10 a. m	29.29	75	N. E.	60	Do.
11 a. m	29.22	75	N. E.	74	Do.
12 a. m	29.17	75	N. E.	72	Do.
1 p. m	29.13	75	N. E.	73	Do.
2 p. m	29.06	75	N. E.	68	Do.
3 p. m	29.01	75	N. E.	72	Heavy rain.
4 p. m	28.95	75	N. E.	76	Do.
5 p. m	28.90	75	N. E.	82	Do.

Fifteen minutes later the cups of the anemometer blew away, registering at the rate of 88 miles per hour. Throughout the night of the 15th the tide rose rapidly, with a high sea running, and by morning of the 16th it was breaking over the beach and rushing in torrents through the streets at righ tangles with the bay. Buildings in proximity to the beach were already undermining, and from this time on the work of devastation spread rapidly. By noon the two long wharves in front of the town were a complete wreck, whole rods of planking and timbers being lifted bodily and dashed into pieces among the buildings along the shore. The streets now presented the appearance of narrow and swift rivers, to cross which boats and quantities of rope were brought into requisition, and even with these the passage was attended with great danger. The prairies in rear of the town, as far as the eye could reach through the blinding rain and spray, were deeply submerged and covered with quantities of rapidly-drifting *débris*. The high grade of the G. W. T. and P. Railroad, which bounds the town on the southwest, was also submerged to such a depth as to make its use hazardous and even impossible as a means of escape from the town. About 2 p. m. a large schooner, the only one which chanced to be anchored off the town, succumbed to the increased force of the wind and drifting ashore, stern first, striking and nearly demolishing the telegraph-office with her boom. Throughout the day parties of men buffeted the strong current, dragging life-boats and skiffs laden with rescued women and children, who were carried to the strongest and most protected buildings. Other parties were as actively engaged in collecting the numerous cotton-bales which at every moment came eddying around the corners, and lashing them together into the most substantial rafts. Two large rafts of this description were secured to the large safes at Messrs. Seeligson & Co. and Messrs. Runge & Co.'s banks, on Main street, as a *dernier ressort*, should these buildings be swept away. As night drew near the storm increased to a hurricane, and the

rain fell, or rather flew, in torrents. Objects could hardly be discerned across the street, and the noise of the wind and surf was deafening. Toward night we observed the signal-office was rapidly undermining, and a party of three, including myself, made an attempt to deflect the current from the last corner of the building by means of planking and other *débris*, but we were obliged to return to the office without accomplishing much, owing to the rapid succession of breakers which continually swept down the street. The 5 p. m. observation, as will be observed by reference to the table of special observations, gave the barometer 28.90 corrected, a fall of .27 in five hours; the temperature remained at 75°, from which it varied but one degree throughout the day, and the wind was still blowing a hurricane from the northeast. The anemometer registered 82 miles per hour, and the rain had increased fourfold. The amount of rain collected (4.19) during the whole storm is believed to be greatly deficient. At fifteen minutes past 5 the anemometer blew away, registering 88 miles per hour. The volume and immense velocity of water pouring through the streets was now truly terrible. As night drew on the work of rescuing was generally abandoned, every one acting on the principle of "*sauve qui peut.*" Small buildings and dwellings were being swept away on all sides, but darkness rendered assistance to the unfortunate inmates impossible. Toward 6 p. m. a large hide and wool warehouse, which stood in rear of this office, fell in with a loud crash, the owner fortunately escaping with his life. The fall of this building, which stood immediately between the signal-office and the bay, uncovered the latter to the full force of the waves, and it immediately became evident that an early evacuation of the building was expedient. Accordingly a party of six or seven persons, who had collected in this office for safety, together with myself and assistant, resolved, if possible, to gain the comparatively secured building of Dr. Lewis, which is obliquely opposite and protected by other buildings, to which it is attached. We immediately set to constructing a raft under the lee of D. Schultz's store, the water in the sidewalk being about breast-deep at that time. We secured a number of cedar piles, which we lashed together and covered with a door. While thus engaged we made the valuable acquisition of a large skiff, which was more manageable and answered our purpose better than the raft. Before leaving Schultz's building we gave all the extra rope we could spare to a party of 30 or 40 negroes who had congregated in the long hall, but were unable to help them further. Most of them left the building forthwith, and succeeded in reaching the banks (which were already crowded) by means of the rope guides which had been established. After the acquisition of the skiff our party crept along under the lee of the buildings until opposite our destination, and succeeded, after considerable difficulty and some hard swimming in effecting a hold on the opposite gallery, which in our drenched condition we climbed with difficulty. The rain and wind both increased up to midnight, when the velocity must have been fully 100 miles per hour. This would have blown in the doors and windows, coming in gusts as it did, but for the precaution which had been taken of securely boarding them up. Soon after midnight a change in the tide was noticed; it rose several inches for a few minutes, and then began setting seaward rapidly. This evidence of abatement was hailed with shouts of joy, and was confirmed in a few minutes by the action of the wind, which gradually backed to the north and northwest. The tide now swept out toward the bay with terrific force, the wind having but slightly abated; and it was at this time that the greatest destruction to life and property occurred. The buildings remaining had been so loosened and racked by northeast wind and tide that the moment the tremendous force was changed in a cross-direction dozens of them toppled in ruins and were swept into the bay. It is a noteworthy fact that the immense volumes of water, which for 18 hours poured over the beach at Matagorda Bay until for 20 miles the back country of prairie was an open sea, occupied but the short space of six hours to completely recede, on the wind changing to the northwest. The morning of the 17th opened cool and cloudy, with a "gale" still blowing from the northwest. We emerged from our retreat at an early hour, and it was not until then we could appreciate the full extent of the calamity which had been visited on the town. Fully three-fourths of all the buildings had entirely disappeared from the scene, and of those remaining a large part were in utter ruins. Many of those remaining had been swept from their original foundations—some but a few yards, others several blocks. Numerous bayous indented the shore, occupying the places where prominent buildings stood twenty-four hours previous. Five of these bayous extend clear across the town, and now join the lake in rear of the town. Seven others of considerable proportion had extended their encroachments but partially across. A hurried glance toward the signal-office revealed the building in which it is located still standing, but in a very racked condition, the building leaning considerably toward the southeast; the anemometer cups were gone, the telescopic rod remaining upright. The large vane hung bent and crooked off the southeast side of the building where it had fallen. The stairs approaching the office were wrenched several inches away from the sides of the building, and on reaching the office the doors were all found securely bound from the unnatural inclination of the building. After some difficulty the front door was opened sufficiently to squeeze the body through

sideways. The office-property was found to have sustained but comparatively slight damage. (See letter of 27th instant.) The morning observations of the 17th were taken with the usual punctuality and accuracy, with the exception of the velocity of the wind, which could only be estimated. At 6.17 a. m. the barometer read 29.24 corrected, or a rise of .34 in the previous thirteen hours. The 3.17 p. m. observation gave the same enormous rise in but eight hours, while the rise of the eight hours ending at 9.42 p. m. gave .25. Toward night the wind gradually diminished to "high" and veered to the north, with clearing weather and cirrus clouds from the northeast.

The following is a list of the lost at this place and Saluria: John H. Leak, M. D.; Capt. William Nicholis, wife, and two children; two children of J. H. Clemens; John Nicholis and wife; Mrs. Coffin; J. H. McCreary, M. D., (quarantine officer;) Captain Jones and wife; Max Holler, wife, and sister; George Humphreys, wife, and two children; wife and two children of John Humphreys; Rev. R. Jope; Mrs. Jope; Annie Jope; Jessie Jope; Davenport Lee; two adopted children of Rev. Jope; Mrs. Smith; James Collins; P. Centret, wife, and daughter; Rev. A. Hamburg, wife, and child; Mrs. Morrison; Mrs. Kelley and child; Mrs. Herd and her four children; Samuel Barston; Prof. F. Goepford; three children of Alexander Cole; Mrs. Charles Ernst and child; James Strang; Mrs. Foot and child; Mrs. Perry and child; two sailors, (unknown;) Thomas Decrow and wife; Miss Wilson; Tom Mayne, J. Hall, Captain Hocks, Captain Fink, light-house keepers; Mrs. McGrath and two children; Miss J. Conroy; Miss B. Smith and sister; Antonie Denter; stranger; Mrs. W. Coffin and two children; Mrs. Madden and three children; Rebecca Hammond; Thomas Harrison and two children; R. P. More and child; Colonel Peters, wife, and son; J. J. Schmidt, hospital steward; Winkleman, patient in hospital; D. McMahan, patient in hospital; two children of Mr. Cahil; Mrs. Captain Brennan and two children; sister to Captain Brennan; Charles S. Walker, wife, and four children; Mr. E. Clark; Peter Miller; Harriet Linden; Adam Hiller.

Colored.—John Young, wife, and child; Lila Ebly; Beny; Rev. J. Greene, wife, and four children; Grant Gibbs, wife, and child; P. Lewis; Wallace Lewis; Walter Hains; Edward Williams, wife, and two children; Charles Jordan and wife; E. Antoine; Puss Turner and two children; W. Turner; Charity Daniels; Francis Nelson and three children; Joseph Grey; Maria Anderson and child; Charity Fisher and two children; Lizzie Mitchell; Jane Riely; George Rose; Susan Gahler; Philip Jones; William Luckly and two children; Julia Lloyd and three children.

The principal property losses at this place are the following:

Heych & Bros	$15,000
Runge & Co	20,000
H. J. Huck	30,000
J. E. Mitchell & Co	20,000
D. Lewis	10,000
D. H. Regan	10,000
H. J. Kew	20,000
L. Alexander	30,000
C. Villeneuve	10,000
D. Sullivan	20,000
R. C. Warn	10,000
B. A. Hoyt	5,000
William Westoff	15,000
Carter House	6,000
William Morrison	10,000
William Hogan	6,000
C. T. Beisner	15,000
Gen. W. H. Woodward	10,000
Henry Sheppard	5,000
D. K. Woodward	7,000
Dr. J. M. Reuss	4,000
J. Contret	7,000
C. B. Burbank	5,000
W. H. Crain	2,000
D. C. Proctor	4,000
Andrew Eidelback	8,000
J. McCupin	6,000
Walter Merryman	1,000
Capt. M. Brennan	2,000
Alexander Cole	1,000
Globe Hotel and fixtures	5,000
William M. Cook	1,500
W. Willerman	5,000
C. Eichlitz	7,000
Jessie Parrish	1,000

John Burk	$2,000
Beaumont and Parker	1,000
J. Mahon	1,000
H. Miller	5,000
Morgan Railroad Company	55,000
Morgan Wharf	40,000
Runge and Sheppard Wharf	10,000
J. McDonald	2,500
I. Hollin	1,000
J. Smith	1,500
Aug. Swartz	1,000
Mrs. Cahil	2,000
J. F. Hamm	1,000
Patrick Smith	2,000
Chris. Surrieson	1,000
D. Schultz	1,000
S. Marks	1,000
Mrs. Ashworth	1,500
F. Damie	1,500
Louis de Planque	1,500
C. A. Ogsbury	1,500
Mrs. A. Lipscomb	1,000
Mrs. Crosland	1,000
Episcopal church and parsonage	9,000
Catholic church	2,000
George Seeligson	1,000
J. E. Barlow	1,000
Methodist church, (colored)	1,000
Joe Henderson	1,000
W. P. Milby	1 000
Catholic convent	2,000
J. K. McCreery	1,000
Presbyterian church	1,500
Nelson McCreary	10,000
Casino Hall	5,000
A. Straube	3,000
Masonic Hall	5,000
A large number of small houses, numbering probably 50, at $300 each	15,000
Total	528,000

The following is a list of vessels lost and damaged, (coasting vessels:)

Schooner Edith Belle Nason, Captain Smith, wrecked at Indianola.

Schooner Bibb, United States Coast Survey, ashore on Panther Island; total wreck.

Schooner Henrietta, Captain Steinhart, dismasted and ashore on Matagorda Island.

Schooner Andrew Bordan, Captain ———, dismasted, 60 yards ashore on Matagorda Island.

Schooner Peedie, Captain Gorom, wrecked inland at Saluria.

Schooner Comet, Captain Vialla, ashore at Aransas Pass.

Schooner Rescue, Captain Smith, wrecked at Saluria; the captain lost.

Schooner Comet wrecked 5 miles inland at Indianola.

Schooner Crinoline, owner Thomas Degnian, Galveston, ashore near shell-banks.

Schooner Agnes, Captain Brennan, wrecked 2 miles inland at Indianola.

Schooner Phœnix, Captain Pappadola, dismasted 2 miles inland at Indianola.

Schooner Rebecca, Captain Jones, from Galv ston, ashore at Aransas Pass.

Schooner Emily, Captain Wetherell, dragged anchor 8 miles near Corpus Christi.

Schooner Mabel, Captain ———, lost mast 30 miles southeast of Aransas Pass; came in under a jury-mast.

East and west shoal-lights at entrance of Matagorda Bay gone. A great number of cattle and sheep in the southeastern portion of Calhoun County and Matagorda Peninsula and Island were drowned; the number is variously estimated at from ten to twenty thousand head. Great damage to cotton and sugar crops is reported from Matagorda County. An immense amount of damage of a general nature has been done, which is not included in the preceding estimate, such as the formation of permanent bayous, which would require vast expenditure to fill up, and the preceding losses are rather deficient than otherwise, being calculated according to the depreciated value of property before the storm.

I have the honor to be, very respectfully, your obedient servant,

C. A. SMITH,
Sergeant, Signal-Service, U. S. A.

PAPER 24.

WEEKLY WEATHER CHRONICLE.

WAR DEPARTMENT, OFFICE OF THE CHIEF SIGNAL-OFFICER,
DIVISION OF TELEGRAMS AND REPORTS
FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.
Washington, D. C., June 5, 1876.

GENERAL SUMMARY FOR THE WEEK ENDING MONDAY, JUNE 5, 1876.

An area of high barometer and cool weather moved southeastward over the Lake region, Canada, New England, and the Middle States during Monday and Tuesday of the past week. An area of low barometer appeared in Dakota on Tuesday, moved slowly eastward during Wednesday and Thursday, and passed over Lake Superior into Canada Thursday night, A second depression moved from Michigan and Indiana eastward to the Atlantic during Saturday and Sunday.

The rain-fall for the past week averages about as follows in the various districts: Saint Lawrence Valley, 0.20 inch; New England, 0.98; Middle Atlantic States, 1.50; South Atlantic States, 0.87; Eastern Gulf States, 1.75; Western Gulf States, 1.80; Lower Lake region, 0.75; Upper Lake region, 0.95; Ohio Valley and Tennessee, 1.50; Upper Mississippi Valley, 0.80; Missouri Valley, 0.60; Minnesota, 0.60.

Monday, May 29.—The temperature fell rapidly in the Lake region and Canada, and during the night in New York and New England, with northerly winds, rising barometer, and cloudy or rainy weather, followed by clearing and clear weather during the afternoon and evening in the Lake region and Canada. Warm, partly cloudy weather, with rain areas or thunder-showers, continued in the Gulf and South and Middle Atlantic States. Clear or fair warm weather was generally reported from the northwest, the Ohio Valley, and Tennessee.

Tuesday, 30.—Clear or fair cool weather prevailed throughout the Lake region, Canada, New England, and the Middle States, with northwesterly to northeasterly winds. The temperature continued high in the remaining districts east of the Rocky Mountains, with clear or fair weather in the South Atlantic States, the Ohio Valley, and the Northwest; but with partly cloudy weather and frequent thunder-showers from the Gulf northward to Tennessee and Arkansas.

Wednesday, 31.—Clear or fair weather, easterly to southerly winds, and rising temperature prevailed in the lower Lake region, the British Provinces, New England, and the Middle States, and easterly winds and cooler, partly cloudy, weather in the South Atlantic States. Warm, cloudy or partly cloudy weather, with rain areas or local thunder-showers, was reported from the remaining districts east of the Rocky Mountains, attended in the Northwest and the Upper Lake region by brisk and high southerly winds.

Thursday, June 1.—Warm, cloudy or partly cloudy weather, southerly winds, and frequent thunder-showers continued from the Gulf northward to the Upper Lake region and the Northwest. Rising temperature, clear or fair weather, and easterly to southerly winds were generally reported from the eastern and northeastern sections of the country.

Friday, 2.—Warm, partly cloudy weather, with rain-areas or local thunder-showers, prevailed from the Ohio Valley, Southern Missouri, and Indian Territory southward to the Gulf, and warm, clear, or fair weather throughout the Atlantic States. Partly cloudy weather, falling temperatures, and rain-areas were reported from the Northwest, the Lake region, and Canada.

Saturday, 3.—Clear or partly cloudy cool weather was reported from the Northwest, and cool, partly cloudy or rainy weather from the lake region, the Saint Lawrence Valley, New York, and New England. Warm, partly cloudy weather, with numerous thunder-showers, prevailed elsewhere east of the Rocky Mountains.

Sunday, 4.—Cool, clear, or partly cloudy weather prevailed in the Northwest and the Lake region, and clear or clearing weather, with falling temperature, from the Ohio Valley, Southern Missouri, and Indian Territory southward to the Gulf. Cloudy or partly cloudy weather, with rain-areas or thunder-showers, continued throughout the Atlantic States.

Monday, 5.—Cool, cloudy, or rainy weather is reported this morning from New England and the Eastern British Provinces, and partly cloudy or clearing weather, with rain-areas and falling temperature, from the South Atlantic States. Clear cool weather prevails elsewhere east of the Rocky Mountains.

RIVERS.

During the past week the Red River has fallen one foot at Shreveport. The Missouri has risen from nine to forty inches between Fort Sully and Hermann. The Mississippi

has fallen nineteen inches at Saint Paul, two and a half feet at La Crosse, nineteen inches at Dubuque, five and a half feet at Memphis, four and a half feet at Helena, six inches at Vicksburg, and three at New Orleans, but has risen eleven inches at Keokuk, thirteen at Saint Louis, and is now rising at Cairo; the water still remains nearly three feet above the danger-line at Vicksburg. The Ohio has fallen two feet at Pittsburgh, four at Marietta, eight at Cincinnati, two at Louisville, and three at Evansville. The Savannah has changed but little at Augusta. The Cumberland and Tennessee have risen slightly. The Arkansas is now falling at Little Rock. The Allegheny, Monongahela, and Youghiogheny have fallen slightly.

Published by order of the Secretary of War.

ALBERT J. MYER,
Brig. Gen., (Brt. Asst'd,) Chief Signal-Officer, U. S. A.

PAPER 25.

MONTHLY WEATHER REVIEW, JULY 1875.

INTRODUCTION.

The current Weather Review is compiled from information furnished by eighty-five regular United States Signal-Service stations, twelve Canadian stations, seventeen United States Army surgeons, one naval hospital, two hundred and sixty-nine volunteer observers, and from newspaper reports of weather and storm phenomena.

The chief features of the month's meteorology were: (1) the frequency and destructiveness of local storms and tornadoes in the interior and trans-Mississippi sections of the country, greatly impeding travel and transportation, and inflicting serious damage upon the turnpikes and railroads and loss of property in many towns and cities, as well as causing great disaster to all growing crops and grain standing in the fields; (2) the extremely high mean temperature in the South Atlantic and Gulf States, and also the prolonged drought in the cotton-producing belt; (3) the low temperature in the Upper Lake region; (4) the extraordinary precipitation in the Ohio Valley and Tennessee and the districts to the northwestward, preparing the way for the serious and destructive freshets and floods which ensued after the month of July closed; (5) the scarcity of auroral displays; (6) the encouragingly few reports of grasshoppers and locusts in the agricultural districts.

ATMOSPHERIC PRESSURE.

The average monthly distribution of pressure is given on Chart No. II. From this it will be seen that the highest mean pressure, as usual for July, was in the South Atlantic and East Gulf States, where also prevailed the highest temperatures. The area of lowest mean barometer was in the Northwest.

(1) *Areas of high barometer.*—There were, during the month, five well-defined areas of high barometer, which, with one exception, came from the Northwest and Lake region. The last of these was of great importance in determining the serious weather-conditions of the two last days in July.

I. On the last day of June, a decided area of high pressure (noticed in the June weather review) progressed over the lake region in a southeastward direction, and made itself felt on the 1st of July by cool and generally cloudy weather over all sections north of the Ohio Valley and in the Middle States, except Virginia. There were frequent rains following this area in the lake region, and southwestward to Missouri and Tennessee. This high barometer passed off the Middle Atlantic coast on the 2d and 3d of July; but, after so doing, it worked along the coast southwardly, and with accessions of pressure off the South Atlantic coast, remained nearly stationary there for several days, but unaccompanied by any peculiar circumstances.

II. On the 6th, another decided area of high barometer was reported from the Upper Mississippi Valley and the Northwest, producing a general reduction of temperature everywhere north and west of the Ohio Valley. This area became most clearly marked and central in Minnesota on the morning of the 7th, when the unusually high pressure (for the season) of 30.36 inches was reached, the thermometer falling to 60° or below. The area slowly advanced southeastwardly to the Ohio Valley and Tennessee, and by midnight of the 7th extended from the lakes to the Gulf, but unattended by cloud or rain of any consequence, except in the Lower Mississippi Valley. After this date it slowly diffused itself over the Lower Lakes and the Alleghany region, and on the morning of the 8th the whole country east of the Mississippi River was under a pressure of from 30.20 to 30.30 inches. Accompanying this, on the immediate Atlantic coast, were light rain-fall and general reduction of temperature, with northerly and easterly winds.

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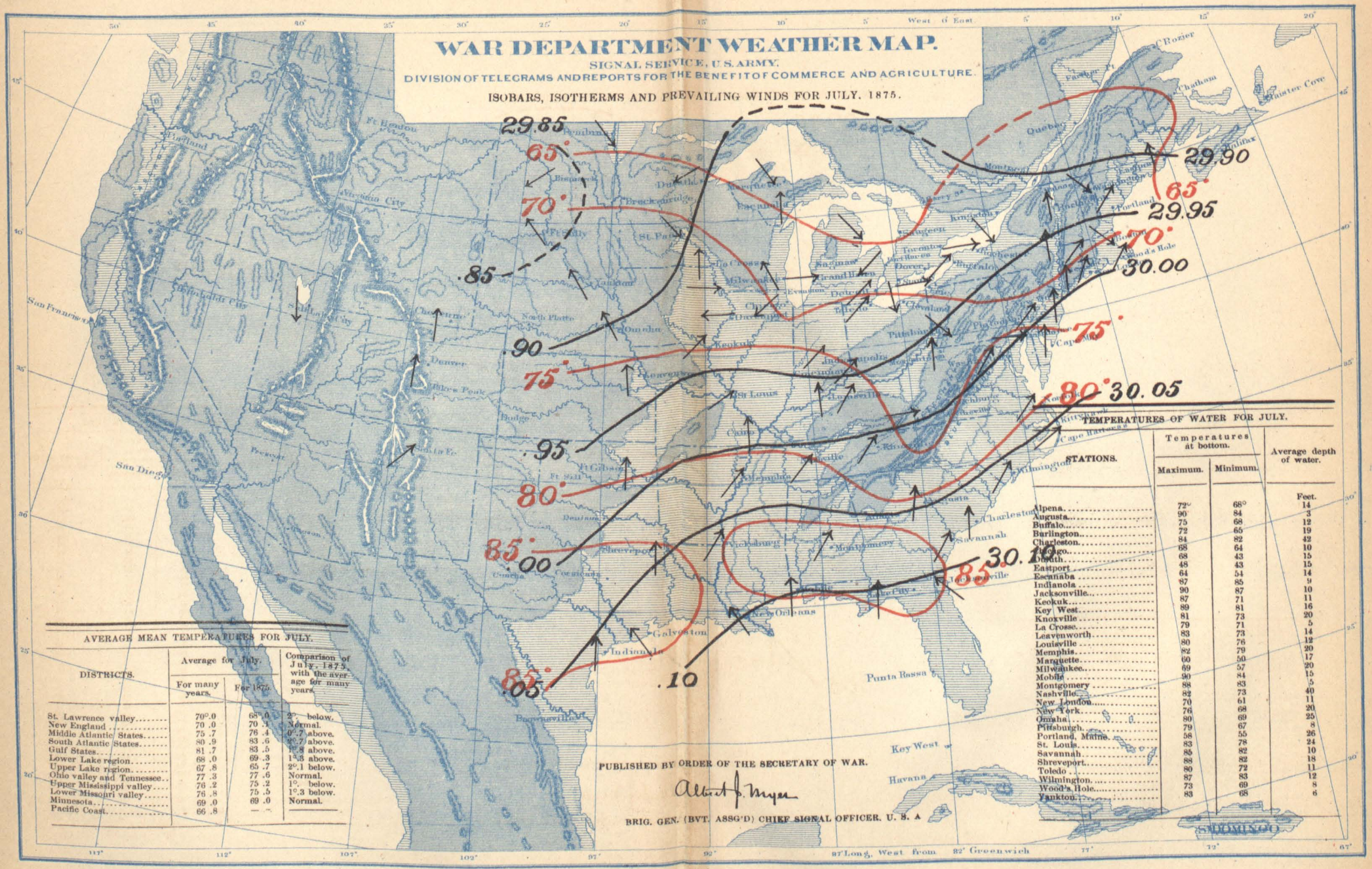
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR JULY, 1875.



PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN. (BVT. ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.

AVERAGE MEAN TEMPERATURES FOR JULY.

DISTRICTS.	Average for July. For many years.	Average for July. For 1875.	Comparison of July, 1875, with the average for many years.
St. Lawrence valley	70°.0	68°.0	2°. below.
New England	70 .0	70 .1	Normal.
Middle Atlantic States	75 .7	76 .4	0°.7 above.
South Atlantic States	80 .9	83 .6	2°.7 above.
Gulf States	81 .7	83 .5	1°.8 above.
Lower Lake region	68 .0	69 .3	1°.3 above.
Upper Lake region	67 .8	65 .7	2°.1 below.
Ohio valley and Tennessee	77 .3	77 .6	Normal.
Upper Mississippi valley	76 .2	75 .2	1°. below.
Lower Missouri valley	76 .8	75 .5	1°.3 below.
Minnesota	69 .0	69 .0	Normal.
Pacific Coast	66 .8	—	

TEMPERATURES OF WATER FOR JULY.

STATIONS.	Temperatures at bottom. Maximum.	Temperatures at bottom. Minimum.	Average depth of water.
			Feet.
Alpena	72°	68°	14
Augusta	90	84	3
Buffalo	75	68	12
Burlington	72	65	19
Charleston	84	82	42
Chicago	68	64	10
Duluth	68	43	15
Eastport	48	43	15
Escanaba	64	54	14
Indianola	87	85	9
Jacksonville	90	87	10
Keokuk	87	71	11
Key West	89	81	16
Knoxville	81	73	20
La Crosse	79	71	5
Leavenworth	83	73	14
Louisville	80	76	12
Memphis	82	79	20
Marquette	60	50	17
Milwaukee	69	57	20
Mobile	90	84	15
Montgomery	88	83	5
Nashville	82	73	40
New London	70	61	11
New York	76	68	20
Omaha	80	69	25
Pittsburgh	79	67	8
Portland, Maine	58	55	26
St. Louis	83	78	24
Savannah	85	82	10
Shreveport	88	82	18
Toledo	80	72	11
Wilmington	87	83	12
Wood's Hole	73	69	8
Yankton	83	68	6

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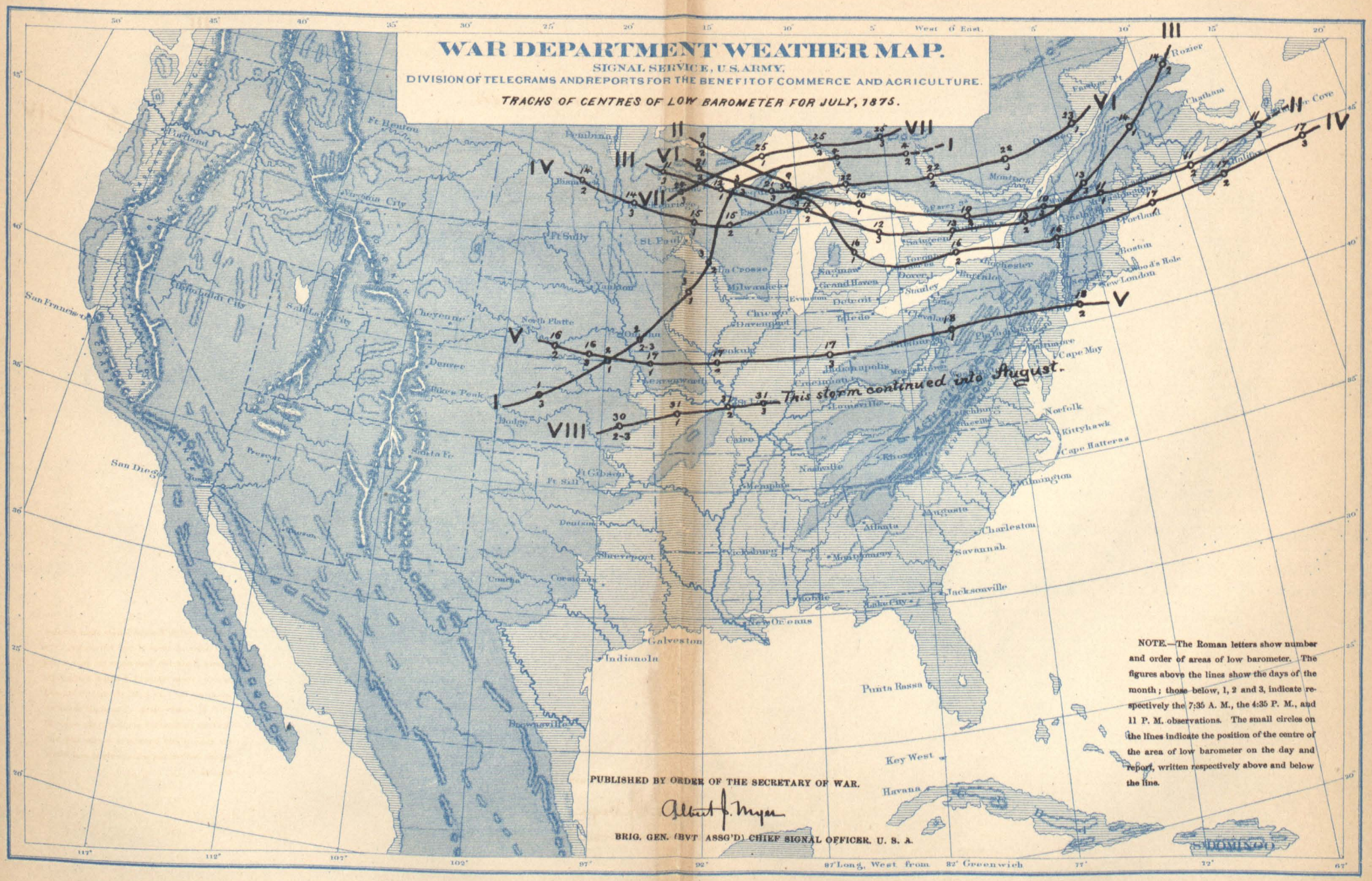
WAR DEPARTMENT WEATHER MAP.
SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.
TRACKS OF CENTRES OF LOW BAROMETER FOR JULY, 1875.
This storm continued into August.
NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
BRIG. GEN. (BVT ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.
Long. West from 82° Greenwich
West 0° East.
San Francisco
San Diego
Portland
Ft Henton
Virginia City
Humboldt City
Salt Lake City
Cheyenne
Denver
Pike's Peak
Santa Fe
Prescott
Yuma
Tucson
Ft Sully
Yankton
North Platte
Omaha
Dodge
Ft Gibson
Ft Sill
Denison
Shreveport
Corsicana
Galveston
Indianola
Brownsville
Pembina
St. Paul
La Crosse
Milwaukee
Chicago
Davenport
Keokuk
Leavenworth
Cairo
Memphis
Vicksburg
Nashville
Mobile
New Orleans
Montgomery
Atlanta
Augusta
Lake City
Jacksonville
Savannah
Charleston
Wilmington
Norfolk
Kittyhawk
Cape Hatteras
Cape May
Baltimore
Philadelphia
Pittsburgh
Cleveland
Toledo
Detroit
Grand Haven
Sagmaw
Saugeen
Toronto
Dover
Stanley
Buffalo
Rochester
Montreal
Quebec
Halifax
Portland
Boston
Wood's Hole
New London
Rozier
Chatham
Farther Pt
Cove
Key West
Havana
Punta Rassa
S. DOMINGO
I
II
III
IV
V
VI
VII
VIII

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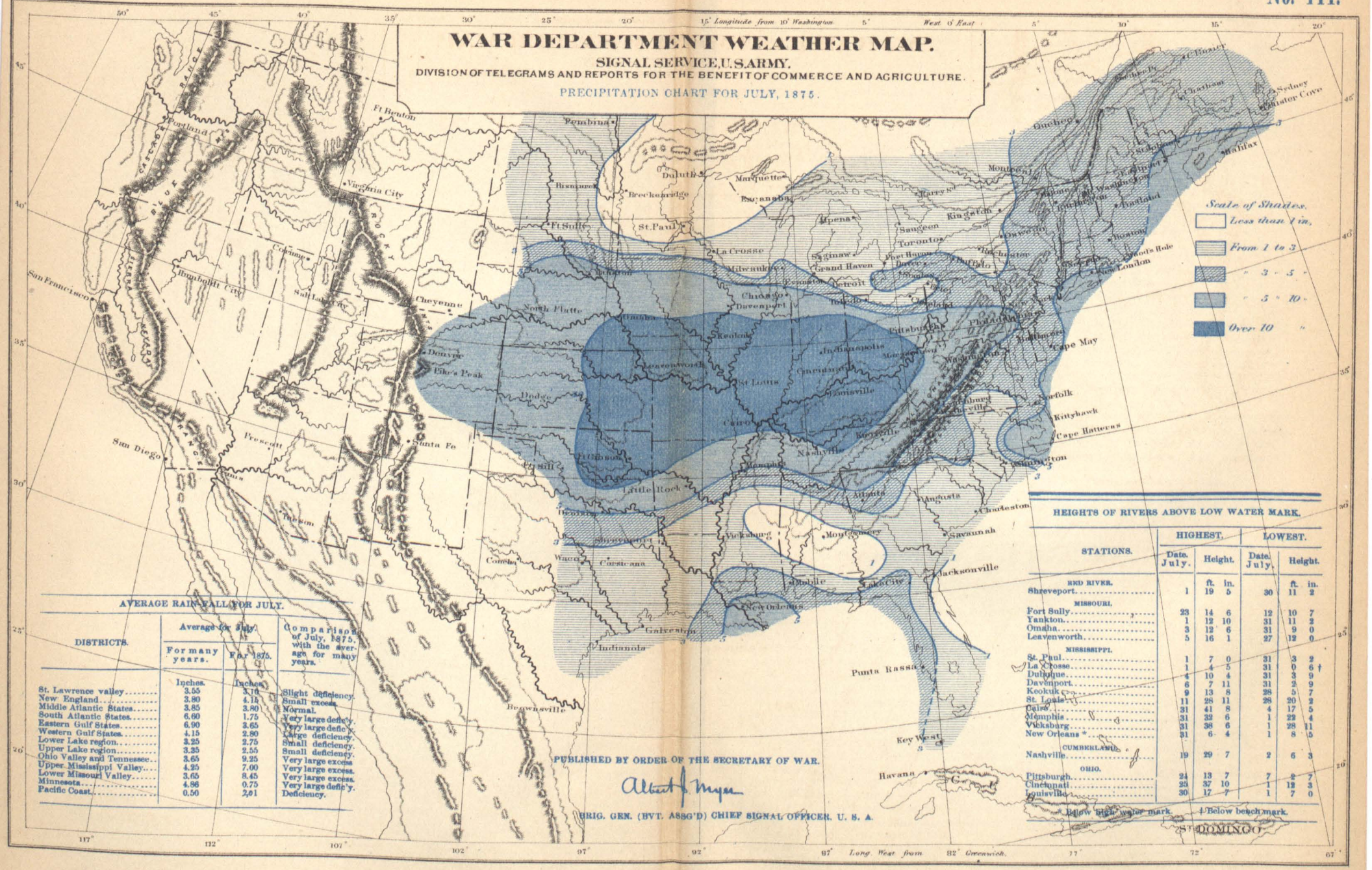
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR JULY, 1875.



AVERAGE RAIN-FALL FOR JULY.

DISTRICTS.	Average for July. For many years.	Average for July. For 1875.	Comparison of July, 1875, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	3.55	3.10	Slight deficiency.
New England	3.80	4.14	Small excess.
Middle Atlantic States	3.85	3.80	Normal.
South Atlantic States	6.60	1.75	Very large deficiency.
Eastern Gulf States	6.90	3.65	Very large deficiency.
Western Gulf States	4.15	2.80	Large deficiency.
Lower Lake region	3.25	2.75	Small deficiency.
Upper Lake region	3.35	2.55	Small deficiency.
Ohio Valley and Tennessee	3.65	9.25	Very large excess
Upper Mississippi Valley	4.25	7.00	Very large excess.
Lower Missouri Valley	3.65	8.45	Very large excess.
Minnesota	4.86	0.75	Very large deficiency.
Pacific Coast	0.50	2.01	Deficiency.

HEIGHTS OF RIVERS ABOVE LOW WATER MARK.

STATIONS.	HIGHEST. Date. July.	HIGHEST. Height. ft.	HIGHEST. Height. in.	LOWEST. Date. July.	LOWEST. Height. ft.	LOWEST. Height. in.
RED RIVER.						
Shreveport	1	19	5	30	11	2
MISSOURI.						
Fort Sully	23	14	6	12	10	7
Yankton	1	12	10	31	11	2
Omaha	3	12	6	31	9	0
Leavenworth	5	16	1	27	12	0
MISSISSIPPI.						
St. Paul	1	7	0	31	3	2
La Crosse	1	4	5	31	0	6 †
Dubuque	4	10	4	31	3	9
Davenport	6	7	11	31	2	9
Keokuk	9	13	8	28	5	7
St. Louis	11	28	11	28	20	2
Cairo	31	41	8	4	17	5
Memphis	31	32	6	1	22	4
Vicksburg	31	38	6	1	28	11
New Orleans *	31	6	4	1	8	5
CUMBERLAND.						
Nashville	19	29	7	2	6	3
OHIO.						
Pittsburgh	24	13	7	7	2	7
Cincinnati	25	37	10	1	12	3
Louisville	30	17	7	1	7	0

* Below high water mark. † Below beach mark.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN. (BVT. ASS'D) CHIEF SIGNAL OFFICER, U. S. A.

This area passed off the Atlantic coast during the night of the 8th, and remained nearly stationary for sixteen hours.

III. On the 18th, after a long interval in which the pressure was generally low, a third noticeable high barometer appeared in the Upper Lake region, and slowly developed eastwardly to the Lower Lakes, and thence over the Middle States, with decidedly cool weather and northerly winds. On the morning of the 20th, it had passed off the Middle Atlantic coast, whence it immediately disappeared.

IV. A noteworthy rise of the barometer was reported from the South Atlantic and Gulf States very generally on the 25th and 26th, owing, perhaps, to higher pressures in the Atlantic Ocean north of the West Indies. This high-pressure area in the South remained until the afternoon of the 27th, but no noticeable phenomena were connected with it.

V. On the morning of the 30th, an important and apparently extensive area of high pressure was reported from the Northwest and the Upper Lake region, slowly extending southeastwardly, with cool weather and northeast and northwest winds over the Lake region. This was the precursor of those heavy and torrential rains that subsequently fell in the last two days of the month in more southerly and easterly parts of the country, and constitute a significant element of the month's meteorology. On the afternoon of the 30th, as this high pressure forced its way southward, its cool northerly winds meeting the warm and vapor-laden winds from the Lower Mississippi Valley, covered the country from Minnesota to Texas with cloudy weather, which, with continued reduction of temperature and condensation, gave heavy rains in the Lower Mississippi Valley and Texas. This long rain-belt now began to extend eastward into the Ohio Valley, which it reached on the night of the 30th, with precipitation that was very seriously felt along all the principal water-courses. The rains, too, were very heavy on the 31st in the Central Mississippi Valley, in some places exceeding four inches in sixteen hours. The high barometer still remained over the Lake region up to the close of the month, serving as a feeder of cold air to condense the vapor in the warmer and moist air of the regions south of it. The low temperature was diffused over the Middle States on the 31st, and was effective in producing heavy rains. But the further and interesting history of this high barometer, in connection with low barometer No. VIII, belongs to the August weather review.

(2) *Areas of low barometer.*—With one or two exceptions, these areas have been of an ill-defined and feeble type, and, though influential (in connection with the high barometer areas) in producing the numerous and destructive local storms and heavy rains of the month, they have been productive of but few high winds on the Lakes or along the Gulf and Atlantic coasts.

The total number of low barometer areas for July, worthy of notice, is eight. But the last of these had but partially developed when the month closed; its history, therefore, will mainly belong to the August weather review. The tracks of these areas will be found on Chart No. I.

No. I. The first depression calling for remark was definitely observed on the midnight of the 1st, then in Western Kansas, and moving at the usual rate of speed toward Lake Superior. As it crossed the Upper Mississippi Valley, it was attended by heavy rains, which extended eastward to the Ohio Valley and Tennessee. Thus, in the beginning of the month, commenced the rain-fall which has proved so disastrous in many of the interior agricultural districts. This first area passed away over the Upper Lake region on the 3d and 4th, with frequent but gentle rains in that section.

Accompanying this depression there were some violent local storms. One of these was felt, in terrific force, on the 3d, near Saint Joseph, Missouri. Another was reported, on the afternoon of the 4th, from the vicinity of Denver, Colo., with heavy hail and rain, which proved very destructive. The Denver and Rio Grande Railway, and the Denver Pacific, were damaged in several places, and the wheat-crops injured in the surrounding country.

No. II. This low-pressure area passed along the northern frontier of the country, having entered the field of observation a little northwest of Lake Superior late on the 9th, and, crossing that lake in a direction east-southeast, traveled over Lake Huron and thence to the Saint Lawrence Valley, vanishing beyond the Nova Scotia coasts, after midnight of the 11th. There was nothing unusual in its progressive velocity; but, after passing the Saint Lawrence Valley, the pressure in the center fell quite decidedly. It was, comparatively, a dry storm, and was attended by no dangerous winds.

No. III was also a lake-storm, though of an undecided type, and rainless through the larger portion of its central track. Approaching the lakes from Minnesota, its course lay near the central lake-line, bending a little to the south, until after it reached the mid-Saint Lawrence Valley, when it deviated to the northeastward, and probably entered the North Atlantic Ocean on parallels north of Newfoundland. Its progress through the United States and Canada lasted from the midnight of the 11th to the afternoon of the 14th, when it disappeared.

No. IV—a much more decided depression than its two predecessors—was first reported from Dakota on the 14th, and its path was more to the southeastward than Nos. II and

III. The Dakota barometers, on the night of the 14th, were reading as low as 29.40 and 29.50. The advance of this area across the Lake region was marked by considerable precipitation, exceeding half an inch of rain in many places. This rain-fall was rather greater as the depression traversed the mid-Saint Lawrence Valley, and proved occasionally very heavy on the coasts of New England and Nova Scotia, toward which it moved, and off which latter it disappeared at the close of the 17th.

No. V. This depression was the first of the month, whose origin and course were wholly within the interior of the United States. It was first distinctly traceable in Kansas and Nebraska on the 16th, and thence moved nearly due east to the Middle Atlantic coast, with unusual progressive velocity, its highest speed reaching nearly thirty miles an hour, from the midnight of the 17th to the afternoon of the 18th, when it was lost sight of beyond Sandy Hook. It was attended at the first by very heavy rains in the Missouri Valley during the night of the 16th, on which a rain-fall of two inches occurred at and near Omaha. While moving rapidly south of the lakes frequent rains fell, and, following its passage, both frequent and heavy rains were reported from the Lower Lakes.

As this area of low barometer was forming on the 16th, a very violent local storm passed over Louisville, with some damage to property, and heavy rain. Early on the morning of the 16th a severe thunder-storm broke over Aurora, Ill., and swept the country around, causing considerable damage to crops. On the 17th and 18th, as the depression-center moved east toward the Middle Atlantic coast, violent storms were experienced in Virginia.

No. VI passed almost entirely beyond the field of observation, north of the Lakes, during the 21st and 22d. It was followed by light rains in the Lake region, and more considerable rain-fall east and northeast of the Lakes. But it was, otherwise, of no special significance.

No. VII, originating west of Lake Superior on the 24th, advanced slowly over the lake, and quickly disappeared to the northeastward on the night of the 25th, apparently moving toward Hudson's Bay. It was preceded and followed by rain on and near its pathway, and by high winds on Lake Huron, but it was not widely felt within the scope of the meteorological observations.

No. VIII. This was by far the most important storm of the month; but as already stated, its history cannot be given, except in a fragmentary form, in this month's review, as it had just began its advance eastward when the month of July closed.

It originated in Southwestern Kansas on the 29th and 30th, remaining nearly stationary for sixteen hours, when, on the morning of the 31st, it began moving very slowly in an east-northeast direction, toward and up the Ohio Valley. In its incipiency it was marked by very heavy rains in the Lower Missouri and Central Mississippi Valleys; and these rains, at an early period of its development, extended eastward to the Ohio Valley. Some of the larger rain-falls, which occurred in eight hours, were at Yankton, 1.45 inches, and at Louisville, 2.09 inches on the night of the 29th; .98 and .61 inch, respectively, at Leavenworth and Cairo on the 30th; 3.44 inches in eight hours at Keokuk on the 31st, and numerous minor but very decided falls on the same day over all the surrounding country, reaching far up the Ohio Valley.

(3) *Local storms and tornadoes.*—A few of the local storms have already been noticed, such as were immediately associated with and whose courses lay along the central paths of the low barometer areas. But many others of serious import, traceable to the interaction of the high and low pressure areas, with their contrary conditions of wind, temperature, and moisture, were reported. Among the principal local rain-storms and thunder-storms may be mentioned the following:

From the 9th to the 12th large quantities of rain fell in Middle Tennessee, and on the 12th, the precipitation between Nashville and Decatur was very heavy. On the 13th, a severe local gale swept over Pittsburgh and vicinity. It was considered one of the heaviest storms of the season, occasioning much loss of property and injury to persons. Trees were uprooted, chimneys demolished, and houses and mills damaged. A severe gale and thunder-storm visited Chicago on the night of Thursday, July 15, and also, on same date, a similar meteor passed over Baltimore with destructive effects. On the 17th a very severe storm visited Petersburgh, Va., following the course of the James River, proving very disastrous to houses and the crops in the neighboring country. Equally severe storms deluged the country around New Albany and Evansville, Ind., drowning the crops in many localities, on the 21st and 22d. Also in Baltimore, on the 27th, a very damaging thunder and rain storm prevailed. A rain-storm which set in at Logansport, Ind., on the 30th, continued with but little interruption for thirty hours. On the morning of the 15th, about 1 a. m., a severe wind-squall passed over Chicago, in which it is supposed that a party of balloonists (who ascended the previous afternoon from that city, and were driven by a southwest wind over Lake Michigan) were caught and perished. The squall came from the northeast. A very heavy thunder-storm was reported from Norfolk on the 6th. On the 25th of July, a violent hail-storm occurred at Ula, Colo.

The great rain-storm which set in at Indianapolis at 10 p. m. of the 31st, lasted

twelve hours, and the rain-fall was 3 inches. Heavy as the rains of the last week in July were at Dayton, and in the valley of the Miami, the precipitation of the 31st was still heavier, and the crops were greatly damaged. To these local storms already mentioned, must be added that of the 26th, at Abbottsburgh, N. C.; that of the 27th, at Leavenworth, Kans., and that of the 28th, at New Albany, Ind.; the heavy rain-storms near Denver, on the 9th, which flooded railroads and forced them to suspend operations temporarily, and on the 17th and 18th, in the adjacent mountains, seriously interfering with mining work; the storm at Shreveport, La., on the 24th; a furious wind-storm at Cape Henry on the 18th, in which the wind blew 72 miles an hour; the hail-storm at Bismarck, Dak., on the 14th, with many hail-stones two inches in diameter and some much larger.

On the 13th a severe tornado struck West Point, N. Y., at 7.10 p. m. The first appearance of it was a black cloud shooting over Crow's Nest. Trees were torn up, and broken off, and blown some distance. Teams on the roads were blown over, and the window-panes in the exposed portions of the buildings were destroyed. The lightning display was very sharp, and the tornado was accompanied by heavy hail. No loss of life took place.

On the 29th of July a tornado, accompanied by a water-spout reported fifty feet high, passed over Great Bay, near Little Egg Harbor, on the New Jersey coast. The meteor came from the southwest, and was very violent, tearing up trees by the root.

At La Crosse, Wis., on the 24th, (at 8.40 p. m.,) after a densely hazy and smoky day, with falling barometer, a whirlwind of about two hundred yards diameter passed from northwest to southeast over the city. Houses and trees were thrown down, and roofs and chimneys lifted from the house-tops while the tornado lasted, (about two and a half minutes.) The greatest observed velocity of the wind was eighty miles an hour, though it is possible for a few seconds it exceeded that. Torrents of rain fell after the passage of the storm, and great damage was done in the neighborhood.

Another tornado visited the southern part of Fountain County, Indiana, on the afternoon of the 27th, with destructive effect and some reported loss of life. This tornado passed near Brownsburgh, Ind.; houses were laid low, and much timber leveled with the ground. It also inflicted much loss in Boone and Hendricks Counties. At Vergennes, Vt., a very severe storm was experienced, accompanied by hail, and it proved very disastrous to crops.

TEMPERATURE OF THE AIR.

This element will be found, as usual, graphically given by the isothermal lines, and in the table in the lower left-hand corner of Chart No. II. One of the most prominent features of the month's weather has been the extremely high temperature in the South Atlantic and Gulf States. The mean temperature of Augusta, Ga., *e. g.*, is 84°.6—the highest observed there since the station has been occupied, and supposed to be the highest monthly mean in twenty years.

The lowest temperature reported for the month was 40° Fahrenheit, at Pembina, Dak., and the highest was 107° Fahrenheit, at Shreveport, La.

The tabular exhibit shows that the July temperature has been 2°.7 above the normal in the South Atlantic States, and 1°.8 above in the Gulf States. The mean was above the normal in the Middle States and the Lower Lake region. Elsewhere (except on the Pacific coast, which has not yet been heard from) the temperature was either at or below the normal. In the Upper Lake region an extremely low mean is found—2°.1 below that which is generally reported in July. This low temperature was very influential in producing the heavy condensation of rain which flooded the Mississippi and Ohio Rivers.

Frosts occurred on the 20th at Mount Desert, Me.; in Wayne County, Pennsylvania, light frosts on the 2d, 3d, 12th, 19th, and 20th; at Hot Sulphur Springs, Colo., slight frosts were observed many mornings at daylight; and at Fall River, Mass., white frost on the lowland on the 19th.

PRECIPITATION.

The rain-fall is exhibited by the figures and shading on Chart No. III, and constitutes one of the most remarkable and significant items of the month's meteorology. From the graphic exhibit of Chart No. III, it will be seen that the rain-fall in the Middle Atlantic States is normal, and that for New England is only a little in excess, while a slight deficiency was reported from the Saint Lawrence Valley and the Lake region. There was a deficiency of nearly half an inch on the Pacific coast, where the month was nearly rainless. There was a very marked deficiency in the South Atlantic States, and also a large deficiency in the Gulf States. In the heart of the cotton-belt the rain-fall has been about an inch. The deficiency in Minnesota was also very great, exceeding four inches.

But in the interior, including the Ohio Valley and Tennessee and the Central Mississippi and Lower Missouri Valleys, an equally marked excess of rain was reported. The excess was very great in the Lower Missouri Valley, amounting to nearly five inches, while in the Ohio Valley and Tennessee the excess has been alarming and almost un-

paralleled, being 5½ inches more than is usual in July, or nearly three times the normal quantity that falls in that month.

In a large belt of country north of Kentucky and Missouri, the month's rain-fall ranged from 10 to 16 inches—a precipitation which has taxed the central tributaries of the Mississippi beyond their utmost drainage-power, and caused damaging floods and extensive ravages of the growing crops.

Some of the heaviest rain-falls for the month were as follows: At Louisville, 16.46 inches; at Indianapolis, 13.12 inches; at Keokuk, 12.70 inches; at Omaha, 10 inches; at Fort Gibson, 10.93 inches. At Beech Grove, Ind., for the week ending August 1, the rain-fall was 11.60 inches.

Rainy days.—The number of days on which rain fell in any quantity averages about as follows: In New York and New England, 10; in the Lake region, Minnesota, and Dakota, 9; in the Gulf States, 11; in the South Atlantic States, 4; from Nebraska, Kansas, and Indian Territory, eastward over Iowa, Missouri, Arkansas, Tennessee, Kentucky, Illinois, Indiana, Ohio, Virginia, Maryland, and Pennsylvania, 16. From many stations in the Ohio and Central Mississippi Valleys, over twenty rainy days during the month are reported.

RELATIVE HUMIDITY.

This element averages 79 per cent. for the immediate Atlantic Coast from Cape Hatteras to Maine, and is also very high, ranging from 74 to 81, from the western portions of Pennsylvania, Virginia, and North Carolina westward to Nebraska, Kansas, and Indian Territory. In the Gulf and South Atlantic States it averages 65 per cent., and in New England, New York, and the Lake region 68. It is somewhat higher than during the month of June at the Rocky Mountain stations, being 30 per cent. at Salt Lake City, 55 at Santa Fé, 56 at Denver, and 58 at Cheyenne.

WINDS.

The *prevailing winds* have been southerly or southwesterly at nearly all stations except those in the far Northwest and on the Lakes, where northeast and northwest winds have been very frequent. The tendency of the wind in the Missouri Valley has been to southeast.

Total movements of the air.—The larger total movements of the air for July were as follows: At Cape Hatteras, 10,586 miles; at Indianola, 8,248 miles; at stations on the New Jersey coast, from 6,000 to 7,900 miles; Key West, 6,956 miles; Wilmington, 6,786 miles, and Escanaba, 6,690 miles. The smallest movements have occurred at Lynchburgh, 2,037 miles; Nashville, 2,561 miles; Wytheville, 2,847 miles; Louisville, 2,859 miles; Indianapolis, 2,901 miles.

VERIFICATION OF "PROBABILITIES" AND CAUTIONARY SIGNALS.

The usual critical comparison of the published "Probabilities" with the weather-conditions actually following their publication shows that, on the average, for all the districts in the United States for which predictions were made, 91.94 per cent. have been verified. The percentage of omissions to predict is, for the whole country, 0.16.

During the month the total number of cautionary signals ordered to be displayed at the forty-three signal-stations on the lakes and Atlantic coast has been two. This is a small number, compared with that of previous months. Of the two signals displayed, one was justified by the fact of succeeding high winds. One was not justified.

NAVIGATION.

On Chart No. III is given the usual table, showing the highest and lowest water-marks of the month. The Red River, at Shreveport, fell steadily during the month. Up to the middle of the month the Upper Mississippi was at its highest, but then fell, and was very low north of Keokuk when the month closed, being six inches below bench-mark on the 31st at La Crosse, Wis. The Cumberland, at Nashville, reached its maximum height on the 19th. The Lower Missouri fell toward the close of July.

The Ohio was highest on the 30th, at Louisville, Ky., and Laconia, Ind.

The floods, which were so general in the first week of August, had not become fully enough developed in July to call for extended notice in the current review. Their history belongs to the meteorology of August.

TEMPERATURE OF THE WATER.

This item is given in the table in the lower right-hand corner of Chart No. II. Generally, the variation of the temperature of the water has been small, not exceeding 8° in the month. The exceptions or greatest variations are at Duluth, 25°; Yankton, 15°; Pittsburgh and Milwaukee, 12°; Omaha, 11°; Leavenworth, Escanaba, and Marquette, 10°. The least thermometric changes have been at Augusta, Ga., 6°; Charleston, S. C., 2°; Indianola, Tex., 2°; Memphis, 3°; Eastport, Me., 5°; Savannah, 3°; and Portland, Me., 0°.

OPTICAL PHENOMENA.

(1) *Solar halos* were observed on the 1st, in New York, Ohio, and Wisconsin; 3d, Maine, New Hampshire, and Vermont; 5th, Illinois; 6th, New York; 8th, New Jersey, New York, and Wisconsin; 9th, New Hampshire and Ohio; 10th, Kansas; 11th, Iowa; 14th, New York and Tennessee; 15th, Dakota; 17th, Illinois and Tennessee; 18th, Tennessee; 19th and 20th, Nebraska; 21st, Canada; 22d, Maine, Massachusetts, Mississippi, and New York; 23d and 25th, Ohio; 26th, Nebraska and New Hampshire; 28th, Michigan and Tennessee; 29th, Massachusetts, New Hampshire, New York, and Vermont; 30th, Canada and Wisconsin; 31st, Iowa, Michigan, New York, Ohio, Pennsylvania, and Wisconsin.

(2) *Lunar halos* were reported as follows: On the 7th, in Louisiana and Mississippi; 8th, Louisiana, New Jersey, and Wisconsin; 9th, Illinois; 10th, Illinois and Virginia; 12th, Alabama, Florida, Iowa, and Texas; 13th, Alabama, New Jersey, and Wisconsin; 14th, Tennessee and Wisconsin; 15th, Iowa and Tennessee; 16th, Mississippi and Tennessee; 17th, Louisiana, Ohio, Pennsylvania, and Tennessee; 18th, Kansas and Tennessee; 28th, Virginia; 30th, Virginia and Wisconsin; 31st, Virginia.

(3) *Lunar rainbows* noticed at Richmond, Va., on the 17th, and at Baxter Springs, Kans., on the 14th.

ATMOSPHERIC ELECTRICITY.

Thunder-storms.—This feature of the July weather has been already sufficiently exhibited by the data under head of *local storms and tornadoes.*

Auroras were unusually scarce. One was observed at Alpena, Mich., on the 10th. It first appeared as a faint arch of light of a pale white color, reaching an elevation of twenty degrees at 10.30 p. m. At 11 p. m. it was marked by a few faint streamers; also a well-defined dark segment. From 11 p. m. to 11.30, it increased in brilliancy, and at 11.40 changed into the shape of a curtain of light, about thirty-five degrees high, of a bright emerald-green color, the fold of the curtain moving from east to west and west to east, the westerly motion being the most frequent. At 11.56 p. m. the curtain showed a nearly complete circle of bright green, yellow, and crimson colors, and shortly after broke up in streamers of a pale green color, having an elevation of seventy degrees, and finally subsided into a pale hazy arch of white, which remained until daylight.

At Marquette, Mich., on the 26th, a faint auroral arch was distinguished in the northern horizon about 9.40 p. m., and slowly disappeared at 11 p. m., the elevation of the topmost portions of the arch at no time exceeding twenty degrees.

Auroras were reported at Mount Washington, on the 3d; Standish, Me., on the 28th; Saint Paul, Minn., on the 27th; and Bangor, Me., on the 30th.

MISCELLANEOUS PHENOMENA.

(1) *Natural History.*—The items of special interest under this head are—

Grasshoppers and locusts, which were reported as follows: At Burlingame, Kans., large numbers pass north on the 15th and 16th. At Newark, N. J., they were numerous on the 18th. At Plattsmouth, Nebr., grasshoppers were reported flying west on the 2d, south on the 6th, and northwest on the 7th and 8th. At Colton, Kans., they flew southwest on the 6th, west on the 7th, and northwest on the 8th. Except a few stragglers, the grasshoppers left Virginia City, Mont., on the 22d, their first appearance there having been reported on the 18th.

Colorado beetles, destructive to potatoes, during the month at Vineland, N. J.

(2) *Polar bands* at Wytheville on 1st, 16th, and 30th; at Iowa City, on the 3d and 10th; at Fayette, Miss., on the 12th, and Saint Paul on the 5th.

(3) *Meteors* were noticed at Lyndon, Ill., on the 9th, 24th, 26th, and 29th; at Afton, Iowa, on the 7th; at Point Pleasant, La., on the 2d and 4th; at Woodstock College, Md., on the 12th and 21st; at New Market, Md., on the 12th; and Detroit, Mich., on the 15th.

(4) *Earthquakes.*—One shock was felt at Colebrook, Conn., on the 28th. It proceeded from east to west.

(6) *Barometer and lake-water oscillations.*—During the month of June, a comparison of the oscillations of the barometer and of the water at Marquette, on Lake Superior, showed that they acted together twenty-seven times, and in a contrary manner sixty-three times. A similar comparison during the month of July shows that they acted together thirty-two times, and in a contrary manner sixty-one times.

Published by order of the Hon. William W. Belknap, Secretary of War.

ALBERT J. MYER,
Brig. Gen., (bvt. assigned,) Chief Signal-Officer, U. S. A.

MONTHLY WEATHER REVIEW, AUGUST, 1875.

INTRODUCTION.

In the compilation of this review, besides the regular reports from the Signal-Service, United States Army stations, and telegraphic reports from the Canadian stations, there have been examined monthly meteorological records from 48 United States Army post-surgeons, forwarded by the Surgeon-General, and from 266 volunteer observers; also miscellaneous data.

The most noticeable features for the month are: First, the comparatively small number of areas of low and high barometer that could be traced; second, the heavy rainfalls and destructive floods in New Jersey, Massachusetts, Connecticut, Ohio, Indiana, and Illinois; third, the generally low mean temperature; fourth, the frequency of thunder-storms.

ATMOSPHERIC PRESSURE.

Chart No. II shows the general distribution of the atmospheric pressure, for the month, by the isobarometric lines in black. It will be observed that it is greatest along the coast from Florida to Nova Scotia, and least in the Northwest. When compared with August, 1873, the pressure is generally less. It is somewhat greater than for August, 1874, in the Southern States, Middle Atlantic States, New England, and Lower Missouri Valley, but decidedly less in the lake region and Minnesota. The latter fact is due to two causes: First, that but two decided high-pressure areas crossed those sections; second, that the low-pressure areas generally affected the same districts. On the Pacific coast the pressure has been normal; at the Rocky Mountain stations, slightly below the mean, except at Fort Benton, Montana, where it was slightly above.

(1) *Areas of high barometer.*—During the month but two areas of high barometer have crossed the country, an unusually small number for August. They were extensive and well defined, and had a marked effect upon the weather, especially in the northern half of the country east of the Rocky Mountains, where cool northerly and easterly winds were experienced, with frequent and heavy rains.

No. I. By reference to the Weather Review for July it will be seen that, at the close of that month, an area of high barometer had been felt over the Northwest and the Upper Lake region, in connection with an area of low barometer moving eastward over Missouri. This high pressure gradually extended over the Lower Lake region, Middle States, and New England on the 1st and 2d, producing cool weather in those sections, and, in connection with low barometer No. I, which, under its influence, moved very slowly, the heavy and continued rains from the Gulf and South Atlantic States to Missouri, the Lakes, Middle States, and New England, except in portions of Tennessee and Kentucky. It disappeared to the eastward of Nova Scotia and New Brunswick on the 4th. The slow progress of low barometer No. I, as well as its eastward course from Missouri to Northern Kentucky, and thence northeastward over the Lower Lakes into Canada, were due to this high-pressure area.

No. II. On the afternoon of the 20th its approach was indicated by a decided rise in the barometers at Fort Garry, Manitoba, and Pembina. During the night the temperature fell to 31° at the former station and to 28° at the latter. It extended itself over the Upper Lake region on the 21st, with temperatures sufficiently low to produce destructive frosts from Eastern Dakota and Northern Iowa to Michigan that night. On the 22d, 23d, and 24th it passed over the Lower Lake region to the Middle and Eastern States. The winds along the coast from the Carolinas to Southern New England shifted to northeasterly, with rain, which at many places was heavy, while the former increased to very brisk and high from New Jersey to Cape Hatteras. Frosts were reported from the northern portions of New York and New England. Cool weather continued in the Middle and Eastern States from the 22d to the 28th, after which this area gradually disappeared under the influence of falling barometer in the Northwestern States.

(2) *Areas of low barometer.*—Of these, only seven well-defined depressions have moved within the limits of the stations, a smaller number than usual for the month of August, the paths of the centers of which have been traced, and are shown upon Chart No. I. The four first were quite decided, and much more so than the others. It will be seen that all of them disappeared over the Lake region into Canada, which is also unusual. Several of them were felt in the Saint Lawrence Valley, but passed so far to the northward of the same as to render the location of their tracks very uncertain.

No. I. This is a continuation of the low barometer designated as No. VIII, for the month of July, and is decidedly interesting on account of the conditions which prevailed, the effect they had upon its movement, and the weather resulting therefrom. On the 1st, warm southerly winds, veering to westerly, and frequent thunder-storms, prevailed in the Southern States. High barometer continued in the Lake region, and gradually extended itself southeastward toward the Middle and Eastern States, with low temperatures and northerly to easterly winds, which increased to severe gales over the western portion of Lake Erie, where the barometric gradient was steep. The wind

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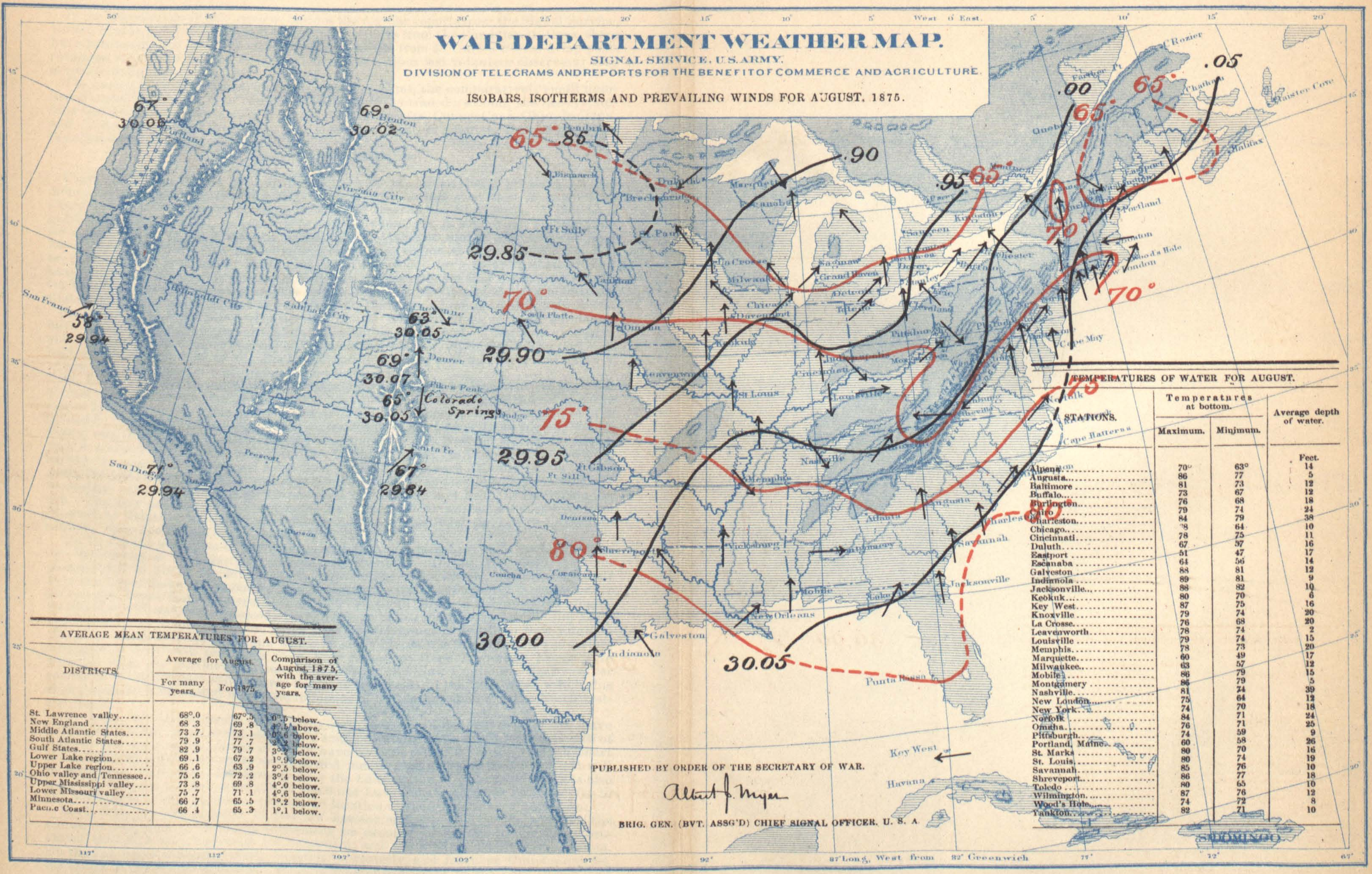

AVERAGE MEAN TEMPERATURES FOR AUGUST.

DISTRICTS.	Average for August.		Comparison of August, 1875, with the average for many years.
	For many years.	For 1875.	
St. Lawrence valley	68°.0	67°.5	0°.5 below.
New England	68 .3	69 .8	1°.5 above.
Middle Atlantic States	73 .7	73 .1	0°.6 below.
South Atlantic States	79 .9	77 .7	2°.2 below.
Gulf States	82 .9	79 .7	3°.2 below.
Lower Lake region	69 .1	67 .2	1°.9 below.
Upper Lake region	66 .6	63 .9	2°.5 below.
Ohio valley and Tennessee	75 .6	72 .2	3°.4 below.
Upper Mississippi valley	73 .8	69 .8	4°.0 below.
Lower Missouri valley	75 .7	71 .1	4°.6 below.
Minnesota	66 .7	65 .5	1°.2 below.
Pacific Coast	66 .4	65 .3	1°.1 below.

TEMPERATURES OF WATER FOR AUGUST.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Alpena	70°	63°	14
Augusta	86	77	5
Baltimore	81	73	12
Buffalo	73	67	12
Burlington	76	68	18
Cairo	79	74	24
Charleston	84	79	38
Chicago	78	64	10
Cincinnati	78	75	11
Duluth	67	57	16
Eastport	51	47	17
Escanaba	64	56	14
Galveston	88	81	12
Indianola	89	81	9
Jacksonville	88	82	10
Keokuk	80	70	6
Key West	87	75	16
Knoxville	79	74	20
La Crosse	76	68	20
Leavenworth	78	74	2
Louisville	79	74	15
Memphis	78	73	20
Marquette	60	49	17
Milwaukee	63	57	12
Mobile	86	79	15
Montgomery	86	79	5
Nashville	81	74	39
New London	75	64	12
New York	74	70	18
Norfolk	84	71	24
Omaha	76	71	25
Pittsburgh	74	59	9
Portland, Maine	60	58	26
St. Marks	80	70	16
St. Louis	80	74	19
Savannah	85	76	10
Shreveport	86	77	18
Toledo	80	65	10
Wilmington	87	76	12
Wood's Hole	74	72	8
Yankton	82	71	10

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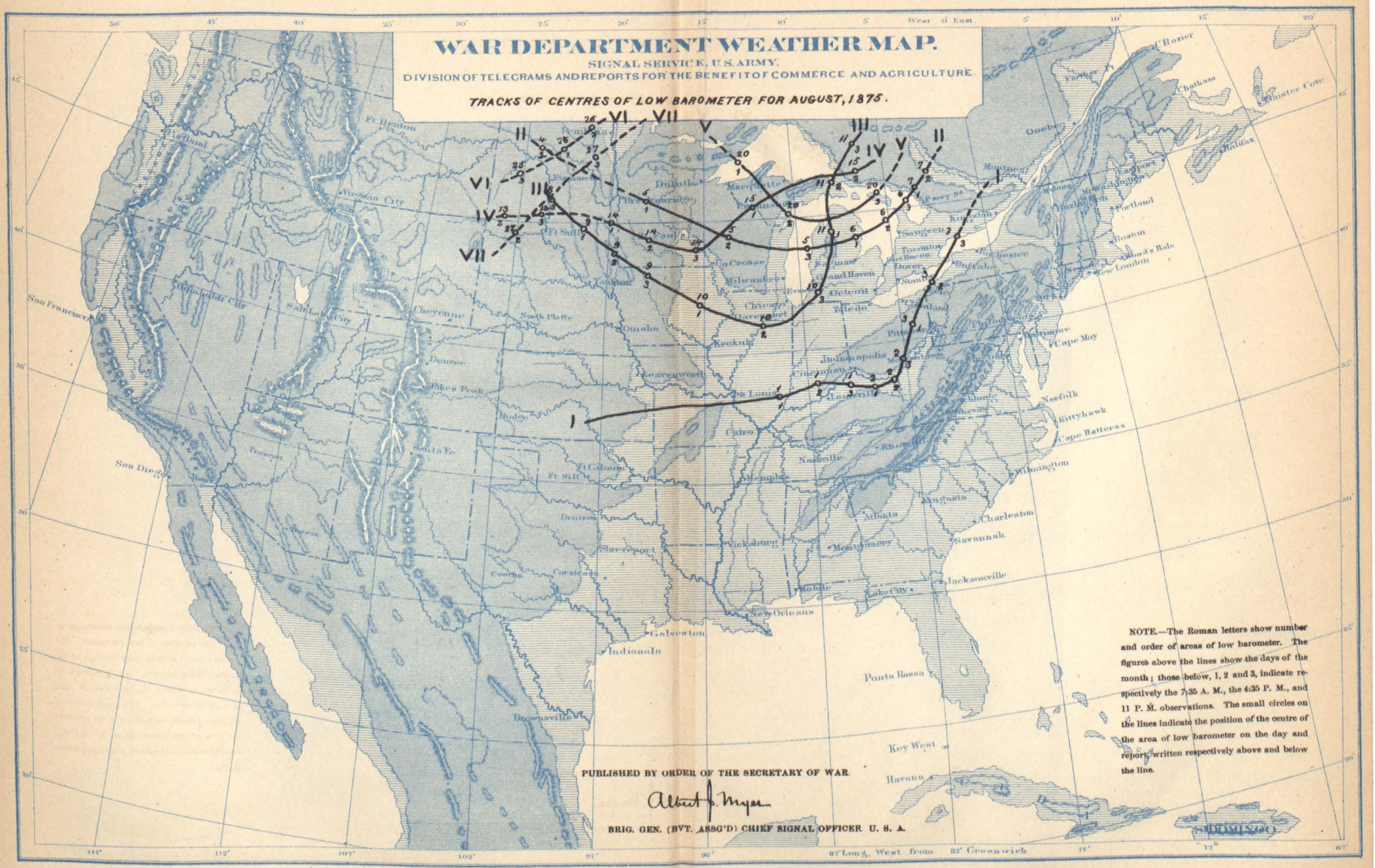
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY,

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF LOW BAROMETER FOR AUGUST, 1875.



NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and reports written respectively above and below the line.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN. (BVT. ASSG'D) CHIEF SIGNAL OFFICER U. S. A.

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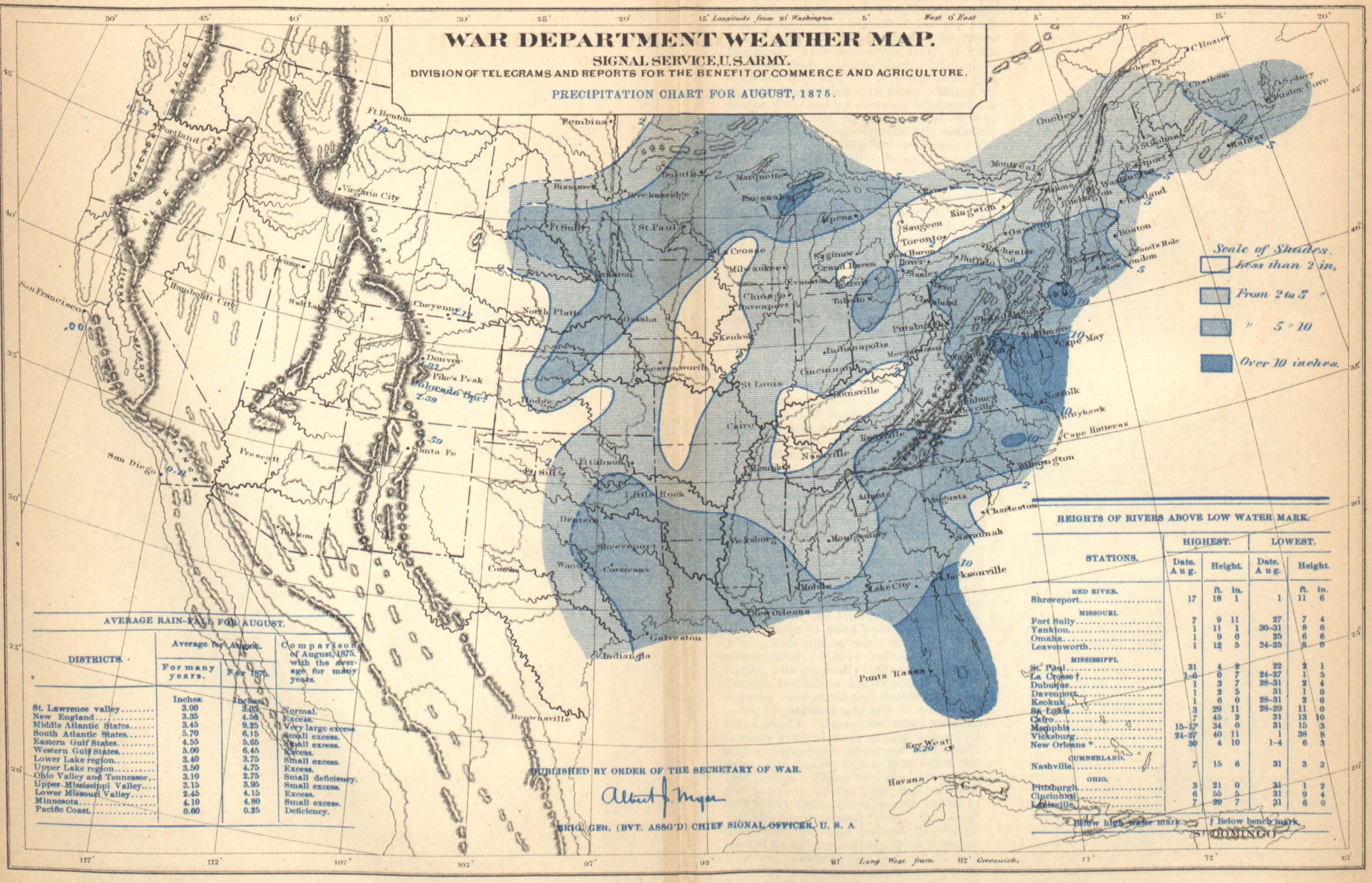
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR AUGUST, 1875.



AVERAGE RAIN-FALL FOR AUGUST.

DISTRICTS.	Average for August. For many years.	Average for August. For 1875.	Comparison of August, 1875, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	3.00	3.05	Normal.
New England	3.35	4.50	Excess.
Middle Atlantic States	3.45	9.25	Very large excess.
South Atlantic States	5.70	6.15	Small excess.
Eastern Gulf States	4.55	5.65	Small excess.
Western Gulf States	5.00	6.45	Excess.
Lower Lake region	3.40	3.75	Small excess.
Upper Lake region	3.50	4.75	Excess.
Ohio Valley and Tennessee	3.10	2.75	Small deficiency.
Upper Mississippi Valley	3.15	3.95	Small excess.
Lower Missouri Valley	2.45	4.15	Excess.
Minnesota	4.10	4.80	Small excess.
Pacific Coast	0.60	0.25	Deficiency.

HEIGHTS OF RIVERS ABOVE LOW WATER MARK.

STATIONS.	Highest. Date. Aug.	Highest. Height. ft.	Highest. Height. in.	Lowest. Date. Aug.	Lowest. Height. ft.	Lowest. Height. in.
RED RIVER.						
Shreveport	17	18	1	1	11	6
MISSOURI.						
Fort Sully	7	9	11	27	7	4
Yankton	1	11	1	30–31	8	8
Omaha	1	9	0	25	6	6
Leavenworth	1	12	5	24–25	3	0
MISSISSIPPI.						
St. Paul	31	4	2	22	2	1
La Crosse †	1–6	0	7	24–27	1	5
Dubuque	1	3	7	28–31	2	4
Davenport	1	2	5	31	1	0
Keokuk	1	6	0	28–31	2	0
St. Louis	3	29	11	28–29	11	0
Cairo	7	45	2	31	13	10
Memphis	15–17	34	0	31	15	3
Vicksburg	24–27	40	11	1	38	8
New Orleans *	30	4	10	1–4	6	3
CUMBERLAND.						
Nashville	7	15	6	31	3	3
OHIO.						
Pittsburgh	3	21	0	31	1	2
Cincinnati	6	55	5	31	9	4
Louisville	7	29	7	31	6	0

* Below high-water mark. † Below bench mark.

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Albert J. Myer

BRIG. GEN. (BVT. ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.

reached the velocity of forty-five miles per hour at Toledo. Heavy rains fell from Kentucky and Illinois to Lake Erie; at Indianapolis 3.85 inches in eight hours. On the 2d the high barometer moved over New England, permitting this low pressure to take a northeastward course. The northeasterly gales continued on the western portion of Lake Erie, and commenced on the Middle Atlantic and New England coasts. The heavy rains gradually extended eastward over the Middle States to Southern New England. At Washington, D. C., 2 inches fell in eight hours. Southerly gales were reported from Eastern North Carolina. During the 3d decided changes took place. Both the high and low pressure areas commenced to lose their distinctive features, and the winds diminished in force. Rainy weather prevailed in the Middle and Eastern States, followed by clearing weather in the former at night. At Albany 1 inch of rain fell in less than eight hours; at Oswego 1.05 inches; at Long Branch 1.15 inches; at Boston 1.55 inches. On the 4th occasional showers passed in New England and the eastern portion of the Middle States. The heavy rains in Missouri, Southeastern Iowa, Illinois, Indiana, Ohio, West Virginia, and Western Pennsylvania, from July 31 to August 2, were not only very destructive to the crops, but also caused the streams to overflow their banks, and wash away houses, bridges, grain, railroads, &c. The Monongahela River was above the "danger line" on the 1st, 2d, and 3d. The Ohio reached the "danger line," at Pittsburgh, on the 3d; at Marietta the 2d; at Cincinnati the 3d; at Louisville the 4th; at Evansville during July, and its highest point on the 9th instant; at Paducah the 12th.

No. II. Diminishing pressure in the Northwest on the 4th indicated the approach of some disturbance, while severe and destructive hail-storms occurred in Eastern Nebraska. The morning of the 5th it had advanced, so that its center could be located in Southern Minnesota. By midnight it had reached the eastern shore of Lake Michigan, having moved southeastward very rapidly, and, consequently, produced frequent and heavy squalls. Gales were reported from Lakes Michigan and Superior. Heavy showers of rain occurred in Minnesota and the Upper Lake region. On the 6th, the center took a northeastward course to Georgian Bay. South to west gales prevailed on Lakes Michigan, Erie, and Huron, to the south of its path, and northeast to northwest gales to the north of it on Lakes Huron, Michigan, and Superior. Heavy showers of rain fell, the largest amounts in eight hours having been at Escanaba, 1.01 inches; at Marquette, 1.09 inches; at Buffalo, 1.37 inches; at Oswego, 1.48 inches; at Erie, 1.65 inches; at Rochester, 1.77 inches. Terrific and destructive thunder-storms accompanied it in Illinois, Indiana, Southern Michigan, Ohio, Kentucky, and Tennessee. The highest wind velocities were reported from Grand Haven, west, 40 miles per hour; at Escanaba, north, 32 miles; and at Long Branch, southwest, 45 miles. It disappeared into Canada on the 7th. As the storm approached the Lake region the barometric readings grew less and the gradients steeper.

The lowest barometric reading (29.329 inches) was reported from Alpena, Mich., on the morning of the 6th.

No. III, as will be seen by the chart, made its appearance in Dakota, passing thence into Iowa, on the 9th. So far as known, dangerous winds were not experienced thus far, and generally light showers of rain fell from Wisconsin and Iowa westward. During the 10th, the rains extended eastward to Lake Huron and Ohio, with occasional heavy thunder-storms in the Southern States. Heretofore, its progress had been southeastward, but on the 11th it took a nearly due north course over Michigan into Canada. Frequent and severe thunder-storms continued in the Southern States, and extended to the Middle States. Light rains fell in the Lower Lake region, and very heavy rains in the Upper Lake region. At Marquette, 2.85 inches, and at Escanaba, Mich., 3.59 inches were recorded within twenty-four hours. On the 12th it slowly disappeared. Heavy rains continued on the Eastern Gulf coast and in the Middle States, but generally light rains in New England. In Essex and Passaic Counties, New Jersey, tornadoes are reported as having occurred, with heavy rains, on the 11th, causing very rapid and destructive rises in the rivers.

No. IV pursued a nearly due east course from Dakota over the Upper Lake region into Canada. Occasional rains resulted therefrom in the Northwest on the 14th, which became general, and, at places, heavy in the Upper Lake region. At the same time a minor depression advanced eastward over Texas, producing heavy rains. At Corsicana 3.88 inches fell within eight hours; at Shreveport, 1.29 inches; at Vicksburg, 1.54 inches. These two gradually combined to form a secondary depression, which, on the morning of the 18th, was central over Pennsylvania. Up to that date frequent and heavy thunder-storms prevailed in the Southern and Middle States, and hail occasionally accompanied them. On the 18th and 19th it slowly disappeared to the northeastward over and beyond the Saint Lawrence Valley. Dangerous winds were reported as having accompanied thunder-storms along the New Jersey and Southern New England coasts on the 18th, while in the western portions of Connecticut and Massachusetts, and the southeastern portion of New York, unusual heavy rains fell. At Springfield, 2.80 inches in less than eight hours; at Hartford, 3.10 inches in about an hour; causing creeks and rivers to overflow their banks, and destroying an immense amount of property.

No. V reached the Upper Lake region from Manitoba, and disappeared northeastward into Canada. It was felt principally in the first section and Eastern Minnesota, where high north and northwest winds, and occasional hail and heavy rains, occurred on the 28th. At Escanaba, Mich., the wind attained a velocity of 44 miles per hour. On the 21st, a severe thunder-storm and gale of wind prevailed in Northern Indiana during the afternoon; also numerous rains in the Lower Lake region. Its sudden disappearance was no doubt due to high barometer No. II, which followed it quite rapidly on the 21st. A destructive whirlwind resulted near Albany, N. Y., on the 22d.

No. VI. Following high barometer No. II, the pressure diminished quite rapidly on the 23d and 24th from the Upper Mississippi Valley westward, with rising temperature, south to east winds, increasing to brisk and high, increasing cloudiness and rain-areas, from Nebraska to Dakota and Minnesota. Thus far it had pursued a southeastwardly course, but on the 25th and 26th was forced to take a northeastward course, as shown on the chart, under the influence of the pressure prevailing over the country to the east and southeast of it. Severe rain, wind, and thunder-storms are reported as having accompanied it from Kansas and Western Missouri to Dakota, Minnesota, and the western portion of Lake Superior.

No. VII. This depression succeeded the previous one on the 27th, and also moved northeastward from Dakota beyond the limit of the stations on the 28th. From Kansas and Missouri northward over Dakota, Minnesota, and the western portion of Lake Superior, frequent and violent thunder-storms accompanied it.

On the 29th, 30th, and 31st the pressure diminished in the extreme Northwest, with brisk and high south to east winds, high temperature, and numerous severe thunder-storms. At Saint Paul 2.05 inches of rain fell within eight hours; at La Crosse, 1.32 inches.

(3) *Local storms.*—A cyclone struck about 2 miles east of Somonauk, Ill., at 7.20 p m., on the 5th instant, and passed through Sandwich, doing considerable damage. Thence it took a northeastward course, damaging corn-fields, fences, &c. On the same date, in Palmyra Township, Lee County, Illinois, a hurricane demolished windmills and prostrated trees, fences, &c. In the adjacent counties of Carroll and Whitesides, barns were destroyed. North of Galesburgh, Ill., a disastrous tornado occurred on the same date, demolishing twenty-five farm-houses and destroying all the crops in its course. It passed over Wataga, where it also did considerable damage. Its path was from one-fourth to one-half of a mile in width. During the morning of the 6th a severe thunder-storm occurred at McMinnville, Tenn. The wind was from the southwest and suddenly increased to a gale. It shifted very quickly to northwest, when hail commenced falling, and again back to southwest and south, leveling trees and fencing. After shifting to south, a railroad-bridge, 300 feet in length, was raised from its piers and thrown into the river. Blacksburgh, Va., was visited about noon of the 10th by a heavy and terrific rain and hail storm, which was very destructive to property. During the heavy rain-storm in New Jersey on the 11th, a whirlwind passed from south-southwest to north-northeast in South Orange, with a track about 200 feet in width. Barns were blown down and trees uprooted and broken off. Corn-fields presented the appearance of a heavy roller having passed over them. From 9 a. m. to 2.30 p. m., 5.10 inches of rain fell, which caused the streams to overflow and become destructive. A violent tornado passed about two miles south of the village of Hutchinson, Minn., on the evening of the 25th. Houses, &c., in its path, were destroyed. Bundles of grain were carried a distance of nearly a mile. At Vicksburgh, Miss., a very violent thunder-storm occurred on the 5th. The wind shifted to north and northeast, and attained the velocity of 40 miles per hour. On the 14th, at Corsicana, Tex., during the heavy thunder-storm, the lightning was fearful, and 3.90 inches of water fell. The creeks overflowed their banks and carried away houses, &c. Spartanburgh, S. C., was visited on the same date by a severe wind, rain, and hail storm, damaging buildings and crops.

United States steamer Rio Bravo encountered a heavy southerly gale during the night of the 13th, 15 miles from Sabine light, on the coast of Texas. The vessel was badly damaged and run ashore. A schooner was struck by lightning on the 16th off Sandy Hook, N. J. Off Chatham, New Brunswick, a schooner was damaged by a whirlwind.

TEMPERATURE OF THE AIR.

The isothermal lines for the month appear on Chart No. II, while in the left-hand lower corner of the same is a table giving the average temperatures, by districts, for the month. In all the districts excepting New England the weather has been cooler than usual, especially from the Gulf coast to the Upper Lake region and the Northwest. The difference is greatest in the Upper Mississippi and Lower Missouri Valleys. It has been slightly warmer than August, 1873, in New England and Eastern New York, but otherwise generally cooler. Compared with August of last year, the temperature averages a little higher in New England, Eastern New York, New Jersey, and on the Pacific coast. In other sections it averages lower, especially in the Southwest, where the

difference is as much as 8°. The following are the minimum temperatures for the several districts: Escanaba, 38°; Pembina, 26°; Pike's Peak, 24°; Cleveland and Buffalo, 48°; Mount Washington, 28°; Burlington, Vt., 46°; New York, 55°; Wytheville, Va., 48°; Charleston, 67°; Bismarck, Dak., 39°; Virginia City, Mont., 33°; Dubuque, 41°; Saint Louis, 55°; Memphis, 63°; Corsicana and Shreveport, 64°; Montgomery, 65°; Key West, 73°. Maximum temperatures: Bismarck, 91°; Saint Paul and Dubuque, 90°; Milwaukee, 89°; Erie, 87°; Mount Washington, 61°; Burlington, Vt., 87°; Portland, Me., 90°; Wood's Hole, Mass., and Newport, 81°; New York, 90°; Wilmington, N. C., 92°; Key West and Augusta, Ga., 91°; Jacksonville, 95°; Montgomery, 94°; Shreveport, 104°; Nashville, 89°; Louisville, 88°; Leavenworth, 90°; Denver, 96°; Pike's Peak, 55°. The greatest range of temperature (59°) was at Pembina, Dak., and the least (18°) at Key West.

Frost.—Light frosts were reported to have occurred on the 1st in Northeastern Pennsylvania; the 19th in Iowa; 20th in Ohio; 23d, 24th, and 25th in New York; 27th in New York, Pennsylvania, and Wyoming Territory; 28th in Iowa; 29th in Minnesota; heavy and destructive frosts on the 21st in Minnesota; the 22d in Illinois, Iowa, Michigan, Wisconsin, and Minnesota; the 23d in Wisconsin, Michigan, Iowa, Illinois, Indiana, and Ohio. Some of the above have been spoken of in connection with the movement of areas of high barometer.

PRECIPITATION.

Chart No. III shows the distribution of the rain-fall. The table upon the same, giving the average by districts, furnishes the means of comparing it with the average for years. It shows that the precipitation has been above the average, excepting in the Saint Lawrence Valley, Tennessee, and the Ohio Valley, and on the Pacific coast. The very large excess in the Middle Atlantic States is due principally to the storms of the 2d and 3d, the 7th, 11th, 12th, and 13th, and the 17th and 18th. The rain-fall has also been heavier than for August, 1874, in the Saint Lawrence Valley, Middle Atlantic States, South Atlantic States, East Gulf States, West Gulf States, Lake region, Upper Mississippi and Lower Missouri Valleys, and Minnesota.

Cloudy days.—The number of cloudy days (other than those on which rain fell) averages as follows: In New England, 4; Middle Atlantic States, 2; South Atlantic States, 4.2; Gulf States, 2.4; Ohio Valley and Tennessee, 2.5; Lower Lake region, 3; Upper Lake region, 1.6.

Rainy days.—The number of days during which rain fell is decidedly above the average for the month in all the districts except the Northwest: In New England the average number of days being 12.2; Middle Atlantic States, 18.2; South Atlantic States, 14.4; Gulf States, 12.4; Ohio Valley and Tennessee, 9.8; Lower Lake region, 13.5; Upper Lake region, 13.5; the Northwest, 10.6.

In Southeastern Indiana the greater portion of the rain fell during the first part of the month. The latter part is reported to have been very dry, and the crops suffering from drought.

Unusually heavy rains, and destructive floods resulting therefrom, have generally been mentioned under the head of storms.

The heaviest total rain-falls reported from the different States for the month are: at Gardiner, Me., 6.60 inches; Contoocookville, N. H., 6.10; Norwich, Vt., 4.10; Springfield, Mass., 9.38; Newport, R. I., 5.26; Colebrook, Conn., 14.39; New York City, 10.42; Trenton, N. J., 14.08; West Chester, Pa., 9.67; Milford, Del., 11.75; Woodlawn, Md., 11.81; Washington, D. C., 12.93; Hampton, Va., 14.41; Morgantown, W. Va., 5.58; Goldsborough, N. C., 11.45; Greenville, S. C., 7.80; Gainesville, Ga., 7.62; Punta Rassa, Fla., 12.14; Mobile, Ala., 7.07; Vicksburgh, Miss., 8.85; Point Pleasant, La., 11.78; Denison, Tex., 9.30; Hot Springs, Ark., 2.60; Fort Gibson, Ind. T., 4.44; Cleveland, Tenn., 8.45; Newport Barracks, Ky., 3.73; Kenton, Ohio, 7.92; Indianapolis, Ind., 3.66; Traverse City, Mich., 7.15; Escanaba, Mich., 12.06; Embarrass, Wis., 7.70; Sandwich, Ill., 5.40; Corning, Mo., 3.60; Rockford, Iowa, 7.60; Fort Snelling, Minn., 8.82; Fort Randall, Dak., 5.15; Norfolk, Nebr., 16.10; Belleville, Kans., 7.90; Pike's Peak, Colo., 3.52; Fort D. A. Russell, Wyo., 9.

Snow.—On the summit of Pike's Peak, Colo., snow fell from the 11th to the 15th; 18th to the 23d; on the 25th and 27th.

Hail.—Hail fell upon sixteen days of the month on Pike's Peak; on the 3d at Fort Snelling, Minn.; 4th, Flushing, N. Y., Nebraska, and Wyoming Territory; 5th, Ringgold, Ohio; 6th, McMinnville, Tenn.; 7th, Alabama, Virginia, and Wyoming; 10th, Illinois and Virginia; 14th, South Carolina and Wyoming; 16th, Colorado, Wyoming, Ohio, and New York; 18th, Indiana; 19th, Wyoming and Ohio; 20th, Minnesota; 21st, Pennsylvania, Michigan, and Wyoming; 24th and 27th, Minnesota.

RELATIVE HUMIDITY.

The relative humidity averages, for the different districts, as follows: In New England, 77 per cent.; on the New Jersey coast, 86; in the Middle Atlantic States, 78;

South Atlantic States, 76; Gulf States, 75; Ohio Valley and Tennessee, 71; Lower Lake region, 73; Upper Lake region, 73; the Northwest, 68. It is above the average in all the districts, especially in the Middle States and Lower Lake region. For Denver, Colo., and Santa Fé, N. Mex., the mean for the month is 47 per cent.

WINDS.

The *prevailing winds* for the month are shown by the arrows upon Chart No. II. They have been southerly at the majority of stations, and from the high-pressure area toward the low. The effect of local influences will be seen at Boston, Pittsburg, Lynchburg, Nashville, Memphis, Cincinnati, Marquette, &c. The highest wind-velocities, in miles per hour, have been mentioned in connection with the general storms, during the passage of which they occurred. The total movement of the air, independent of direction averages for the stations in New England, 3,626 miles; New Jersey coast, 7,811; Middle Atlantic States, 4,368; South Atantic States, 4,540; Gulf States, 4,119; Ohio Valley and Tennessee, 2,941; Lower Lake region, 4,985; Upper Lake region, 5,930; the Northwest, 5,138. The following are some of the greatest total movements, viz: Pike's Peak, 11,209 miles; San Francisco, 9,105; Atlantic City, N. J., 8,431; Long Branch, 8,399; Indianola, 7,784; Grand Haven, 6,875; Cheyenne, 6,382; Escanaba, 6,328. Of the least are given Montgomery, 2,683 miles; Louisville, 2,626; Memphis, 2,624; Morgantown, W. Va., 2,580; Springfield, Mass., 2,575; Albany, 2,531; Vicksburg, 2,182; Nashville, 2,163; Augusta, 2,159; Knoxville, 2,145; Wytheville, Va., 2,048; Lynchburg, 2,045.

VERIFICATIONS.

Probabilities.—The usual comparison of the "probabilities," issued tri-daily and covering twenty-four hours from the time of issue, with the conditions following the same, shows that the average verification, for all the districts predicted, is 91.14 per cent. The percentage is greatest for the Upper Lake region, (92.6 per cent.,) and least for New England, (89.4 per cent.) The wind direction predictions have been the most successful, viz, 96.73 per cent. verified; weather, 91.43; temperature, 91.09; barometer, 85.77. The omissions to predict average 0.32 per cent.

Cautionary signals.—Twenty Canadian stations were notified of the probable approach of storms during the month, but with what result is not known. Out of forty-nine cautionary signals ordered to be displayed at the Signal Service, United States Army, stations on the Lakes and the Atlantic coast, thirty-nine were justified by subsequent dangerous winds either at the station or within a radius of one hundred miles of the same. Three were ordered late. Seven were not justified. Gales were reported to have occurred, for which cautionary signals were not ordered, at Wilmington, N. C., on the 2d; over Lake Michigan on the 5th; at Jacksonville, Fla., on the 6th; at Milwaukee on the 10th; over Lake Huron on the 11th; along the New Jersey and southern New England coasts on the 18th; over Lake Michigan on the 20th; along the middle Atlantic coast on the 23d and 24th; on the North Carolina coast during the 25th and 26th.

NAVIGATION.

Upon Chart No. III will be found a table giving the highest and lowest water-marks, with the dates on which they occurred, at the stations along the principal rivers. The Ohio fell almost continuously after the floods during the first part of the month. The Mississippi, at Cairo, had reached the "danger-line" during July, but continued rising until the 7th, after which it fell continuously. At Memphis, the "danger-line" was reached on the 15th, twenty-seven miles below which point it overflowed on the 4th. At Helena it rose above the "danger-line" during July, and to its maximum on the 21st instant. At Vicksburg its maximum, on the 24th, was within one inch of the "danger-line." The Red River rose slowly and steadily until the 17th, after which it continued falling. The Lower Missouri rose during the first week, but generally fell afterward. Navigation was suspended on the 7th, over the Des Moines Rapids at Keokuk, Iowa, on account of low water.

TEMPERATURE OF THE WATER.

A table appears on Chart No. II, giving the maximum and minimum temperatures of the water at the bottom, at the different stations along the coast, lakes, and rivers.

ATMOSPHERIC ELECTRICITY.

(1) *Thunder-storms.*—These occurred in at least four States during every day of the month. On the 21st and 23d they were reported as the least frequent, and only from the Southwestern and Northwestern States. The dates upon which they occurred most frequently are the 4th, 5th, 6th, 10th, 13th, 16th, and 19th.

Near Freehold, N. J., upon the 7th, while the sky was clear overhead with clouds in

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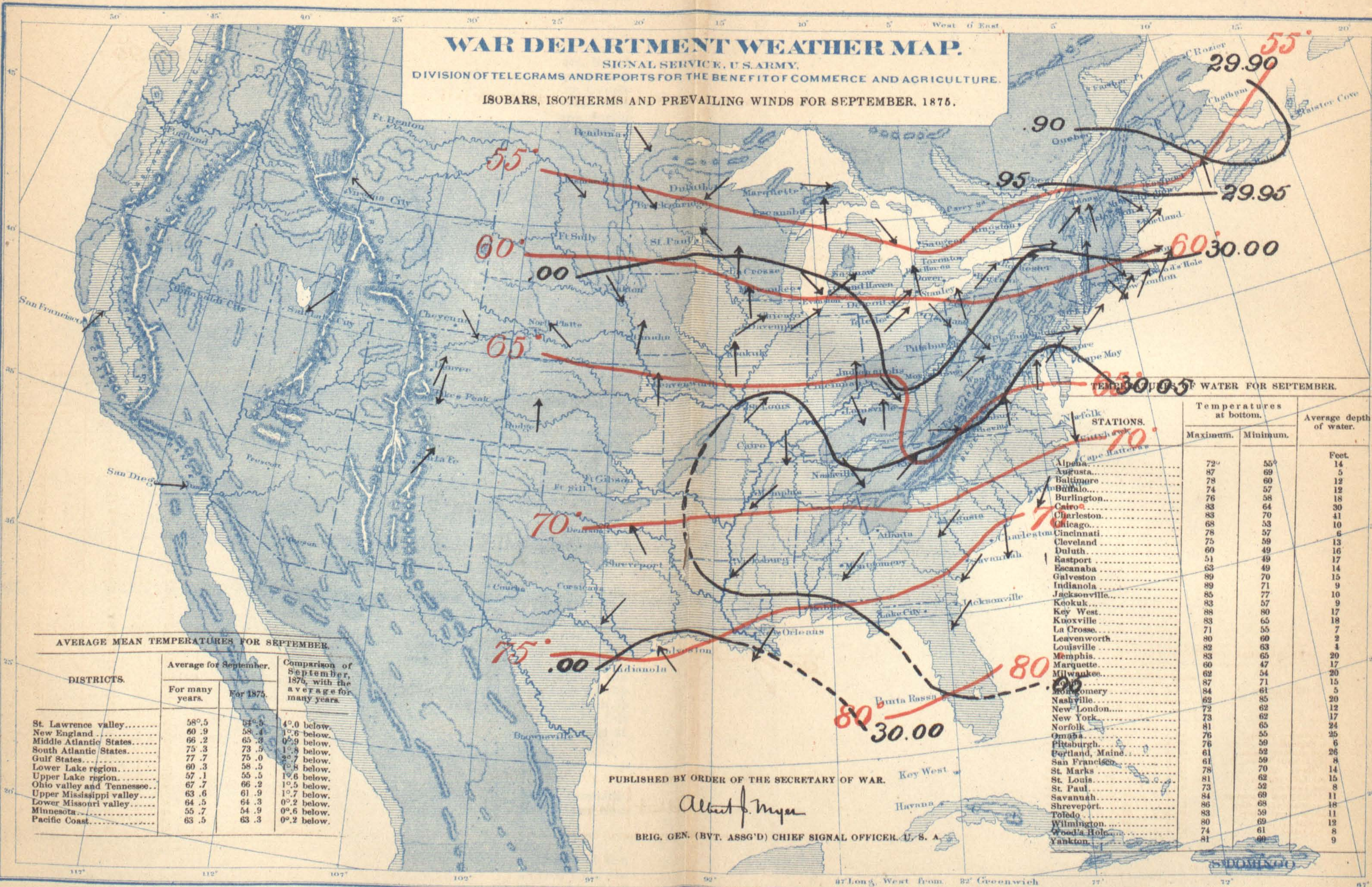

AVERAGE MEAN TEMPERATURES FOR SEPTEMBER.

DISTRICTS.	Average for September.		Comparison of September, 1875, with the average for many years.
	For many years.	For 1875.	
St. Lawrence valley	58°.5	54°.5	4°.0 below.
New England	60 .9	58 .4	1°.6 below.
Middle Atlantic States	66 .2	65 .3	0°.9 below.
South Atlantic States	75 .3	73 .5	1°.8 below.
Gulf States	77 .7	75 .0	2°.7 below.
Lower Lake region	60 .3	58 .5	1°.8 below.
Upper Lake region	57 .1	55 .5	1°.6 below.
Ohio valley and Tennessee	67 .7	66 .2	1°.5 below.
Upper Mississippi valley	63 .6	61 .9	1°.7 below.
Lower Missouri valley	64 .5	64 .3	0°.2 below.
Minnesota	55 .7	54 .9	0°.6 below.
Pacific Coast	63 .5	63 .3	0°.2 below.

TEMPERATURES OF WATER FOR SEPTEMBER.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Alpena	72°	55°	14
Augusta	87	69	5
Baltimore	78	60	12
Buffalo	74	57	12
Burlington	76	58	18
Cairo	83	64	30
Charleston	83	70	41
Chicago	68	53	10
Cincinnati	78	57	6
Cleveland	75	59	13
Duluth	60	49	16
Eastport	51	49	17
Escanaba	63	49	14
Galveston	89	70	15
Indianola	89	71	9
Jacksonville	85	77	10
Keokuk	83	57	9
Key West	88	80	17
Knoxville	83	65	18
La Crosse	71	55	7
Leavenworth	80	60	2
Louisville	82	63	4
Memphis	83	65	20
Marquette	60	47	17
Milwaukee	62	54	20
[illegible]	87	71	15
Montgomery	84	61	5
Nashville	62	85	20
New London	72	62	12
New York	73	62	17
Norfolk	81	65	24
Omaha	76	55	25
Pittsburgh	76	59	6
Portland, Maine	61	52	26
San Francisco	61	59	8
St. Marks	78	70	14
St. Louis	81	62	15
St. Paul	73	52	8
Savannah	84	69	11
Shreveport	86	68	18
Toledo	83	59	11
Wilmington	80	69	12
Wood's Hole	74	61	8
Yankton	81	60	9

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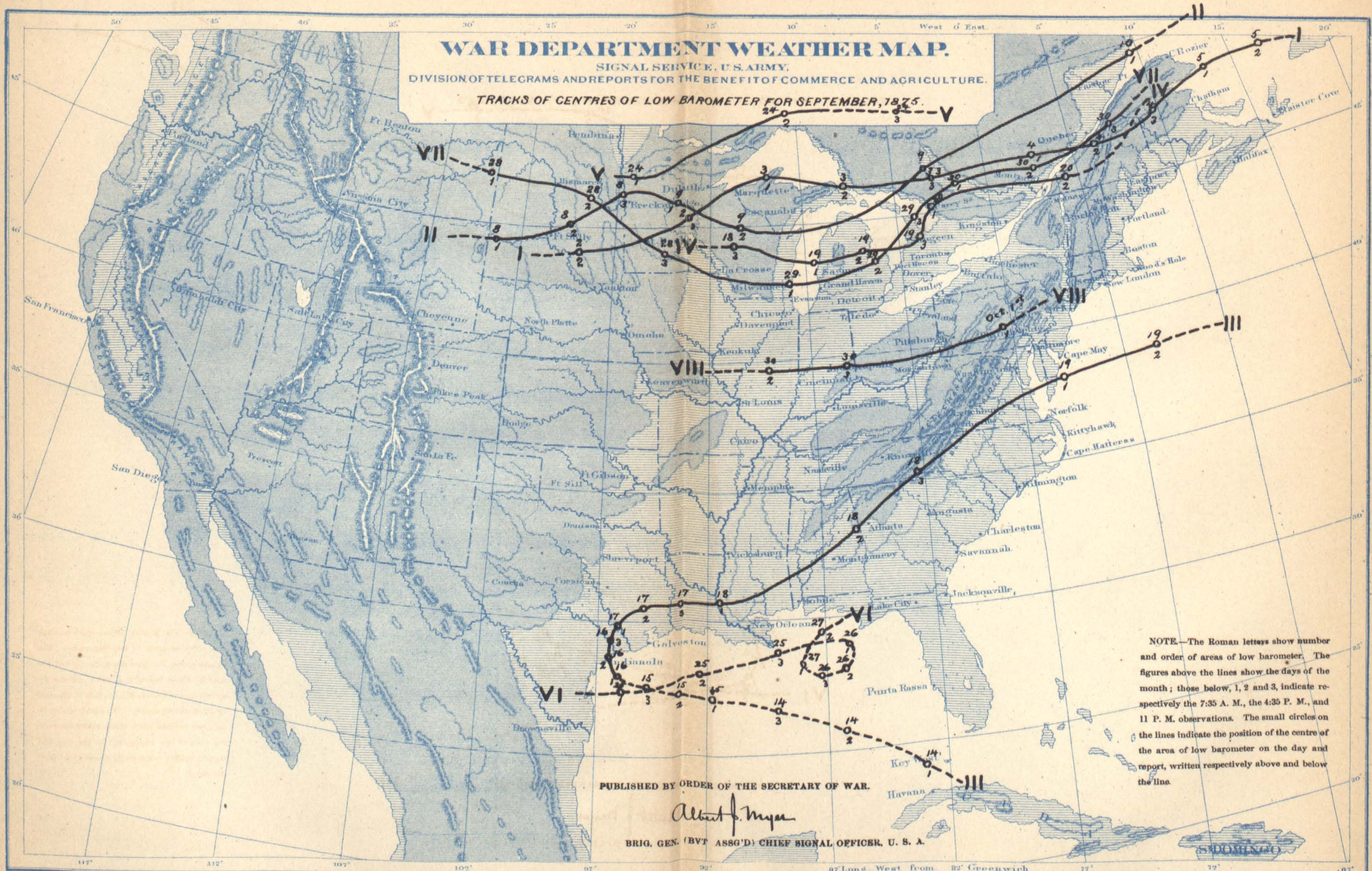
WAR DEPARTMENT WEATHER MAP.
SIGNAL SERVICE, U.S. ARMY,
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.
TRACKS OF CENTRES OF LOW BAROMETER FOR SEPTEMBER, 1875.
NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
Albert J. Myer
BRIG. GEN. (BVT ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.
Long. West from Greenwich
San Francisco
San Diego
Cheyenne
Denver
Omaha
Chicago
St Louis
Milwaukee
Marquette
Duluth
Bismarck
Toledo
Detroit
Cleveland
Buffalo
Pittsburgh
Cincinnati
Nashville
Memphis
Vicksburg
Shreveport
Galveston
Indianola
New Orleans
Mobile
Montgomery
Atlanta
Augusta
Charleston
Savannah
Jacksonville
Wilmington
Norfolk
Cape Hatteras
Kittyhawk
Cape May
Baltimore
New London
Boston
Portland
Eastport
Halifax
Quebec
Chatham
Punta Rassa
Key West
Havana
S. DOMINGO

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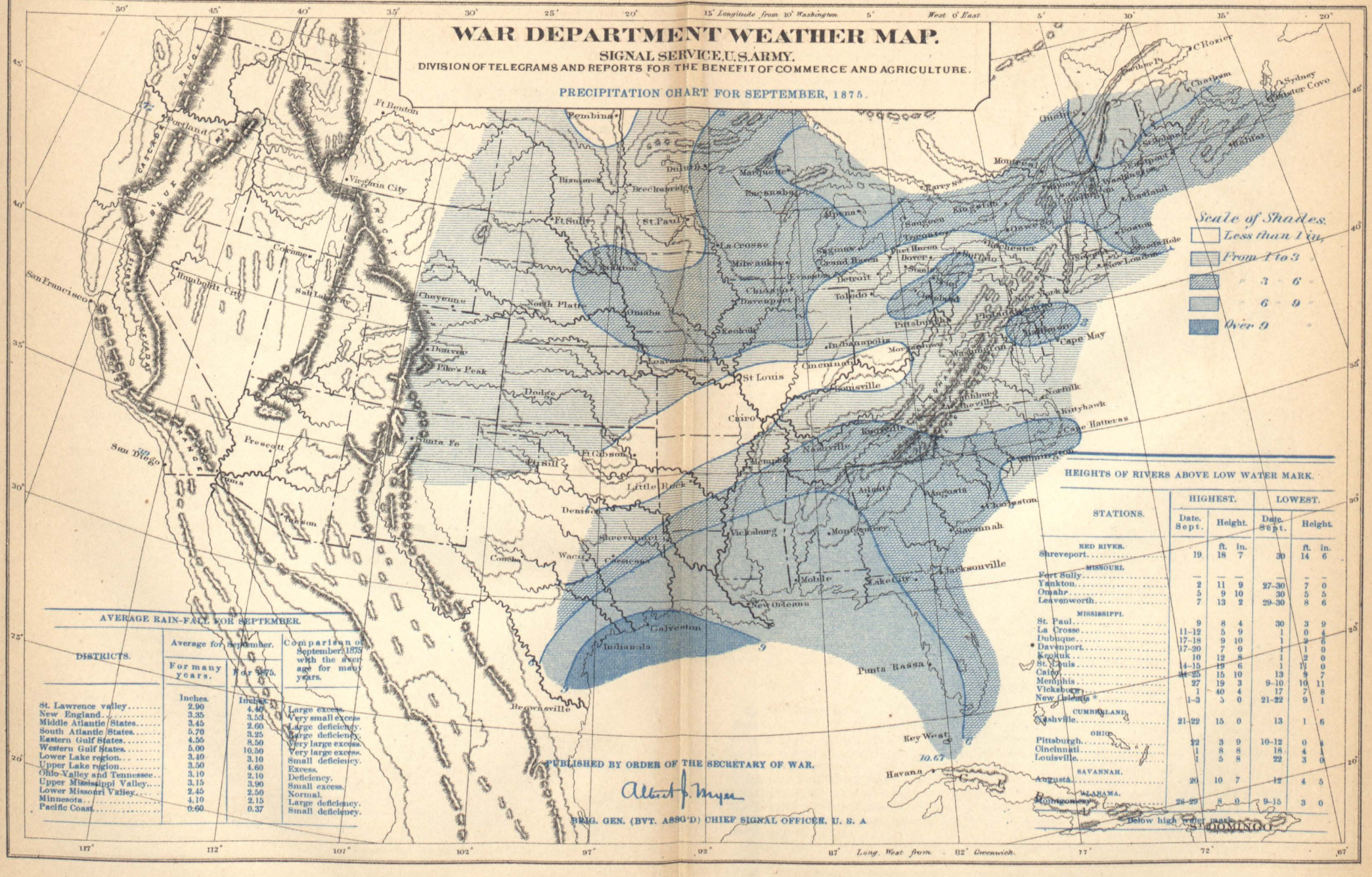
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR SEPTEMBER, 1875.



AVERAGE RAIN-FALL FOR SEPTEMBER.

DISTRICTS.	Average for September. For many years.	For 1875.	Comparison of September, 1875 with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	2.90	4.40	Large excess.
New England	3.35	3.53	Very small excess
Middle Atlantic States	3.45	2.60	Large deficiency.
South Atlantic States	5.70	3.25	Large deficiency.
Eastern Gulf States	4.55	8.50	Very large excess.
Western Gulf States	5.00	10.50	Very large excess.
Lower Lake region	3.40	3.10	Small deficiency.
Upper Lake region	3.50	4.60	Excess.
Ohio Valley and Tennessee	3.10	2.10	Deficiency.
Upper Mississippi Valley	3.15	3.90	Small excess.
Lower Missouri Valley	2.45	2.50	Normal.
Minnesota	4.10	2.15	Large deficiency.
Pacific Coast	0.60	0.37	Small deficiency.

HEIGHTS OF RIVERS ABOVE LOW WATER MARK.

STATIONS.	HIGHEST. Date. Sept.	HIGHEST. Height.		LOWEST. Date. Sept.	LOWEST. Height.	
		ft.	in.		ft.	in.
RED RIVER.						
Shreveport	19	18	7	30	14	6
MISSOURI.						
Fort Sully	—	—	—	—	—	—
Yankton	2	11	9	27–30	7	0
Omaha	5	9	10	30	5	5
Leavenworth	7	13	2	29–30	8	6
MISSISSIPPI.						
St. Paul	9	8	4	30	3	9
La Crosse	11–12	5	9	1	0	4
Dubuque	17–18	9	10	1	2	6
Davenport	17–20	7	0	1	1	0
Keokuk	10	12	8	1	2	0
St. Louis	14–15	19	6	1	11	0
Cairo	24–25	15	10	13	9	7
Memphis	27	19	3	9–10	10	11
Vicksburg	1	40	4	17	7	8
New Orleans	1–3	5	0	21–22	9	1
CUMBERLAND.						
Nashville	21–22	15	0	13	1	6
OHIO.						
Pittsburgh	22	3	9	10–12	0	4
Cincinnati	1	8	8	18	4	1
Louisville	1	5	8	22	3	0
SAVANNAH.						
Augusta	20	10	7	12	4	5
ALABAMA.						
Montgomery	28–29	8	0	9–15	3	0

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN. (BVT. ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.

the northwest, and heavy shower in the southeast, discharges of electricity took place from the latter to the former, and a barn was struck by lightning and consumed.

(2) *Auroras.*—The only auroras reported to have been seen were at Memphis on the 7th, Buffalo on the 9th, and Santa Fé, N. Mex., on the 23d.

OPTICAL PHENOMENA.

(1) *Solar halos.*—These were most frequently observed on the 1st and 2d, in advance of the low barometer; No. I, in Michigan, Pennsylvania, New York, Massachusetts, New Hampshire, Vermont, and Maine. They were seen in one or more States upon every day, except the 3d, 4th, and 16th; in Delaware, New Hampshire, New York, and Connecticut, the 10th; in Massachusetts, New Jersey, Mississippi, and Louisiana, the 19th; in Maine, New Hampshire, New York, Ohio, and Wisconsin, the 23d.

(2) *Lunar halos* are reported to have been seen in Illinois, Ohio, New Jersey, Massachusetts, and Maine, on the 10th; in Kansas, Wisconsin, Texas, North Carolina, and Rhode Island, on the 12th; in Maine, Virginia, North Carolina, Georgia, and Illinois, on the 13th; in Massachusetts, Rhode Island, New York, Wisconsin, Iowa, Missouri, Kansas, and Nebraska, on the 14th. During the first and last parts of the month very few were observed.

(3) *Mirage.*—On the 1st, at Fort Niagara, N. Y.; 2d, Pt. Pleasant, La.; 4th, 10th, 16th, and 19th, at Atlanta, Kans.; 16th, at Ellinwood, Kans.

MISCELLANEOUS PHENOMENA.

(1) *Zoological.*—*Grasshoppers* were reported numerous at Cheyenne, Wyo., on the 6th 8th, 23d, and 24th; at Denver, Colo., from the 8th to the 14th, 19th to 28th, 30th and 31st; at Ellinwood, Kans., on the 18th; near Las Vegas, N. Mex., on the 26th. *Colorado beetle* at Manitowoc, Wis., up to the 22d; at Atco, N. J., and Brookhaven, N. Y., destroying vegetation. *Winged ants* at Kensico, N. Y., on the 20th. *Martins* left Independence, Iowa, on the 20th; Jacksonville, Ohio, on the 14th.

(2) *Forest fires* southeast of Marquette, Mich., on the 3d.

(3) *Meteors* were noticed least frequently about the middle of the month. They were seen on the 5th in Iowa, Minnesota, Missouri, Nebraska, Louisiana, Tennessee, Virginia, and New York; the 6th in Illinois, Indiana, Iowa, Nebraska, Missouri, Minnesota, and Mississippi; the 10th in Iowa, Missouri, Indiana, Louisiana, New York, and Rhode Island; the 12th, in Dakota, Iowa, Illinois, Indiana, Louisiana, and New Jersey.

(4) *Earthquakes* at El Monte, Cal., hummings on the 4th, and rumbles on the 14th.

(5) *Zodiacal lights* at Fall River, Mass., on the 27th; at Burlington, Iowa, 30th and 31st.

(6) *Lunar rainbows* at Mason City, Iowa, on the 9th; Leesburg, Ind., 10th; Gardiner, Me., 13th; Brookhaven, Miss., 18th.

(7) At Marquette, Mich., a comparison of the changes in the barometer with those in the surface of the water in the lake, from tri-daily observations, shows that they acted in a contrary manner sixty-six times, and together twenty-seven times.

Published by order of the Hon. Wm. W. Belknap, Secretary of War.

ALBERT J. MYER,
Brig. Gen., (Brevet Assigned,) Chief Signal-Officer, U. S. A.

MONTHLY WEATHER REVIEW, SEPTEMBER, 1875.

INTRODUCTION.

In the preparation of this general review of the meteorological conditions which obtained in the United States and adjoining territories during the past month, meteorological reports from the following sources have been recorded and carefully examined at this office: Signal Service, U. S. A., 96 stations; United States Army post surgeons, forwarded by the Surgeon-General, 39; Canadian meteorological service, 13; regular volunteer observers, 251; these latter reports have been particularly valuable in the preparation of the accompanying rain-chart. In addition to the above, marine reports have been received, which have served to determine the course and extent of storms beyond the region of permanent stations. The most noticeable meteorological features of the month are—

First. The violent cyclone, which passed to the westward over the West Indies, and thence to the coast of Texas, causing great loss of life and destruction of property, and furnishing one of the most perfect types of a tropical storm originating in the lower latitudes, and passing into the region of the temperate zone, the center of disturbance describing approximately a parabola, the axis of which may be said to coincide with the northern limit of the trade-winds, and the vertex, or most westerly portion of the

curve, being located near Galveston. The storm is referred to in the text under the head of low barometers, and is marked as No. III on the chart of storm-tracks.

Second. The low mean temperature of the month, which has averaged from one to four degrees below the mean in the several districts. This variation, though apparently slight, gives to the month its appreciable low temperature, a condition particularly unfavorable to the agricultural interests of those sections of the country requiring warm, dry weather for the maturing of the unusually late crops. Very early frosts have injured fruit and late corn in the Northwest, and sections of the Middle and New England States.

Third. The droughts which prevailed in sections of the Southern States have been followed by heavy rains in the regions of the Gulf States and Lower Mississippi Valley, but dry and warm weather has continued in the southern portion of the South Atlantic States, and in the northern portion of Texas.

Fourth. The violent local storms which have occurred, especially in New Mexico and Colorado, and on the eastern slope of the Rocky Mountains.

ATMOSPHERIC PRESSURE.

From an examination of Chart No. II, it will be seen that the area of high barometer now extends over the southern portion of the United States, from the South Atlantic coast westward to the Lower Mississippi Valley; and that the area of mean low barometer is in the region of the Lower Saint Lawrence Valley. A comparison with the corresponding chart of the July Review shows a rapid increase of pressure in the Mississippi Valley and the Northwest, and that the area of mean low barometer has moved toward the Atlantic with unusual rapidity.

(1) *Areas of high barometer.*—These areas, observed within the limits of the United States during the month, approached from the northern and interior portion of the continent, moving toward the Atlantic with uniform progression in the interior, but with an apparent retardation after the center had passed to the east of the coast-line. They have been accompanied by a depression of temperature ranging from five to twenty-five degrees below the mean, depending upon the latitude of the station.

No. I. This area is of particular interest, as its origin is distinctly marked within the limits of the United States. It was first inclosed by an isobarometric line of 30.10, which included the regions north of Tennessee and Virginia. During the 7th and 8th the barometer rose at the stations on the Atlantic coast, and the shifting of the winds to the east and south indicated that this area continued its southeasterly course.

No. II. The telegraphic reports received on the morning of September 9 indicated the advance of this area toward the Lake region from British America. It followed immediately depression No. II, accompanied by rain and brisk and high northerly winds from the Missouri Valley eastward over the Lake region. Heavy gales occurred in its southeast quadrant on Lakes Michigan, Erie, and Huron, and in the Saint Lawrence Valley, causing loss of life and serious marine disasters. The path of the center of this area lies to the north of the Lake region, and thence over the northern portion of the Middle States to the Atlantic. Its southern half, therefore, extended over the entire country east of the Rocky Mountains, southward to the Gulf, and the cool weather which was experienced on the Atlantic coast between the 10th and 15th occurred while these districts were in the western quadrants of this area.

No. III. A slight area of high barometer which moved from the Northwest over the Lake region between the 14th and 18th, but not reaching the Atlantic coast, and apparently disappearing under the influence of the cyclone. Frosts proving injurious to late crops occurred in Minnesota, Michigan, Wisconsin, and the northern portions of Illinois and Iowa while this area was central in the Northwest.

No. IV passed from British America southeastward to the South Atlantic, extending over the entire country, causing the barometer to rise from two to four tenths above the mean in all the districts. Clear, cool weather prevailed generally from the 20th to the 24th, and frosts occurred in the northern districts.

(2) *Areas of low barometer.*—The number of barometric depressions traced from the tri-daily reports received at this office during the month is, as in the two preceding months, less than in the corresponding months of previous years.

Chart No. I shows the track of each depression as determined from the consecutive reports after the definite progressive movement had commenced. Compared with those of the previous month, the tracks in the northern portion of the country have a lower mean latitude and a general direction more directly to the east, passing to the Atlantic in the region of the Saint Lawrence Valley.

The disturbances in the southern portion of the United States have been unusually severe, and resulted from storms which originated beyond the limits of the stations of observation. The records of previous years show that the most violent storms occurring in the United States have their origin in the tropics, and that before reaching our stations they have a westerly movement.

No. I. First observed latitude 43° 30′, longitude 22° west from Washington; last

observed latitude 48°, longitude 16° east of Washington; time of transit, 72 hours; hourly velocity, 23½ miles. Reports received during September 1 indicated the approach of this depression, but the center was not located on the tri-daily weather maps until the afternoon of the 2d, and then only approximately in the Upper Missouri Valley, near the eastern boundary of Dakota. The above-mentioned report indicated heavy rains in Minnesota and light rains in the Upper Lake region; the barometer at Bismarck reading 29.63, and at Yankton, 29.66. The rain-belt attending this depression extended from the Missouri Valley eastward over the northern portion of New England and the Middle States and Saint Lawrence Valley during the 2d, 3d, 4th, and 5th. As the storm approached the Atlantic coast the gradient increased, and the winds became dangerous to shipping in the Gulf of Saint Lawrence.

No. II. First observed in latitude 44°, longitude 26° 30′ west; last observed in latitude 49°, longitude 9° east; time of transit, 48 hours; velocity per hour, 33 miles. Reports from the Pacific coast and the northern stations of the Rocky Mountains indicate that this depression had its origin in the North Pacific. It was at no time wholly within the limits of the stations, and its general form was that of an elongated-ellipse, or trough, extending toward the northeast, immediately in advance of the most extended area of high barometer of the month. The rains which followed were unusually heavy in the Lake region, where the storm became very violent on the morning of the 10th, causing disasters, which resulted in serious loss of life. Wrecks were also reported in the Gulf of Saint Lawrence, where the wind became unusually strong, after shifting to the north and west.

No. III. First observed latitude 13°, longitude 17° east; last observed latitude 38°, longitude 6° east; co-ordinate of the vertex of path, latitude 28° 30′, longitude 19° 30′ west; mean velocity per hour, 19 miles. Although this storm is not traced on the chart further to the eastward than the western portion of Cuba, reports recently received indicate that it originated east of Barbadoes, where a severe tornado occurred on the morning of the 9th. Succeeding reports from the West India stations show great barometric disturbances in that region until the afternoon of the 12th, when the storm had reached the eastern portion of Cuba. On the 13th a violent hurricane occurred at Santiago de Cuba, and the barometer at Key West had fallen to 29.81, with a brisk northeast wind. By midnight the wind had increased to a northeast gale, and the barometer had fallen to 29.74. The morning report of the 14th indicated that the center of disturbance had passed to the westward of Key West and Havana. The succeeding tri-daily reports of the 15th and 16th show a continuous westerly movement of the center, the progressive velocity being retarded as the storm approached the vertex of its path; from the afternoon of the 15th to the afternoon of the 17th its mean velocity being 8 miles per hour. During the slow progressive movement the velocity of rotation increased to 88 miles per hour, when the cups of the anemometer at Indianola were carried away. Full accounts have already appeared giving details of the loss of life and destruction of property caused by this storm, the most severe which has occurred in the United States since the establishment of the Signal-Service. In the meteorological history of the country, its parallel occurred between the 27th of September and the 10th of October, 1837. In Chart No. I, it will be seen that the northern half of the curve passes directly to the northeast, cutting the coast-line near Norfolk. During the easterly movement the center of depression gradually changed to an elongated ellipse, and the velocity of rotation was materially retarded while the center remained on the continent. It, however, left the Atlantic coast, producing heavy gales and marine disasters on the Jersey coast. Recent reports from the Atlantic, considered in connection with the violent storms which prevailed north of Great Britain from seven to nine days after the storm left our coast, indicate that this depression may have crossed the Atlantic.

The following reports and observations are taken from the monthly journals of the Signal-Service:

Galveston, September 17.—Storm continues with increased violence; at 2 p. m., barometer reached its minimum, 29.038; maximum velocity of wind, 4.50 p. m., 60 miles, southwest and west.

September 16.—Observer at Indianola reports: "Rain continued and storm increased to hurricane from northeast, accompanied by a disastrous inundation from the bay. One hundred and seventy-six lives lost and three-fourths of the town swept away, causing a loss of upward of one million dollars' worth of property, a severance of communication with the outside world, and a total suspension of business. Highest registered velocity of wind, 88 miles; estimated velocity, 100. The following hourly observations were taken at Indianola on the 15th and 16th:

Date.	Barometer.	Thermometer.	Direction.	Wind—velocity.	Weather.
15th, 2 p. m	29.60	84	N. E.	40	Threatening.
3 p. m	29.73	83	N.	36	Do.
4 p. m	29.70	82	N.	40	Do.
5 p. m	29.70	76	N.	38	Light rain.
6 p. m	29.68	76	N.	41	Do.
7 p. m	29.70	75	N.	40	Do.
8 p. m	29.68	75	N. N. E.	48	Do.
9 p. m	29.66	75	N. N. E.	53	Do.
10 p. m	29.63	74	N. N. E.	56	Do.
11 p. m	29.59	74	N. N. E.	58	Do.
12 m	29.56	74	N. N. E.	60	Do.
16th, 1 a. m	29.52	74	N. N. E.	56	Do.
2 a. m	29.46	74	N. N. E.	60	Heavy rain.
3 a. m	29.39	74	N.	66	Light rain.
4 a. m	29.36	74	N. N. E.	68	Heavy rain.
5 a. m	29.35	74	N. N. E.	64	Do.
6 a. m	29.36	74	N. E.	58	Light rain.
7 a. m	29.34	75	N. E.	66	Heavy rain.
8 a. m	29.33	75	N. E.	56	Light rain.
9 a. m	29.31	75	N. E.	64	Do.
10 a. m	29.29	75	N. E.	60	Do.
11 a. m	29.22	75	N. E.	74	Do.
12 m	29.17	75	N. E.	72	Do.
1 p. m	29.13	75	N. E.	72	Do.
2 p. m	29.06	75	N. E.	68	Do.
3 p. m	29.01	75	N. E.	72	Heavy rain.
4 p. m	28.95	75	N. E.	76	Do.
5 p. m	28.90	75	N. E.	82	Do.

During the continuance of this storm in the gulf a secondary depression developed in the Upper Mississippi Valley and passed directly eastward to the Atlantic coast, causing high winds on the Lakes and near the New England coast. This depression was central in Maine on the 17th, and disastrous storms occurred in the Gulf of Saint Lawrence and the Gulf of Mexico on that day.

No. IV. Observed in the Northwest on the 17th, and first located in latitude 44°, longitude 14° west; last observed in latitude 45°, longitude 5° east; mean velocity per hour 22½ miles. This storm was central in Michigan when the cyclone was central in Eastern Tennessee, but the two depressions remained distinct, the latter moving with greater velocity, disappearing to the east, while the former was central in the Lower Lake region on the morning of the 20th. Light rains preceded and followed this depression, and strong northwest winds occurred on Lakes Michigan and Erie during the night of the 19th. The occurrence of these secondary depressions in the vicinity of the cyclone greatly reduced the barometric gradient, and will account for the diminished force with which the latter passed over the continent.

No. V. The telegraphic reports of the 22d and 23d indicated that this depression extended to the Pacific coast, and that the track of its center was to the north of the Lake region, bearing to the northeast toward Hudson's Bay.

No. VI. This is the approximate track of a local barometric disturbance in the Gulf of Mexico, which, though slight, was accompanied by very heavy rain on the coast, and dangerous winds in the Gulf on the 24th and 25th. Six inches of rain are reported at New Orleans and three inches at Mobile on the 25th. The depression moved slowly to the east, south of the Gulf coast, on the 26th and 27th, and disappeared apparently under the influence of the high barometer, in the Lower Mississippi Valley without passing to the east of Florida. Heavy rains continued near the Gulf coast and in the southern portion of the South Atlantic States during the 26th and 27th.

No. VII. First observed in latitude 47°, longitude 37° west; last observed in latitude 47° 30′, longitude 7° 30′ east; time of transit, sixty-four hours; mean velocity, 25 miles per hour. It developed in the extreme Northwest, and moved in a southeasterly direction until it reached the southerly portion of the Upper Lake region on the morning of the 29th, after which its course changed to the northeast, following the general direction of the Saint Lawrence Valley, being felt as an area of cloud and light rain in the northern portion of the United States, and accompanied by high northerly and westerly winds on Lakes Erie and Michigan, the velocity of which, on the night of the 29th, exceeded 30 miles.

No. VIII. First observed in latitude 39° 30′, longitude 12° west; last observed in latitude 40°, longitude 1° west. This storm is of particular interest, as it developed within the limits of the United States, and moved directly to the east, after a rotary movement of the atmosphere had commenced. On the morning of the 1st of October it was central in Eastern Pennsylvania, after which its course changed slightly to the north of east. The rain-belt accompanying this storm extended over the Lake region, southward to Tennessee, and thence eastward to the Atlantic coast.

(3) *Local storms.*—On the 1st, gales were reported at Wyanet, Ill., and at Independence, Iowa, many trees being blown down at the latter place. On the 3d a severe thunder-storm occurred 20 miles southwest of Abington, Ill., the lightning striking the house of Robert Meachum, killing four cows and one horse. This is regarded, in the vicinity, as the heaviest storm of the year. On the 5th, gales were reported at Corning, Miss., and at Florida, Mass. On the 6th a thunder-storm, accompanied by a high wind, passed over Penn Yan, N. Y. On the 7th and 8th at Belvidere, Ill.; on the 8th and 9th at Beloit, Wis.; on the 9th at Chicago and Keokuk; and on the 9th and 10th at Dubuque, heavy and destructive rain-storms were reported, producing overflows in the rivers and streams of the various neighborhoods on the 9th and 10th, and causing much destruction of property along the banks, bridges, &c. The amount of rain-fall during the storm at Beloit, Wis., is reported over six inches, and at Belvidere, Ill., nearly four inches. On the 10th at 5.30 p. m. at Las Cruces, N. Mex., a water-spout suddenly appeared in the hills one mile back of the town, toward the north, and passed over the town as a tall, dark column of water and dust, destroying buildings, &c., in less than ten minutes. The water in the streets was from four to five feet deep, and two hours later rain commenced and fell in torrents for several hours. One report of this disaster says: "It was midnight before the flood abated, and this morning our town, which was yesterday one of the most flourishing in the Southwest, stands a mass of ruins sad to contemplate. It is impossible to estimate the value of property destroyed." On the night of the 9th a tornado spent its fury on Normal, Ill., where two gales seemed to converge, demolishing a large brick house and severely injuring one person. Other buildings and barns were demolished, and at King's Mill, a few miles west of Bloomington, the storm cut a track through a maple grove, twisting and uprooting the trees. At Clinton one man was killed by lightning, and at La Fayette cars were blown off the track. On the 10th, gales were reported at Newport Barracks, Kentucky; Milford, Del.; Depauville, N. Y.; Weldon, N. C.; Carthagena, Ohio; West Charlotte, Vt.; on the 11th at Atlanta, Ga.; on the 16th at Atlanta, Ga., and Carthagena, Ohio; on the 17th at Gardiner, Me., and Brashear, La.; on the 18th at Florida and Fall River, Mass.; on the 25th at Ringgold, Ohio; on the 29th at Carthagena, Ohio; and on the 30th at Florida, Mass. During the night of the 18th and morning of the 19th, Charleston, S. C., was visited by a heavy rain and wind storm, doing damage to trees, &c. On the 15th, at 5.30 p. m., a heavy rain and hail storm, with high wind, passed over Saint Anthony and Minneapolis, Minn. On the afternoon of the 21st a severe storm of wind, hail, and rain was reported from the southwestern portion of New Mexico, extending from Bear Creek Cañon beyond the Upper Mimbres, breaking down the largest trees and carrying them high in the air, the wind denuding the earth of everything. Hail-stones as large as cups fell and covered the mountains, looking at a distance like snow; some stones are described as weighing over a pound. On the 24th a storm of hail, sleet, and snow, was also reported from Santa Fé, N. Mex. On the 30th a severe wind-storm passed near Fort Madison, Iowa, blowing down fences, unroofing houses, &c.

TEMPERATURE OF THE AIR.

The distribution of mean temperatures for the month is indicated by the isothermal lines on chart.

No. I. The temperature table on the same chart gives the average for the various districts for the month, together with the average for September during a long series of years. The comparison shows that the weather has been cooler than usual in all the districts, and most particularly so in the Saint Lawrence Valley. This excess of cold is largely due, in the northern sections, to the areas of unusually high barometric pressure which have crossed the country, and in the southern, to the prevailing northerly winds induced by the storms in the gulf. The following are a few of the maximum temperatures of the month: Corsicana, Tex., 100°; Jacksonville, Fla., 98°; Augusta, Ga., Dodge City, Kans., and Montgomery, Ala., 97°; Shreveport, La., and Tybee, Ga., 96°; Indianola and Denison, Tex., and Wilmington, N. C., 95°. The minimum temperatures for the month occurred at the following stations: Mount Washington, 15°; Pike's Peak, 17°; Pembina, Dak., 21°; Colorado Springs, Colo., 27°; Cheyenne, Wyo., and Breckenridge, Minn., 28°; Bismarck, Dak., 29°; Marquette, Mich., 30°; Wytheville, Va., and Yankton, Dak., 30°; Escanaba, Mich., North Platte, Nebr., and Burlington, Vt. The greatest range of temperature was 68° at Pembina, Dak., from 89° to 21°, and the least 20° at Key West, from 93° to 73°.

Frosts.—Light frosts occurred on the 10th in Minnesota; on the 11th in Iowa, Wisconsin, Michigan, Illinois, Indiana, Ohio, Pennsylvania, New York, New Jersey, and all of the New England States; on the 12th in New York and New England. Heavy and destructive frosts occurred on the 17th in Minnesota, and on the 18th throughout the Northwest and the Upper Lake region, and lighter frosts on the same date in the Lower Lake region, the Middle States, and New England. Late corn and other crops suffered severely at this time in many portions of these districts. From the 18th to the 26th inclusive, frosts, more or less severe, were frequent in all that portion of the

United States lying north of the 38th parallel. Light frost was reported from the vicinity of Vicksburg on the 19th, and from the mountainous regions of Virginia, Tennessee, and the Carolinas, on the 27th and 28th.

PRECIPITATION.

Chart No. III shows in a graphic manner the monthly distribution of the rain-fall. The table upon the same, giving the average by districts, furnishes the means of comparing it with the average for many years. The rain-fall has been unusually heavy in the Gulf States, and particularly so in Texas and Louisiana, where more than double the normal quantity has fallen. A large excess is also given for the Saint Lawrence Valley. The deficiency of rain has been noticeably great in the Middle and South Atlantic States and in portions of the Ohio Valley, Missouri, Kansas, and Minnesota. In the remaining districts the amount of rain does not differ widely from the average for September.

Among the heavy rain-falls for the month may be noticed the following: Galveston, 18.41; Mount Washington, 11.34; Key West, 10.60; Indianola, 10.65: Jackson, Miss., 8.54; Mobile, 8.52; Baton Rouge, La., 8.07; Shreveport, La., 8.02. At Galveston the rain-fall amounted to over six inches on two different days—the 16th and 25th.

Snow.—Snow fell on Pike's Peak on twelve days during the month. The first snow of the season fell on the 17th in the Adirondacks; on the 19th at Pembina, Dubuque, and Oswego; 21st at Denver and Escanaba; 22d at Malone, N. Y., and on the 24th at Santa Fé, N. Mex.

Hail.—Hail frequently fell with the snow on Pike's Peak during the month. Local hail-storms have also occurred as follows: 5th, at Houseville, N. Y.; 15th, at Minneapolis, Minn.; 19th, on Lake Erie and at Dubuque, Iowa; 20th, at La Crosse, Malone, Milwaukee, Marquette, Duluth, Traverse City, Mich., and Brownsville, Pa.; 21st at Port Huron and Marquette; 22d, Bangor, Me., and Madison Barracks, N. Y.; 24th at Santa Fé; 26th, at Wytheville, Va.; 30th, Buffalo, Fort Abercrombie, Dak., Rockford, Iowa, Danville, Ky., and Norfolk, Nebr.

Rainy days.—The number of days during the month on which rain in any quantity fell averages about as follows: New England, the Northwest, and the Southern States, 10; Middle Atlantic States, Tennessee, and the Ohio and Central Mississippi Valleys, 10; Lake region, 13.

Cloudy days.—The number of cloudy days (other than those on which rain fell) averages, in New England, 4; Middle Atlantic and Southern States and Lower Lake region, 3; the Ohio Valley and the Northwest, 3.5; Upper Lake region, 4.5.

RELATIVE HUMIDITY.

The relative humidity for the month averages, on the New England, New Jersey, and South Atlantic coasts, 75 per cent.; in the interior portions of the New England, Middle, and Southern States, 70; on the Gulf coast, 78; Ohio Valley, 67; Lower Lake region, 69; Upper Lake region and Northwest, 72. The lowest means are, as usual, reported from the Rocky Mountain stations, being 64 per cent. at Colorado Springs; 57 at Cheyenne; 56 at Santa Fé; 51 at Denver, and 31 at Salt Lake City.

WINDS.

The prevailing winds for the month are shown by the arrows on Chart No. II. It will be seen that they are mostly from the northeast in the Gulf and South Atlantic States; from the south or southwest in the Northwest, the Middle Atlantic States, and New England, while in Tennessee, the Ohio Valley, and the Lake region, they vary from northwest to southwest. The total movement of the air during the month, independent of direction, averages, in New England, 4,810 miles; on the New Jersey coast, 7,750; in the Middle States, 4,410; South Atlantic coast, 5,115; Gulf coast, 6,800; interior of the Southern States, 2,890; Ohio Valley, 3,640; Lower Lake region, 6,610; Upper Lake region, 6,800; Northwest, 5,190. The following are some of the largest total movements: Sandy Hook, 10,247 miles; Cape Hatteras, 10,243; Galveston, 9,300; Cleveland, 8,928; Erie, 8,351; Pike's Peak, 8,136; Peck's Beach, 8,124. The smallest movements occurred at the following stations: Lynchburg, 2,014 miles; Nashville, 2,316; Augusta, 2,414; Albany, 2,639; Vicksburg, 2,731; Shreveport, 2,863; Cairo, 2,883.

TEMPERATURE OF THE WATER.

A table of the maximum and minimum temperatures of water for the month at the different stations on the coast, lakes, and rivers, will be found on Chart No. II. A comparison of the mean temperatures of water with those of the air, shows that at nearly all points the air has been much cooler than the water at the corresponding points. On the coast of Maine, however, the reverse is the case, the air-temperatures

averaging 3° higher than the water-temperatures. In the Upper Lake region the two have been nearly equal. On the Atlantic coast, from Cape Cod to Florida, the water has been about 3° warmer than the air, and on the Gulf coast 2°, while along the western rivers this difference amounts to an average of 5°, and on Lake Erie 7°.

NAVIGATION.

On Chart No. III will be found a table giving the highest and lowest water marks, with the dates on which they occurred, at the stations on the principal western rivers. The Red River rose steadily at Shreveport from the 10th to the 20th, after which it declined slowly. The Missouri fell almost continuously after the first few days of the month, but the depth of water has remained sufficient for navigation. The rise, which began in the Upper Mississippi in August, continued until about the middle of September, the freshet-wave gradually extending itself downward, until its crest reached Memphis, on the 27th. At Vicksburgh and New Orleans the high water of August steadily subsided until toward the close of the month, when a slight rise occurred. The Ohio remained low during the month, changing but little. A rise of 10 feet was experienced in the Cumberland, at Nashville, on the 21st, but the water subsided rapidly during the week following. Navigation was resumed over the rapids in the Mississippi, near Keokuk, early in the month, and no reports concerning interruption of navigation, owing to low water, have been received from other points.

VERIFICATIONS.

The usual comparison of the "Probabilities" with the succeeding three tri-daily reports shows that on an average, in the United States, 87.82 per cent. of the predictions have been fully verified. The percentage of verifications in the various districts is as follows: New England, 90.76 per cent.; Middle States, 89.92; South Atlantic, 86.94; Eastern Gulf, 84.72; West Gulf, 84.99; Lower Lake region, 88.74; Upper Lake region, 89.44; Tennessee and the Ohio Valley, 86.66; Upper Mississippi Valley, 90.13; Lower Missouri Valley, 85.97.

The percentage of verification of the several elements is as follows: Weather, 90.35; wind-direction, 92.38; temperature, 88.12; and barometer, 80.44.

Cautionary signals.—Total number of storm-warnings sent to both Canadian and United States shipping-ports during the month, is 203. One hundred and fifty-four cautionary signals were displayed, of which 116 were fully justified by the occurrence of dangerous winds at or near the station; 5 were partly verified and 33 were not verified. Reports received at this office show that the cautionary signals ordered at the stations on the Gulf and South Atlantic coast previous to the cyclone were generally observed, and that the warning was given in ample time to enable interested parties to prepare for the storm.

ATMOSPHERIC ELECTRICITY.

(1) *Thunder-storms.*—The most severe of these have already been noticed under the head of local storms. A general view shows that they have been most frequent in the Upper Mississippi Valley and on the Gulf coast.

(2) *Auroras.*—The display of auroras has been unusually faint; the principal display occurring between the forty-third and forty-seventh degrees of latitude. The most marked occurred in the early portion of the month at Duluth, Escanaba, Eastport, and Pembina. The most extended auroral display occurred on the 30th at Duluth, Alpena, Waterburgh, and Albany, N. Y.

OPTICAL PHENOMENA.

(1) *Solar halos.*—The most prominent displays of this phenomenon occurred on the 12th and 16th, when they were observed in most of the States lying in a direct line from Maine to Louisiana, and on the 18th from New England to the Ohio Valley and Michigan. They were observed in one or more States upon every day, except on the 1st, 4th, and 11th, the principal (other than the above) being on the 3d, 9th, 10th, 13th, 14th, 15th, 29th, and 30th.

(2) *Lunar halos.*—These phenomena were mostly observed from the 8th to the 18th very few being reported from the 5th to the 8th, and from the 21st to the 29th; while none were observed from the 1st to the 4th; on the 7th, 19th, 20th, 25th, 26th, 27th, and 30th. The most extensive occurred on the 9th, observed from New England to West Virginia, in Minnesota and Florida; on the 11th in Iowa, Louisiana, Michigan, Indiana, Illinois, Pennsylvania, New York, Maine, and Florida, and during the 13th, 14th, and 15th, from Newfoundland to the Gulf of Mexico and Texas, and in Dakota and Utah.

(3) *Coronæ* were observed on the 9th at Norfolk, Va.; on the 15th at Tybee Island, Ga.; on the 18th at Buffalo, N. Y., and Tybee, Ga.; on the 21st, 22d, 23d, 27th, and 26th, at Rochester, N. Y., and on the 30th at Wood's Hole, Mass.

(4) *Parhelia* were observed on the 14th at Houseville, N. Y.

(5) *Mirage.*—This was observed on the 11th, 22d, and 23d at New London, Conn., and frequently at Ellinwood, Kans.

MISCELLANEOUS PHENOMENA.

(1) *Zoological.*—*Grasshoppers* were reported at Denver, Colo., from the 1st to the 6th, and on the 17th, 18th, 20th, 21st, 22d, and 27th in countless numbers, going eastward; at Hot Sulphur Springs, Colo., from the 1st to the 8th, and from the 15th to the 30th; and at Las Vegas, N. Mex., from the 2d to the 9th, and on the 15th. *Wild geese*, flying south, have been reported on the 11th, 15th, 16th, and 22d at Dubuque; on the 19th at Santee Agency, Nebr.; on the 20th at North Platte, Nebr.; on the 26th at Corsicana, Tex.; and from the 27th to 29th at Leesburg, Ind.; Fort Madison, Iowa; Houlton, Kans.; Mesquite, Tex.; Yankton, Dak., and Breckenridge, Minn. *Wild ducks* were observed going south on the 11th, 15th, 16th, and 22d at Dubuque, Iowa; and the 26th at Corsicana, Texas; and from the 27th to the 30th, at Yankton, Dak., and Atlantic City, N. J. *Cranes* were observed going south on the 26th at Austin, Tex.; on the 28th at Fort Madison, Iowa, and going west, on the 30th, at Wilsonville, Ala. *Sea-gulls* were seen going south on the 16th at Atlantic City, N. J. *Swallows* were last seen on the 4th at West Charlotte, Va., on the 12th at Contoocookville, N. H.; on the 14th at Coalville, Utah; on the 21st at Fort Union, N. Mex.; and on the 28th at Morgantown, West Va. *Martins* were last seen on the 20th at Morgantown, West Va.; the *King-bird* on the 6th at Contoocookville, N. H.; the *Humming-bird* on the 20th at West Charlotte, Vt., and on the 23d at Contoocookville, N. H.; the *Fire-fly* on the 25th at North Germantown, N. J.; the *Oriole* was last heard on the 3d at Contoocookville, N. H.; and the *Katydid* on the 25th at North Germantown, N. J. *Black-birds* were seen on the 16th at Fort Union, N. Mex., and Coalville, Utah. *Dragon-flies* on the 20th and 21st at Indianola, Tex., going northwest. *Locusts* were observed at Cincinnati on the 1st. On the 30th hundreds of squirrels were reported emigrating across the James River at Lynchburg, Va., and on the 22d, snapping mackerel (blue-fish) were reported going south at Cape May.

(2) *Prairie-fires* were reported near Saint Paul on the 20th and 28th.

(3) *Meteors.*—These were most frequently observed as follows: On the 4th in Connecticut, Ohio, Rhode Island, and New York; on the 5th in New York, Massachusetts, and Iowa, and on the 26th in Michigan, Minnesota, Missouri, and Connecticut; also, in one or two States on the 1st, 3d, and from the 6th to the 10th, 15th, and from the 19th to the 28th.

(4) *Polar bands.*—These were observed on the 1st at South Bend, Ind.; on the 9th at Newport, R. I., and Long Branch, N. J.; on the 11th, at Carthagena, Ohio; on the 14th at Iowa City, Iowa; on the 15th and 21st at Wytheville, Va.; on the 22d at Saint Paul, Minn., and on the 23d at Wilmington, N. C.

(5) *The eclipse of the sun*, which occurred on the 29th, was observed at Bangor, Me.; Freehold, N. J.; Gardiner, Me.; Harbor Grace, Newfoundland; Lenoir, N. C.; Malone, N. Y.; Mobile, Ala.; Mount Desert, Me.; New Castle, Pa.; Rochester, N. Y.; Wendell, Mass.; West Charlotte, Vt., and Woodlawn, Md.

Published by order of the honorable Wm. W. Belknap, Secretary of War.

ALBERT J. MYER,
Brig. Gen., (Brevet Assigned,) Chief Signal-Officer, U. S. A.

MONTHLY WEATHER-REVIEW, OCTOBER, 1875.

INTRODUCTION.

The current review is made up from meteorological returns from the following sources: 94 United States Signal-Service stations; 49 surgeons, United States Army; 1 naval hospital; 13 Canadian meteorological service; and 271 voluntary observers, together with material obtained from marine log-books, shipping-news, and other press-reports. The chief features of the meteorology of October are—

First. The low mean temperature of the month, which, as will be seen under the appropriate heading, has been universally below the normal October temperature, except on the Pacific coast. Owing to this low temperature, unusually early and destructive frosts occurred in most of the Southern States, and early and heavy snows in the northern and lake districts.

Second. The number and severity of general and local storms is also another marked characteristic. The local storms have been in many cases destructive to property. The frequency and force of the general storms rendered necessary the largest number of cautionary signals ever displayed in any one month by the Signal-Service.

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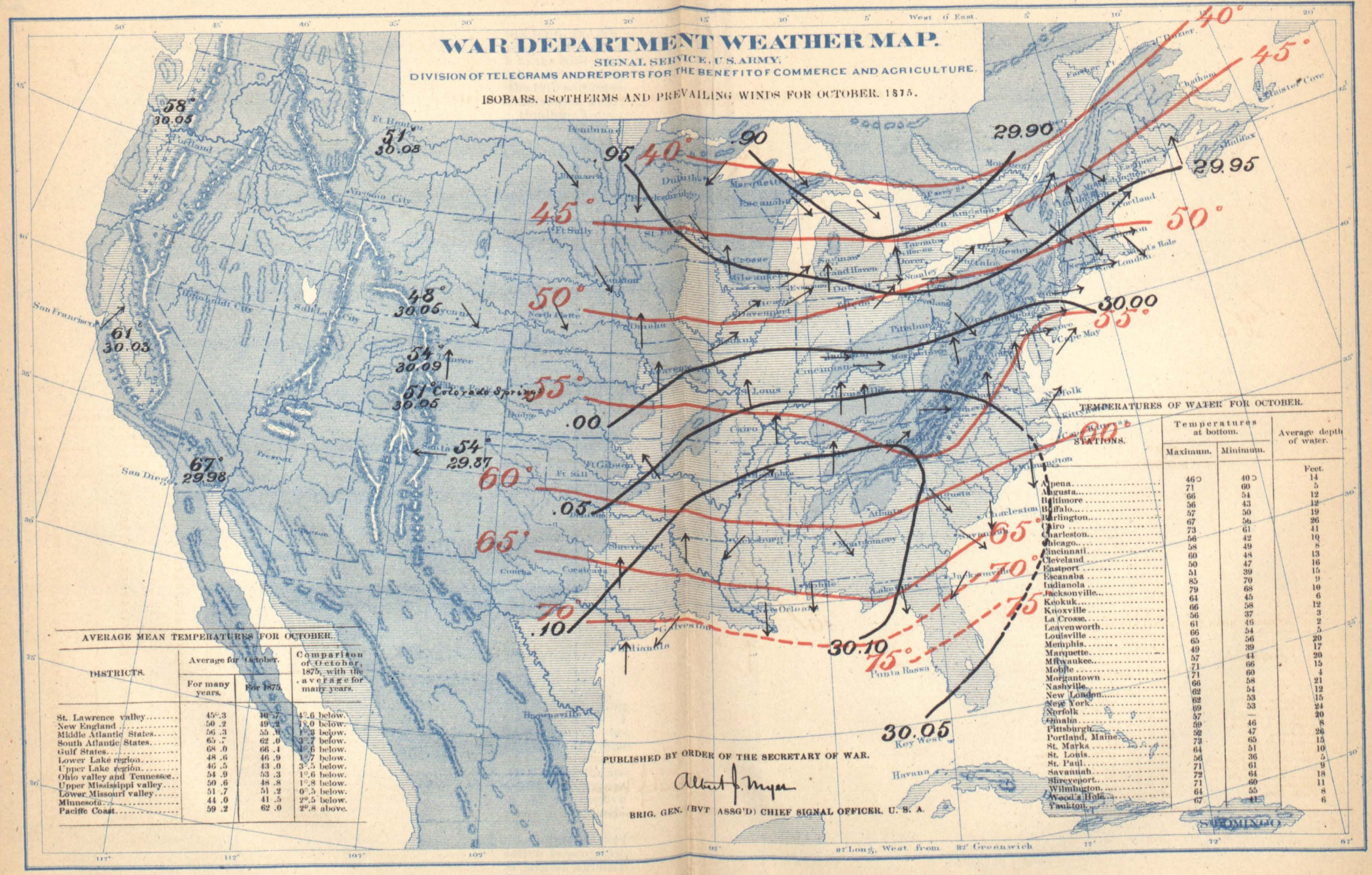
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR OCTOBER, 1875.



AVERAGE MEAN TEMPERATURES FOR OCTOBER.

DISTRICTS.	Average for October. For many years.	Average for October. For 1875.	Comparison of October, 1875, with the average for many years.
St. Lawrence valley	45°.3	40°.7	4°.6 below.
New England	50 .2	49 .2	1°.0 below.
Middle Atlantic States	56 .3	55 .0	1°.3 below.
South Atlantic States	65 .7	62 .0	3°.7 below.
Gulf States	68 .0	66 .4	1°.6 below.
Lower Lake region	48 .6	46 .9	1°.7 below.
Upper Lake region	46 .5	43 .0	3°.5 below.
Ohio valley and Tennessee	54 .9	53 .3	1°.6 below.
Upper Mississippi valley	50 .6	48 .8	1°.8 below.
Lower Missouri valley	51 .7	51 .2	0°.5 below.
Minnesota	44 .0	41 .5	2°.5 below.
Pacific Coast	59 .2	62 .0	2°.8 above.

TEMPERATURES OF WATER FOR OCTOBER.

STATIONS.	Temperatures at bottom. Maximum.	Temperatures at bottom. Minimum.	Average depth of water.
			Feet.
Apena	46	40	14
Augusta	71	60	5
Baltimore	66	54	12
Buffalo	56	43	12
Burlington	57	50	19
Cairo	67	56	26
Charleston	73	61	41
Chicago	56	42	10
Cincinnati	58	49	8
Cleveland	60	48	13
Eastport	50	47	16
Escanaba	51	39	15
Indianola	85	70	9
Jacksonville	79	68	10
Keokuk	64	45	6
Knoxville	66	58	12
La Crosse	56	37	3
Leavenworth	61	46	2
Louisville	66	54	5
Memphis	65	56	20
Marquette	49	39	17
Milwaukee	57	44	20
Mobile	71	66	15
Morgantown	71	60	4
Nashville	66	58	21
New London	62	54	12
New York	62	53	15
Norfolk	69	53	24
Omaha	57	—	20
Pittsburgh	59	46	8
Portland, Maine	52	47	26
St. Marks	73	65	15
St. Louis	64	51	10
St. Paul	56	36	5
Savannah	71	61	9
Shreveport	72	64	18
Wilmington	71	60	11
Wood's Holl	64	55	8
Yankton	67	41	6

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Albert J. Myer

BRIG. GEN. (BVT ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.

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WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF LOW BAROMETER FOR OCTOBER, 1875.

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

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Albert J. Myer

BRIG. GEN. (BVT. ASSG'D) CHIEF SIGNAL OFFICER U. S. A.

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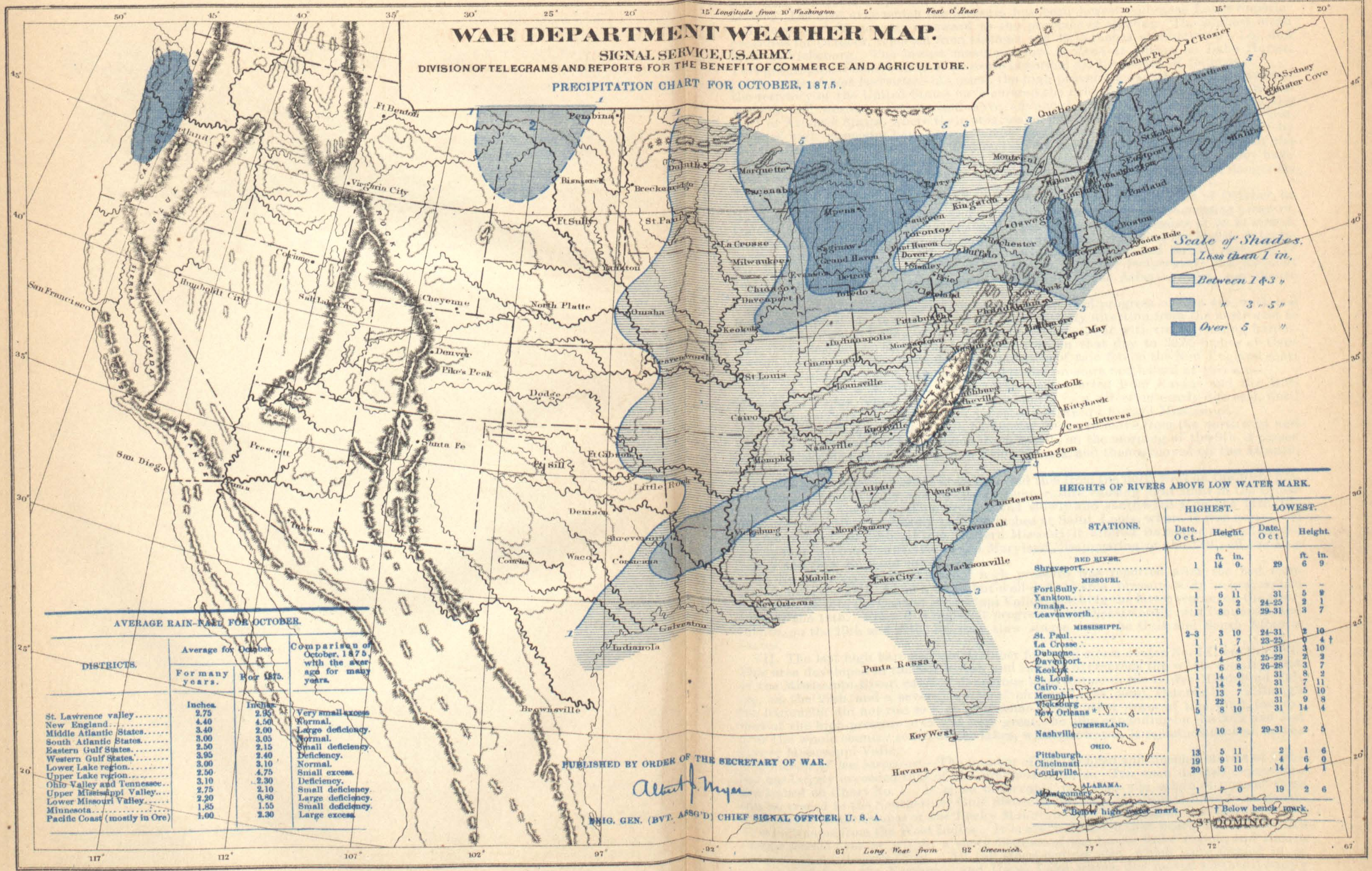
No. III.



AVERAGE RAIN-FALL FOR OCTOBER.

DISTRICTS.	Average for October. For many years.	Average for October. For 1875.	Comparison of October, 1875, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	2.75	2.95	Very small excess
New England	4.40	4.50	Normal.
Middle Atlantic States	3.40	2.00	Large deficiency.
South Atlantic States	3.00	3.05	Normal.
Eastern Gulf States	2.50	2.15	Small deficiency.
Western Gulf States	3.95	2.40	Deficiency.
Lower Lake region	3.00	3.10	Normal.
Upper Lake region	2.50	4.75	Small excess.
Ohio Valley and Tennessee	3.10	2.30	Deficiency.
Upper Mississippi Valley	2.75	2.10	Small deficiency.
Lower Missouri Valley	2.20	0.80	Large deficiency.
Minnesota	1.85	1.55	Small deficiency.
Pacific Coast (mostly in Ore)	1.00	2.30	Large excess.

HEIGHTS OF RIVERS ABOVE LOW WATER MARK.

STATIONS.	Highest. Date. Oct.	Highest. Height. ft.	Highest. Height. in.	Lowest. Date. Oct.	Lowest. Height. ft.	Lowest. Height. in.
RED RIVER.						
Shreveport	1	14	0	29	6	9
MISSOURI.						
Fort Sully	—	—	—	—	–	–
Yankton	1	6	11	31	5	9
Omaha	1	5	2	24-25	2	1
Leavenworth	1	8	6	29-31	3	7
MISSISSIPPI.						
St. Paul	2-3	3	10	24-31	2	10
La Crosse	1	1	7	23-25	0	4 †
Dubuque	1	6	4	31	3	10
Davenport	1	4	8	25-29	2	2
Keokuk	1	6	8	26-28	3	7
St. Louis	1	14	0	31	8	2
Cairo	1	14	4	31	7	11
Memphis	1	13	7	31	5	10
Vicksburg	1	22	1	31	9	8
New Orleans *	5	8	10	31	14	4
CUMBERLAND.						
Nashville	7	10	2	29-31	2	5
OHIO.						
Pittsburgh	13	5	11	2	1	6
Cincinnati	19	9	11	4	6	0
Louisville	20	5	10	14	4	1
ALABAMA.						
Montgomery	1	7	0	19	2	6

* Below high water mark. † Below bench mark.

ATMOSPHERIC PRESSURE.

The region over which the barometer has stood highest during the month will be seen from the isobaric lines (in black) on Chart No. II to be the Gulf States and Tennessee. The area over which the pressure has been lowest embraces Lakes Superior and Huron and the country eastward to the province of Quebec. The highest mean pressures for October, reported from stations, are 30.15 inches at Shreveport, La., and 30.19 at Vicksburg. The lowest mean pressure is 29.84 at Alpena, on Lake Huron. This geographical distribution of pressure is normal for the month of October.

(1) *Areas of high barometer.*—As usual, the high-pressure areas which have traversed the territory of the United States have entered the field of observation from the northwestern and western sections, and have advanced quite rapidly until reaching the Gulf or Atlantic States, where their progression has been comparatively slow. These areas of high barometer have been attended by fresh or high northwest winds and by low temperatures, producing frequent and severe frosts, and, in the latter part of the month, frequent snows in the northern and lake sections of the country. They have also been preceded on the Atlantic and Western Gulf coasts by high and dangerous winds.

I. The first prominent area of high pressure was reported, on the 1st of October, in Kansas and the Indian Territory, and moved slowly eastward, with increasing pressure. On the morning of the 2d it was central in Tennessee, with a pressure of 30.32 inches, and thence developed in a direction slightly north of east, reaching the Middle Atlantic coast on the evening of the 2d, with still increasing pressure, and on the morning of the 3d the barometer rose to 30.57 in Virginia, with low temperature and frequent frosts. From Virginia it moved slowly eastward off the Atlantic coast, and thence southeastwardly.

II. The second high-pressure area began its eastward progress on the 4th, with less marked features. It, too, moved slowly in an easterly direction from the northwest to the Saint Lawrence Valley, which, by tardy advances, but with steadily rising barometer, it reached on the 6th. The barometer rose on that day to 30.55 inches at Cape Breton and northward. Considerable quantities of rain fell on the New England coast on the 6th and 7th, which was partly due to the pressure northward of this area.

III. On the 6th a third and similar area was reported from Kansas and the Mid-Mississippi Valley, which also moved very slowly in a direction nearly due east, until the evening of the 7th, when it was deflected southward toward Mississippi.

IV. On the 8th still another high barometer began to move from the northwest and to slowly overspread the Lake region, from which, on the morning of the 9th, it passed east, and became central in Northern Pennsylvania, and thence moved off the Atlantic coast.

V. A fifth, but more decided area, followed this from the northwest on the 10th, progressing southeastwardly, and, by its low temperature, causing light snow in the Upper Lake region on the 11th. This area moved slowly and southwardly on the 11th, the pressure mean time increasing to 30.52 inches at Saint Louis, where it was central on the morning of the 12th. From Eastern Missouri it altered its course and advanced nearly due east into Pennsylvania and Maryland, disappearing, on the 13th, off the New Jersey and New England coasts.

VI. No other very decided area of high pressure was reported after the last mentioned until the 17th, when a small but well-defined area (pressure 30.48 inches) moved from Dakota into the Central Mississippi Valley, reaching the latter section on the afternoon of the 18th. From this region it progressed southeastwardly into Tennessee, and thence, on the 19th and 20th, by very slow stages, into the Gulf and South Atlantic States.

VII. The last high barometer of October followed storm-center No. IX, on the 29th. This area developed in the Northwest, and rapidly overspread the whole country west of the Mississippi River, causing dangerous local storms in the Lower Mississippi Valley, on the 29th, and a severe "norther" on the Texas coast, October 30. Although the barometer did not rise so high as in some of the other areas of this kind, the extent of the high-pressure area was very great, the area expanding on the 30th and 31st over the whole country south of the lakes, while, however, it remained central in the Lower Mississippi Valley.

(2) *Areas of low barometer.*—The number of well-defined and decided storms of October has largely exceeded that of the previous months. Ten such decided depressions are traced on Chart No. I. It is an observable fact that the origin of none of these can be traced to the Southern or Gulf districts, but they all seem to have been generated on the eastern slopes of the Rocky Mountains, excepting alone that marked as No. V, which came from the West Indies. It is also noticeable that nearly all the month's storms passed over or within a short distance of the Lower Lake region, and thence progressed northeastwardly. All the storm-centers also, which were formed in or approached from the Northwest and Upper Lake region, first moved southeastwardly to the lower lakes before they curved to the northeastward. Of these disturb-

ances No. VIII, No. IX, and its offshoot, No. X, were the most severe and dangerous that occurred.

No. I began its observed progress from the upper valley of the Missouri (latitude 46° N., longitude 102° W.,) on the morning of October 2, and moved slowly southeast until reaching Central Iowa, when, with accelerated motion, it pursued a direct easterly course toward Long Island, near and off which it passed on the 5th—the depression assuming a trough-shape lying east and west. It was attended by no very high winds, but by an extensive rain-belt over the lakes, New England, and the Saint Lawrence Valley. Its velocity varied from 15 to 20 miles per hour.

No. II is first traced on the map in Northern Kansas on the afternoon of the 4th, whence, with a gentle deflection to the south until it had crossed the Mississippi River, its track was northeasterly to Nova Scotia. The average rate of its easterly progression was about 20 miles an hour. As it neared the Lake region from the north on the 6th, it caused high winds and heavy rains on the lower lakes, and also rain, with high and dangerous onshore winds, along the Middle Atlantic coast. On the morning of the 7th, when it reached New England, it occasioned further heavy rains and dangerous easterly coast-winds.

No. III. This depression originated northwest of Dakota on the 8th, and is clearly discernible on the morning map of the 9th. Its path lay mostly on or beyond the northern frontiers of the United States, and its history is of no special interest.

No. IV was very similar to its predecessor in the track it pursued, except that it was deflected unusually far south into the States of New York and New Jersey. This storm-center was also first seen in the northwest, having, doubtless, been generated on the eastern slopes of the Rocky Mountains, near the parallel of 50° N. It approached the Middle Atlantic coast on the 15th at the same time that No. V, another depression, but from the West Indies, was advancing northward on a line parallel with the same coast. The two depressions were very near each other on the evening of the 15th, *i. e.*, within 225 miles. They did not, however, coalesce, but preserved their individuality—No. V taking the lead and No. IV slowly following. The latter advanced on the 16th from the Jersey coast to Maine, followed by high winds at and south of Sandy Hook. On the night of the 16th it moved rapidly to the Lower Saint Lawrence Valley, still followed by dangerous winds in that valley and on the New England coast. The velocity of the winds on the night of the 16th rose as high as 48 miles at Sandy Hook.

No. V being a West Indian cyclone moving upon the Gulf Stream, is traced with difficulty, and the track marked for it on Chart No. I is, of course, only approximate. Its track and progression, up to midnight of the 14th, is roughly deduced from a few marine logs; but the afternoon reports of the 14th led to the belief, and the midnight reports of that day confirmed it—that a hurricane was advancing northward between Bermuda and the American coast. After the 14th its presence and direction were rendered unmistakable, although the longitude of its track could not be accurately determined. The following shipping-notes furnish various clews to its course:

"Brig Nellie Antrim, October 13, damaged by a northwest gale off Cape Fear.

"Schooner Lillie Taylor, on the 12th, encountered heavy northeast weather.

"Brig Lady Mary, October 15, off Hatteras, had heavy gales from the east-southeast, lasting fourteen hours.

"Schooner Tampico encountered heavy northeast gales October 13, in latitude 30° N., longitude 77° 50′ W.

"Schooner J. B. Marshall had heavy gales October 14, in latitude 44° 20′ (?), longitude 76° 3′ W.

"Schooner E. E. Ruckett, from the Bahamas, encountered hurricane on 14th. (No location given.)

"Schooner Hatch, October 13, in Straits of Florida, had heavy gale from north-northeast."

No. VI. This storm's track crossed the Lake region, the depression passing off the coast of Massachusetts on the 18th. It was of no special importance. The only noteworthy circumstance attending it was that, instead of increasing in violence as it neared the Atlantic coast, as such storms generally do, its central depression became nearly filled up in Massachusetts, and when it left the coast, going east, it was scarcely discernible.

No. VII also traversed the Lake region. It was somewhat elongated from west to east, moving slowly, attended by no very high winds, and also, like its predecessor, filled up and obliterated just before it reached the coast of Massachusetts.

No. VIII. This storm was of a very decided and dangerous character, and had not its path, in its earlier stages, been so distinctly northerly, its progress might have been very disastrous on the Atlantic coast. It first becomes conspicuous on the map of October 25, 7.35 a. m., in Eastern Kansas; and thence its movement was to Lake Superior, which it crossed on the evening of the 25th to pursue an east-northeast route toward Labrador. As it neared Lake Superior it occasioned high and dangerous winds, especially on that lake, but also on Lakes Michigan and Huron, and these high winds

followed it after it had curved to the eastward. Wind-velocities of from 34 to 44 miles per hour were reported from the upper lakes, and heavy snow and rain occasionally attended them. As the storm-center entered the Lower Saint Lawrence Valley, its indraught produced high winds on the coast of Maine, the wind reaching a velocity of 34 miles an hour at Eastport, Me., on the morning of the 27th.

No. IX. This storm was of more than usual interest and importance. Its first distinct appearance was reported on the morning of the 28th, then in Southwestern Kansas, whence it shaped its course in a line due northeast to the Lower Saint Lawrence Valley. Its velocity varied from 20 to 25 miles per hour, although its earlier progress was slow. It followed very close upon No. VIII, and exceeded that disturbance in the extent and destructiveness of its cyclonic winds. The cloud-area attending it on the morning of the 28th was inconsiderable, although its existence in Kansas gave rise to cloudy weather over the upper lakes. On Thursday midnight (the 28th) its center had advanced to Missouri, and was then nearing the Mississippi Valley. On the morning of the 29th the barometer had fallen to 29.50, and by 4.35 p. m., to 29.38, occasioning fresh and rising easterly winds on the lower lakes. As it passed over Southern Lake Michigan on the night of the 29th heavy rains fell, and the wind rose to a gale on Lakes Michigan and Erie. By the morning of the 30th the pressure had fallen to 29.27 or less on Lake Huron, and the winds on Lakes Michigan, Huron, and Erie rose proportionately. The gale was now moving along the Saint Lawrence Valley, and as it passed north of Lake Erie about noon of the 30th, an offshoot-depression of about 29.50 inches was formed and moved rapidly southeast into Central Pennsylvania, and was reported at 4.35 p. m. as a little west of Philadelphia. The original storm-center continued its course northeastwardly without deviation, and passed away on the night of the 30th toward the Gulf of Saint Lawrence. Frequent and considerable snows fell on the northern and western sides of the storm as it moved forward.

No. X, which was an offshoot from No. IX, after rapidly progressing to Eastern Pennsylvania, soon became a severe gale, and began to move directly up the Atlantic coast toward Maine. Its path was marked by heavy rains and high winds, and considerable snow followed its progress through New England and northeastward to Newfoundland. The local storms to which this depression gave rise are, in part, referred to under the head of "Local storms."

(3) *Local storms.*—In Harford County, Md., on the 6th, at 3.45 p. m., a very severe storm, preceded by roaring noise, some time before any agitation of the air, took place at the point of observation. As the storm approached a little island in the Chesapeake Bay, 15 miles distant from where it was first seen, it is reported to have occasioned a small water-spout. On the 26th, in the same county, a severe storm, with lightning, was observed. At Fort Wayne, Ind., on the 29th, at 11 a. m., there was a local storm, with great darkness, frequent flashes of lightning and heavy thunder, followed by rain. Forty miles north of Fort Wayne, the same storm took the form of a tornado, striking Goshen and the surrounding country, demolishing a large barn, and blowing out-buildings completely away. At 12 o'clock of that night, it struck Angola, Ind., blowing the engine-house of the Fort Wayne, Jackson and Saginaw Railroad to the ground, and also inflicting much other damage. A severe thunder-storm visited Boston on the morning of the 27th, having passed over Springfield, Mass., on the previous evening. The wind subsequently rose to 42 miles an hour in Boston Harbor. A gale, accompanied by heavy rain, swept over Louisville at 11 p. m. of the 29th. At Vicksburg, on the 29th, at 11.45 p. m., a violent storm of wind, rain, and hail struck the city from the northwest, the wind-velocity reaching 60 miles an hour. This same storm, on the 29th, passed over Memphis at 9.30 p. m., with vivid lightning and heavy thunder and rain. It also passed over Saint Louis, same day, at an earlier hour, about 4.43 p. m., with intense zigzag lightning, followed by a wind blowing 50 miles an hour and half an inch of rain, and inflicting much damage on buildings. Its effect was felt at Shreveport, La., at 8.50 p. m. of the 29th, in a thunder-shower; and at New Orleans at 4.05 a. m. of the 30th, in a heavy shower of rain, with brisk winds, thunder, and lightning. The local storms of the 29th and 30th were evidently due to the cold northwest winds descending the Mississippi Valley, and following behind the storm-center No. IX.

TEMPERATURE OF THE AIR.

The isothermal lines on Chart No. II show the mean distribution of temperature for October. From the tabular exhibit in the lower left-hand corner of this chart, it is seen that the October temperature has with very remarkable uniformity been below the usual average in all sections of the country east of the Rocky Mountains. This early and unusual cold weather has been most marked in the South Atlantic States and the Upper Lake region, and also in the Saint Lawrence Valley. This low mean temperature in the South Atlantic States may perhaps be explained by the presence of the mean high barometer in the Lower Mississippi Valley, which is seen on Chart No. II. In the Lower Missouri Valley, the temperature has most nearly conformed to the normal. On the Pacific coast, the temperature has been nearly three degrees higher than usual.

The following maximum temperatures were reported: Dodge City, Kans., 88°; Indianola, Tex., 89°; Shreveport, La., 85°; Galveston, Tex., 84°; Breckenridge, Minn., 84°. Among the minimum temperatures, are: Breckenridge, 13°; Cheyenne, 11°; Pike's Peak, —5°; Colorado Springs, 18°; Yankton, 18°; North Platte, 18°; Bismarck, Dak., 21°. The greatest ranges are at Yankton, 69°; Colorado Springs, 64°; Breckenridge, 71°.

Frosts were observed at Huntsville, Ala., on the 12th, 30th, and 31st; Jackson, Miss., 13th and 14th; Wilsonville, Ala., 13th and 14th, and killing frost on the 16th; Mount Ida, Ark., and Forsyth, Ga., 2d, and killing frost at the latter place on the 17th; Atlanta, Ga., 13th; Gainesville, Ga., killing frost on the 3d; Fayette, Miss., 19th, 20th, 27th, and 31st; Las Vegas, N. Mex., 15th; Weldon, N. C., 3d, 13th, and 18th; Attaway Hill, N. C., 3d, 13th, and 17th; Greenville, S. C., 13th, 19th, and 20th; Aiken, S. C., 13th; Spartanburg, S. C., 2d, 3d, and 13th; Edgefield C. H., 13th and 17th; Powhatan Hill and Lynchburg, Va., first killing frost on the 13th; Purdy, Tenn., 2d; Norfolk, 17th; Jacksonville, Fla., 28th; Montgomery, 8th, 12th, and 17th; Nashville, 12th and 13th; Memphis, 12th, 16th, 19th, 20th, 21st, and 31st; Augusta, Ga., 17th.

Ice was first formed at Fort Wallace, Kan., on the 15th; Fort Wayne, Mich., 12th; Decatur, Ill., Richmond, Ind., Rockford, Iowa, 11th; Mount Desert, Me., Fallston, Md., Florida, Mass., 13th; Moorehead, Minn., 1st; Cooperstown, N. Y., 14th; Hillsboro', Ohio, 12th; Cleveland, Ohio, 2d; Fallsington and West Chester, Pa., 13th; Edgefield, S. C., 17th; Purdy, Tenn., and Mount Solon, Va., 12th; Salem, W. Va., 2d; Embarrass, Wis., 1st; Powhatan Hill, Va., 13th; Newport, R. I., 13th; Keokuk, Iowa, 12th; Indianapolis, 11th and 12th; Milwaukee, 10th and 11th; Nashville, 17th; Detroit, 12th.

PRECIPITATION.

This item is graphically shown on Chart No. III, and numerically by the table in the lower left-hand corner. It will be seen from the data thus furnished that the largest rain-fall has been in the Upper Lake region, and there only, except in Oregon, has any noteworthy excess of rain been reported for October. Large deficiencies have occurred in the Middle States and in the Lower Missouri Valley, but elsewhere there has been no very marked departure from the normal. The largest excess in Oregon does not apply to California.

Among the stations at which the smallest rain-fall occurred, were: Colorado Springs, Colo. 0.13 inch; North Platte, Nebr., 0.14 inch; Cheyenne, Wyo., 0.06 inch; Santa Fé, N. Mex., 0.06. Among the largest rain-falls reported were at Alpena, Mich., 6.55 inches; Eastport, 7.50; Grand Haven, 6.15; Portland, Oreg., 6.73.

Snow.—Snow fell at Albany on the 30th and 31st; Portland, Me., Barnegat, N. J., New York City, New Haven, Cleveland, and Toledo, 31st; Wytheville, Va., on the 16th and 19th; Oswego, N. Y., 12th and 31st; Erie, Penn., 12th; Escanaba, Mich., 5th and 10th; Chicago, 15th and 18th; Logansport, Ind., 11th; Milwaukee, Wis., 26th; Detroit, Mich., 11th; Rochester, N. Y., 16th and 17th; West Chester, Pa., and Philadelphia, 31st; Blooming Grove, Pa., 10th and 31st; Carlisle and Williamsport, Pa., 31st; Salem, Greenbrier County, W. Va., 11th and 16th; Woodlawn, Md., 31st, and Ashville, N. C., the 16th.

Hail fell at Detroit on the 29th; Nashville, 30th; Keokuk on the 29th; Burlington, Iowa, 29th; Springfield, Mass., on the 26th; and at Rolla, Mo., 29th. (See *Local storms.*)

Rainy days average as follows: For New England, 12; Middle Atlantic States, 9; Southern States, 7; Lake region, 17; Ohio Valley and Northwest, 8.

Cloudy days, (other than those on which rain or snow fell.)—New England, 5; Middle States, 2; Southern States and Ohio Valley, 3; Upper Lake region, 4; Northwest, 5.

RELATIVE HUMIDITY.

The relative humidity for the month averages as follows in the different districts: New Jersey and New England coasts, 74 per cent.; South Atlantic and Gulf coasts, 72; interior portions of the New England, Middle, and Southern States, 66; Lower Lake region, 68; Upper Lake region, 71; Ohio Valley and the Northwest, 63. As usual, it has been lowest at the Rocky Mountain stations, amounting to 48 per cent. at Colorado Springs; 40 at Cheyenne; 33 at Denver; and only 24 at Santa Fé.

WINDS.

The prevailing winds of the month will be found indicated by the arrows, flying with the wind, on Chart No. II. Northwesterly and southwesterly winds have the predominance; the only easterly winds on this side of the Rocky Mountains are those due to the influence of the trade-wind belt on the Gulf coast and in Florida. The winds north of latitude 35° north have nearly all had a westerly tendency.

The total movements of the air in all directions during the month average as follows: New England and New Jersey coasts, 8,415 miles; interior of New England and Middle States, 4,460; South Atlantic and Gulf coasts, 5,490; interior of the Southern States, 3,012; Lake region, 3,120; Ohio Valley and Northwest, 6,277.

TEMPERATURE OF THE WATER.

The table of maximum and minimum temperatures of the water, at the various stations on the sea and Gulf coasts, lakes, and rivers, is given on Chart No. II.

NAVIGATION.

The table of highest and lowest water marks of the principal western rivers is given on Chart No. III, (lower right-hand corner.) The greatest ranges have been at Shreveport, La., Memphis, Tenn., Cairo, Ill., and Vicksburg, Miss.; at which latter point the range has exceeded 12 feet. At other points, the variation of level has been unimportant. At Saint Louis, greatest depth was observed on the 1st; least on the 29th and 31st.

VERIFICATION OF "PROBABILITIES" AND CAUTIONARY SIGNALS.

(1) *Probabilities.*—The usual comparison of the probabilities, item by item, with the weather following, shows that on the average for all districts in the United States, 87.4 of the former have been verified. The percentage of omissions to predict has been 0.8. The percentage of verifications in the different districts was as follows: For New England, 88.70; Middle States, 89.80; South Atlantic States, 89.30; East Gulf States, 89.30; West Gulf States, 83.90; Lower Lakes, 86.50; Upper Lakes, 87.70; Tennessee and the Ohio Valley, 87.60; Upper Mississippi Valley, 84.80; and the Lower Missouri Valley, 82.80.

(2) *Cautionary signals.*—The number of storm-warnings issued to the various seaport and lake stations in the United States and Canada during October was by far the largest number issued in any one month since the Signal-Service was instituted. The total number for October, 1874, was 86; for July, August, and September, 1875, was, respectively, 2, 49, and 154. The total number for the October just passed was 324. Of this number, there were 90 storm-warnings telegraphed for the benefit of Canadian seaports and shipping centers, of the results of which this office has no intelligence. There were 234 cautionary signals ordered for and displayed at United States ports, which were justified by ensuing dangerous winds, as follows: Non-justified, 34; partly justified, 4; fully justified, 196. This gives the percentage of verifications, 83.76.

ATMOSPHERIC ELECTRICITY.

(1) *Thunder-storms.*—These have been, in the main, noted under the head of *Local storms.*

(2) *Auroras* were few during the month. The chief displays reported were as follows: At Cresco, Iowa, on the 7th; New Orleans, 14th; Gardiner, Me., 7th and 8th; West Waterville, 9th; Fall River, Mass., 7th; Depauville, N. Y., 2d, 10th, and 24th; Hector, N. Y., 20th; Fallsington, Pa., 8th; York Sulphur Springs, Pa., 7th; Rocky Run, Wis., 2d; Eastport, Me., 5th; and Escanaba, 6th and 29th.

OPTICAL PHENOMENA.

(1) *Solar halos* were reported from Wisconsin on the 12th, 16th, and 24th; Minnesota, 11th and 12th; Nebraska, 8th, 9th, and 24th; Colorado, 14th; Iowa, 8th, 10th, 12th, 13th, and 28th; Illinois, 8th and 12th; Indiana, 12th; Ohio, 6th, 7th, 8th, 9th, 12th, 14th, 23d, 24th, and 25th; Pennsylvania, 13th; New York, 4th, 13th, 23d, 24th, and 28th; Massachusetts, 9th and 14th; New Hampshire, 4th, 13th, 23d, 26th, and 28th; Maine, 26th; Tennessee, 21st, 26th, and 27th; Memphis, 2d, 9th, 22d, and 28th; Alabama, 28th and 29th.

(2) *Lunar halos* were reported from Colorado on the 11th; Kansas, 9th; Iowa, 8th; Wisconsin, 8th, 9th, and 20th; Illinois, 17th, 24th, and 25th; Indiana, 12th; Michigan, 11th and 13th; Ohio, 12th and 23d; Pennsylvania, 12th and 13th; New York, 9th, 13th, and 14th; New Jersey, 7th; Massachusetts, 9th and 14th; New Hampshire, 8th and 9th; Maryland, 13th; Virginia, 3d, 10th, 12th, 13th, and 14th; North Carolina, 10th and 22d; Georgia, 14th, 15th, and 22d; Tennessee, 11th, 12th, to 16th, inclusive; and Alabama on the 9th.

(3) *Mirage.*—New London, 11th, 12th, and 14th.

MISCELLANEOUS PHENOMENA.

(1) *Zoological.*—Grasshoppers were reported at Austin, Tex., in the air, October 7; at Nashville, 23d; Denver, on 7th, flying to the southward. Wild geese at Lower Brulé Agency, Dakota, on the 1st and 7th; Fort Gibson, Indian Territory, flying south, on 9th; Wilsonville, Ala., flying south, 11th, 15th, and 17th; Southington, Conn., flying south, 30th; at Rockford, Iowa, 1st; Afton, Iowa, 4th, 8th, 10th, and 23d; Independence, Iowa, 7th; Fort Madison, Iowa, 9th; Holton, Kans., 28th; Burlingame, Kans., 6th; Leroy, Kans., 23d and 25th; Atchison, Kans., 29th and 30th; Fall River, Mass., 6th; Waltham, Mass., going southwest, on 30th; Emerson, Neb., south, on 9th; Carson City, Nev., south, 23d; Contoocookville, N. H., 30th; Auburn, N. H., 26th; Depauville, N. Y., going southwest on 12th, and southeast, 13th; Kensico, N.Y., southwest, from 25th to 31st inclusive; Farmingdale, N. Y., southwest, 6th and 31st; South Hartford, N. Y.,

south, 18th; Attaway Hill, N. C., south, 11th; Portland, Me., south, 23d; Franklin, Pa., south, 12th; Prospect Hill, Va., on the 19th; Embarrass, Wis., south, 4th, 5th, and 8th; and Utica, Wis., south, 4th. Wild ducks were observed going west at Wood's Hole, Mass., on the 6th; going south at Lower Brulé agency, Dakota, 1st and 2d; at Fort Madison, Iowa, on the 9th, accompanied by brants; and on the 15th, south, North Palermo, N. Y. Cranes were reported going south at Holton, Kans., on 4th; Baxter's Springs, Kans., 29th and 30th. Swallows disappeared at Las Vegas, N. Mex., on 1st; and from Clarksville, Tenn., on the 30th. Sparrows left West Charlotte, Vt., on the 5th. Millets were seen flying south in enormous quantities at Baxter's Springs, Kans., on the 22d. Katydids were heard last at Leroy, Kans., on 22d; at Wappinger's Falls, N. Y., 22d; Benettstown, Ky., 29th. Blackbirds at Las Vegas, N. Mex., disappeared 18th. Bluebirds last heard at Fort Madison, Iowa, 23d; last seen at Contoocookville, N. H., 23d. Snapping-mackerel (blue-fish) moving north at Cape May on 24th; and immense schools of same high up in Delaware Bay on 27th.

(2) *Prairie fires* were reported at Lower Brulé agency, Dakota, to the north and east, from 22d to 28th inclusive; near Holton, Kans., 23d; Baxter's Springs, Kans., during the month; Ellinwood, Kans., 14th, to the north and west, and extensive fires in all directions from the 25th to the 22d, and also fires 24th, 27th, and 29th; at De Soto, Neb., 16th; north of Richmond, Neb., 24th; at Wytheville, Va., mountain fires, 22d, 23d, 24th, and 26th.

(3) *Meteors* were reported at Newport, R. I., on 13th and 20th; Jacksonville, Fla., 5th, 9th, and 23d; Saint Mark's, Fla., 25th; Detroit, Mich., 20th; Linden, Ill., 22d and 31st; Abington, Ill., 15th; Rockford, Iowa, 20th; Afton, Iowa, 7th; Ellinwood, Kans., 8th.

(4) *Polar bands*, Newport, R. I, 21st; Norfolk, Va., 22d; Buffalo, N. Y., 19th; Iowa City, 18th and 23d; Fayette, Miss., 14th; Wytheville, Va., 7th, 8th, 10th, 17th, 22d, and 24th.

Earthquakes were reported at Memphis and Cairo, slight shocks, 7th; at Purdy, McNairy County, Tenn., 27th, 9 p. m., duration from 5 to 30 seconds.

Published by order of the Hon. Wm. W. Belknap, Secretary of War.

ALBERT J. MYER,
Brig. Gen., (Bvt. Assigned,) Chief Signal-Officer, U. S. A.

MONTHLY WEATHER REVIEW, NOVEMBER, 1875.

INTRODUCTION.

This general review of the meteoric conditions which prevailed in the United States during November is based upon, first, the sychronous telegraphic reports received at this office from the stations of the Signal Service and those of the Canadian Meteorological Service, from which are obtained the extent and direction of the movement of barometric depressions, as shown on Chart No. I; second, the regular monthly reports from the stations of the Signal Service, Army post and naval hospitals, and volunteer observers, which serve to determine the several meteorological elements, as shown on Charts Nos. II and III, the hours of observation being 7 a. m. 2 and 9 p. m., local time.

A careful comparison of these data with corresponding reports of previous years show the following marked variations from the mean meteorological conditions of the month:

First. The low mean temperature in the districts north of the 40th parallel of latitude, where the weather, especially during the latter portion of the month, has been unusually severe, the range of temperature at several stations being more than eighty degrees Fahrenheit.

Second. The large number of areas of low barometer and limited number of areas of high barometer.

Third. The large excess of rain on the Pacific coast, and the almost total absence of precipitation in the region of the Missouri and Upper Mississippi Valleys.

BAROMETRIC PRESSURE.

(1) *In general.*—A comparison of Chart No. II with the corresponding chart of the previous month shows the gradual movement of the areas of mean high and mean low barometer to the northeast, the former being now central on the Atlantic coast, corresponding in position to that of November, 1874, but is at least one-tenth (0.1) of an inch below the mean of that month. The rapid increase of pressure in the northern and western districts of the United States is probably due to the direct movement to the eastward of areas of high barometer and the high latitude of the tracks of a large number of the areas of low barometer. The region of low barometer is identical with that of November, 1873, a month particularly distinguished for its low mean temperature. The distribution of pressure on the Pacific coast is the reverse of that shown on the chart of the preceding month, the pressure having increased one-tenth (0.1) of an

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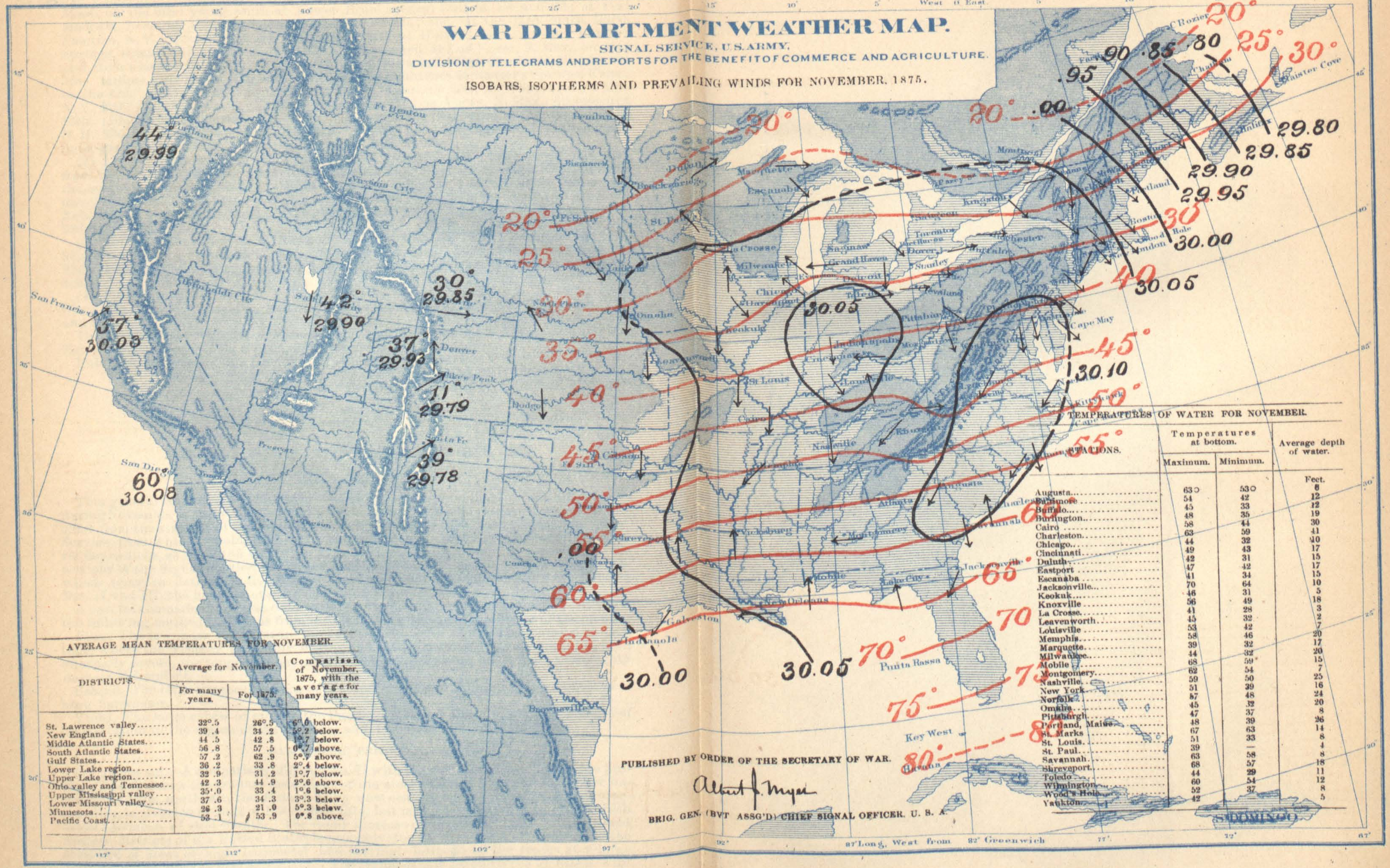

AVERAGE MEAN TEMPERATURES FOR NOVEMBER.

DISTRICTS.	Average for November.		Comparison of November, 1875, with the average for many years.
	For many years.	For 1875.	
St. Lawrence valley	32°.5	26°.5	6°.0 below.
New England	39 .4	34 .2	5°.2 below.
Middle Atlantic States	44 .5	42 .8	1°.7 below.
South Atlantic States	56 .8	57 .5	0°.7 above.
Gulf States	57 .2	62 .9	5°.7 above.
Lower Lake region	36 .2	33 .8	2°.4 below.
Upper Lake region	32 .9	31 .2	1°.7 below.
Ohio valley and Tennessee	42 .3	44 .9	2°.6 above.
Upper Mississippi valley	35 .0	33 .4	1°.6 below.
Lower Missouri valley	37 .6	34 .3	3°.3 below.
Minnesota	26 .3	21 .0	5°.3 below.
Pacific Coast	53 .1	53 .9	0°.8 above.

TEMPERATURES OF WATER FOR NOVEMBER.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Augusta	63°	53°	8
Baltimore	54	42	12
Buffalo	45	33	12
Burlington	48	35	19
Cairo	58	44	30
Charleston	63	59	41
Chicago	44	32	10
Cincinnati	49	43	17
Duluth	42	31	15
Eastport	47	42	17
Escanaba	41	34	15
Jacksonville	70	64	10
Keokuk	46	31	5
Knoxville	56	49	18
La Crosse	41	28	3
Leavenworth	45	32	2
Louisville	53	42	7
Memphis	58	46	20
Marquette	39	32	17
Milwaukee	44	32	20
Mobile	68	59	15
Montgomery	62	54	7
Nashville	59	50	25
New York	51	39	16
Norfolk	57	48	24
Omaha	45	32	20
Pittsburgh	47	37	8
Portland, Maine	48	39	26
St. Marks	67	63	14
St. Louis	51	33	8
St. Paul	39	—	4
Savannah	63	58	8
Shreveport	68	57	18
Toledo	44	29	11
Wilmington	60	54	12
Wood's Hole	52	37	8
Yankton	42		5

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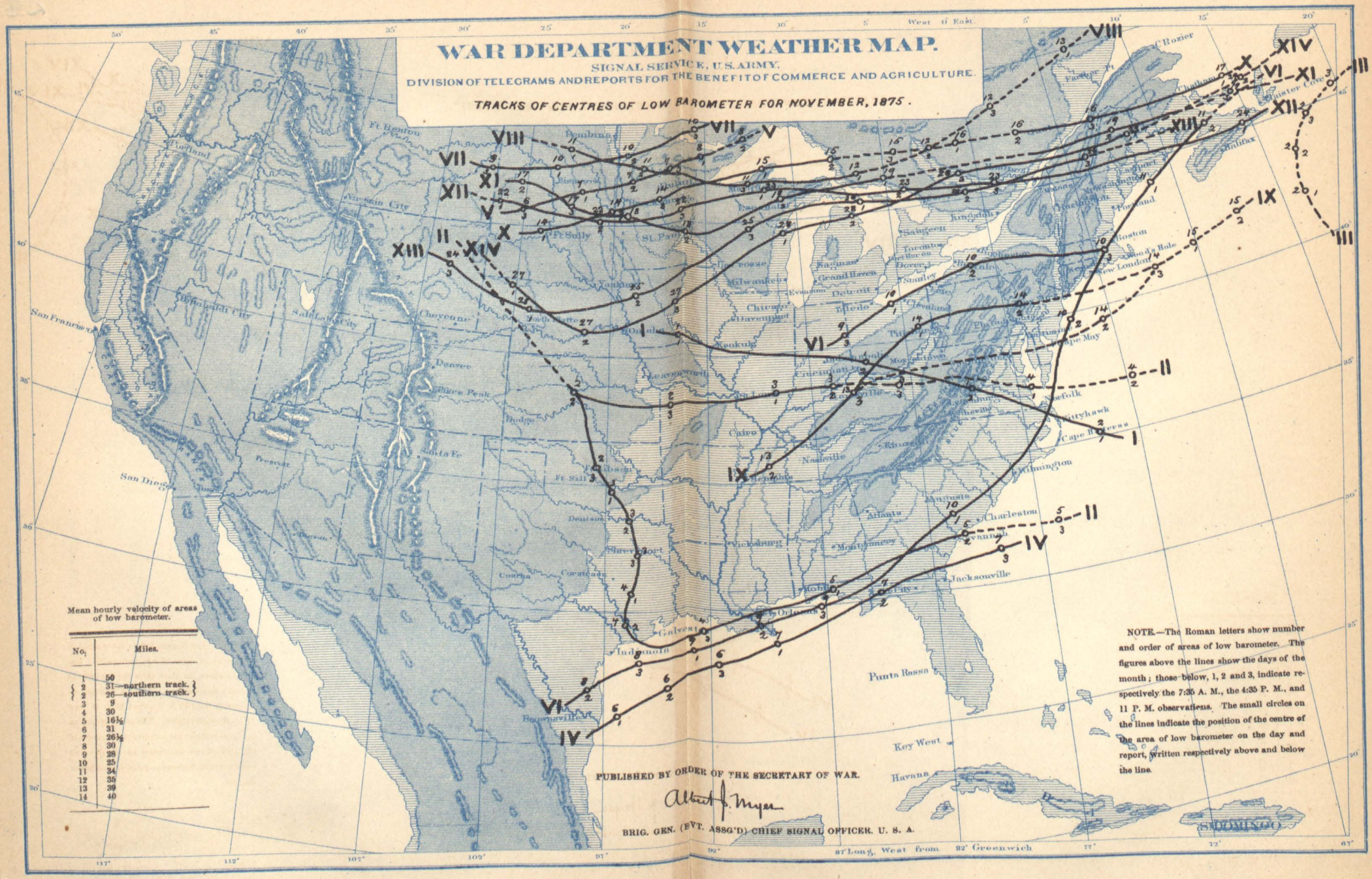
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF LOW BAROMETER FOR NOVEMBER, 1875.



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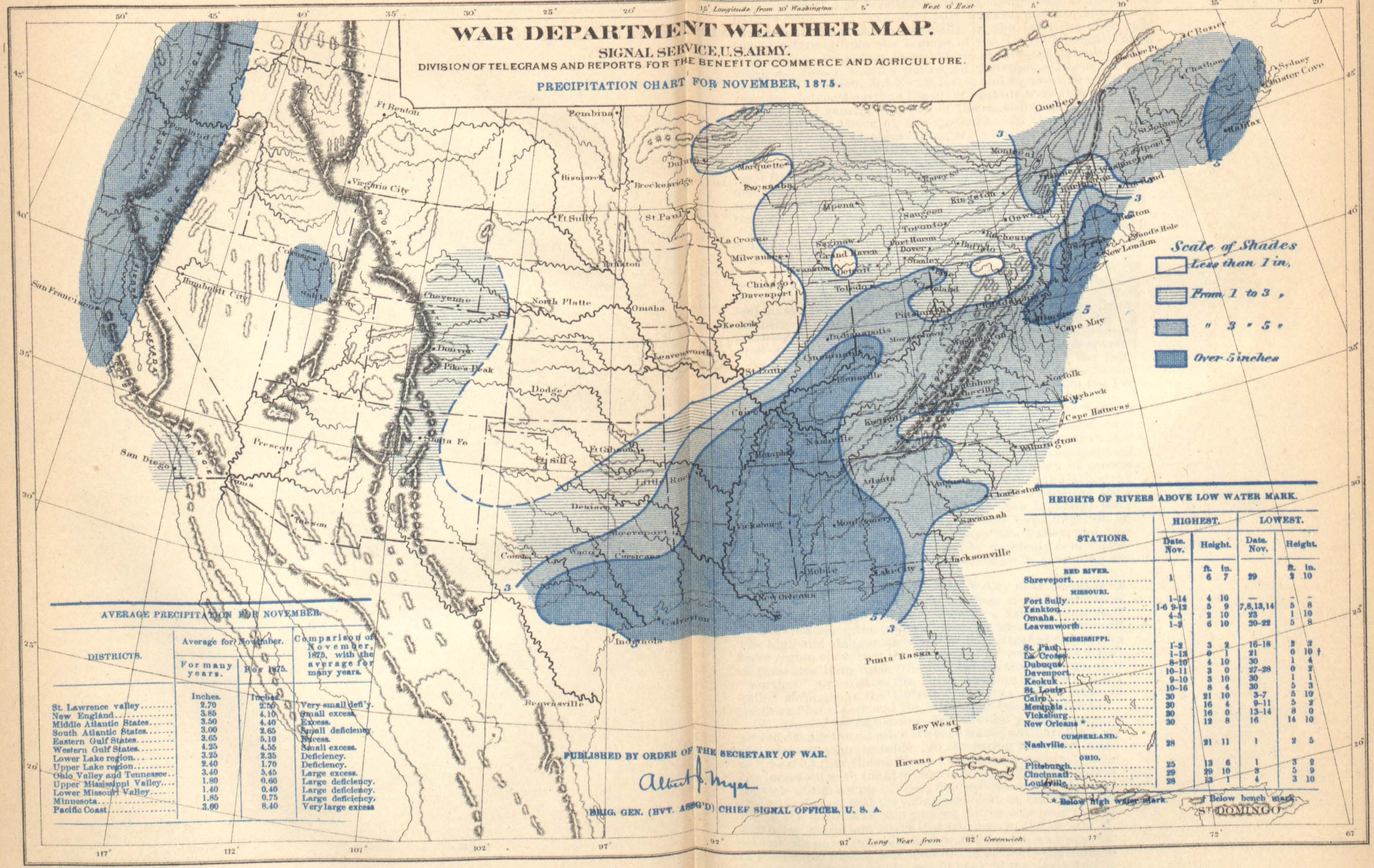
No. III.



AVERAGE PRECIPITATION FOR NOVEMBER.

DISTRICTS.	Average for November. For many years.	Average for November. For 1875.	Comparison of November, 1875, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	2.70	2.56	Very small defi'y.
New England	3.85	4.10	Small excess.
Middle Atlantic States	3.50	4.40	Excess.
South Atlantic States	3.00	2.65	Small deficiency.
Eastern Gulf States	3.65	5.10	Excess.
Western Gulf States	4.25	4.55	Small excess.
Lower Lake region	3.25	2.35	Deficiency.
Upper Lake region	2.40	1.70	Deficiency.
Ohio Valley and Tennessee	3.40	5.45	Large excess.
Upper Mississippi Valley	1.80	0.60	Large deficiency.
Lower Missouri Valley	1.40	0.40	Large deficiency.
Minnesota	1.85	0.75	Large deficiency.
Pacific Coast	3.00	8.40	Very large excess

HEIGHTS OF RIVERS ABOVE LOW WATER MARK.

STATIONS.	HIGHEST. Date. Nov.	HIGHEST. Height. ft.	HIGHEST. Height. in.	LOWEST. Date. Nov.	LOWEST. Height. ft.	LOWEST. Height. in.
RED RIVER.						
Shreveport	1	6	7	29	2	10
MISSOURI.						
Fort Sully	1–14	4	10	—	–	–
Yankton	1-6 9-12	5	9	7,8,13,14	5	8
Omaha	4–5	2	10	23	1	10
Leavenworth	1–2	6	10	20–22	5	8
MISSISSIPPI.						
St. Paul	1–2	3	2	16–18	2	2
La Crosse	1–13	0	1	21	0	10 †
Dubuque	8–10	4	10	30	1	4
Davenport	10–11	3	0	27–28	0	2
Keokuk	9–10	3	10	30	1	1
St. Louis	10–16	8	4	30	5	3
Cairo	30	21	10	3–7	5	10
Memphis	30	16	4	9–11	5	2
Vicksburg	30	16	0	13–14	8	0
New Orleans *	30	12	8	16	14	10
CUMBERLAND.						
Nashville	28	21	11	1	2	5
OHIO.						
Pittsburgh	25	13	6	1	3	2
Cincinnati	29	29	10	3	5	9
Louisville	28	13	1	4	3	10

* Below high water mark. † Below bench mark.

inch at San Diego, and from this point north to Portland decreases uniformly with an increase of latitude.

(2.) *Areas of high barometer.*—These, though less numerous than in previous years, have in some cases been unusually marked, and accompanied by rapid and extreme changes in temperature, especially in the interior; they have approached the stations uniformly from the regions of the Upper Missouri Valley and Manitoba, and, with a single exception, have moved toward the Atlantic with but slight changes in latitude. Nos. 1, 3, and 4 passed off the coast south of New York with no apparent change of direction, but Nos. 2, 5, 6, 7, and 8 passed more directly to the east, and after reaching the coast north of the 40° of latitude were apparently deflected to the northeast, following the general direction of the coast-line until beyond the limits of the stations. The conditions attending the movements of these areas, while the center remained within the region of observation, are generally as follows:

No. 1. The disappearance of the storm marked No. II off the South Atlantic coast was followed by increasing pressure throughout the United States east of the Mississippi River, which resulted in the gradual development of this area over the Middle and South Atlantic States during the 5th and 6th, and the succeeding reports of the 7th show the gradual movement of this area to the east, attended by clear or fair weather throughout the greater portion of the United States.

No. 2 moved slowly from north of the Lake region over New England during the 7th, 8th, and 9th, following the direction of the coast-line in advance of the storm marked as No. VI.

No. 3 was first observed on the morning of the 8th as central near the western boundary of Dakota, and moved to the eastward during the succeeding eight hours, after which its course was directly southward to the West Gulf coast, where it was central on the 10th. A severe "norther" occurred on the Texas coast during the 9th, the intensity of which was increased by the tropical storm then central in the Gulf. After reaching the Gulf coast, its course changed from south to east, and followed the Gulf coast-line to South Atlantic immediately in rear of depression No. VI.

No. 4 followed closely in the rear of the storm of the 15th–16th, causing a rapid increase of barometric gradients, clear and cold weather in the districts east of the Mississippi, the line of greatest pressure extending from the Platte Valley to the coast of North Carolina during the 16th, 17th, and 18th.

Nos. 5 and 6 were observed in the Upper Missouri Valley, the former preceding and the latter following the area of low barometer marked on the chart as No. XII. The tracks of these areas led more directly to the east than that of the mean direction of areas of high barometer. The precipitation which occurred through the Southern States and Ohio Valley was favored by the distribution of pressure, which caused east and south winds around the former, then central on the Atlantic coast, and northerly winds on the east of the latter, then central in the Mississippi Valley.

No. 7. The telegraphic reports of the 26th indicated the advance of this area from the region west of Hudson's Bay toward Lake Superior, and the succeeding reports show that it passed to the Saint Lawrence Valley, and thence to the northeastward, during the 27th and 28th, attended by decidedly cold weather in the northeastern sections of the United States, and immediately preceding the last severe storm of the month.

No. 8 was central in the Missouri Valley near Yankton at midnight of the 28th, and the following unusually high readings of the barometer were reported: Yankton, 31.08; Fort Sully, 31.00; Breckenridge, 30.91; Bismarck, 30.89; Pembina, 30.90; that at Yankton being the highest observed since the establishment of the Signal Service. The high and dangerous winds which preceded the advance of this area toward the Lake region show that the severity of storms depend more upon the relative difference of pressures than upon the low barometric readings of the central area. A severe "norther" occurred on the Texas coast on the 29th, and decidedly cold weather prevailed throughout the United States, the temperature falling below freezing as far south as Shreveport and the interior of the Gulf States.

(2) *Areas of low barometer.*—The unusually large number of barometric depressions observed during the month have been traced on Chart No. I, and the mean hourly movement of each is given in the table. In comparing this chart with those of preceding months, it will be seen that the number of depressions occurring wholly within the United States has increased with the approach of winter. The direction of the movement and the mean latitude of the course of these depressions seem to determine the general character of the disturbance, and they may therefore be classified as follows: First, those originating in the northwest, and passing to the east over the high latitudes, accompanied by southerly winds and slight disturbances in the several districts of the United States; second, those originating in lower latitudes, and passing to the east within the limits of the United States, attended in the northern districts by sudden and severe climatic changes, northeast winds, which back to the northwest as the depression passes to the east of the coast-line. The following detailed account of each depression is given in the order of occurrence:

No. I developed in the Ohio Valley on the afternoon of the 1st, and passed rapidly to the South Atlantic, causing areas of light rain and snow in the Middle and New England States, while clear and warm weather continued in the southern sections of the country.

No. II. This extended depression was first observed on the morning of the 1st, central in the eastern portion of Wyoming Territory; during the succeeding eight hours its center passed southeastward to Kansas, after which two distinct depressions were observed, one moving directly to the east during the 2d, 3d, and 4th, accompanied by rain in the northern sections, and high winds on the middle Atlantic coast; the other depression passed directly south during the 2d and 3d, the progressive movement being retarded until midnight of the 4th, when the course changed from south to east, the central area becoming defined as an elongated ellipse, the longer axis bearing toward the northeast as the depression passed rapidly from the Mississippi Valley to the Atlantic. Heavy rains prevailed in the Southern States during the 3d and 4th, and marine reports show that a violent hurricane from the northwest occurred on the 5th in latitude 32°, longitude 78°.

No. III. A severe storm in the Gulf Stream, at no time within the limits of the United States, and only approximately traced, during the 2d and 3d, when the center followed the general direction of the coast-line and near Sydney, the barometer at that station reading 29.20 on the afternoon of the 2d.

No. IV. The midnight telegraphic report of the 5th indicated the approach of a tropical storm toward the Texas coast, accompanied by northeast gales and heavy rains in the West Gulf. This depression became more extended as it advanced to the east with increasing velocity, the region of precipitation including the entire Southern and Middle States.

No. V. Central in the Upper Missouri Valley on the night of the 6th, when the barometer was below the mean in the Northwest, Upper Mississippi and Lower Missouri Valleys, passed to the north of the Lake, accompanied by slight changes in temperature, but was followed by rapidly rising barometer and low temperature in the Northwest and Upper Lake region on the 8th and 9th.

No. VI. The second tropical storm of the month was central, as a slight depression near Indianola on the night of the 8th, and during the succeeding day moved slowly to the eastward, causing heavy rains on the Gulf coasts. The midnight reports of the 9th show a trough-like depression from the Gulf to Lake Superior, with two central areas, one near the coast, the other near Lake Erie. These depressions moved east and northeastward, uniting on the night of the 10th, when the storm-center was near Boston. Severe gales occurred on the Atlantic coast as this depression passed to the northeastward, the central area becoming more contracted, and the gradient increasing rapidly in its western quadrants. Cautionary signals were displayed on the Atlantic coast from Hatteras to Eastport in advance of this storm.

Nos. VII and VIII originated in the extreme northwest, and moved to the north of the Lake region during the 10th, 11th, and 12th, without producing marked changes in the meteoric conditions.

No. IX. A depression in the northwest on the night of the 11th, which was apparently divided by the advance of an area of high barometer from the Upper Missouri Valley, forming No. VIII, already referred to, and No. IX, which moved slowly from the Southwest to the Lower Ohio Valley, where it was central on the morning of the 13th, as an area of precipitation, and afterward to the Atlantic coast, dividing on the morning of the 14th in the Upper Ohio Valley, and uniting after the minor depressions had passed to the eastern coast. Brisk and high northeast winds, accompanied by sleet and snow, prevailed in the districts north of the center, and rain prevailed generally throughout the Southern States.

No. X. Central in the Northwest on the morning of the 14th, while the preceding depression was central on Lake Erie. It moved almost directly to the east over the northern portion of the Lake region and Saint Lawrence Valley to the Gulf of Saint Lawrence, as one of the severe storms of the month, disastrous gales being reported from the Lakes on the 14th and 15th, and in the North Atlantic during the 15th and 16th. The barometer fell rapidly as the center advanced, and the unusually low reading of 28.65 was observed at Sydney on the morning of the 17th. The winds became more dangerous after shifting to the north and west, and the barometric gradient was one inch to 400 miles when the center was near Cape Breton.

No. XI was central in the extreme northwest on the afternoon of the 17th, and the barometer was generally below the mean at the western stations. The course of this depression differs but slightly from the preceding one, while the reports show less marked changes. In the former, the barometer fell rapidly with the easterly movement; in the latter, the lowest barometric reading was observed in the Northwest.

No. XII. The latitude of the origin and the track pursued by this depression are approximately the same as in the two preceding depressions. It passed from the Upper Mississippi Valley to the Atlantic coast during the 22d and 23d, causing heavy rains and high winds in advance of the center, and gales on the Atlantic coast during the

24th. The extreme low temperature which followed this depression may be more properly referred to the marked area of high barometer which immediately followed.

No. XIII. The barometer was unusually low in the Western Territories on the midnight of the 24th, when this depression developed, passing rapidly, first to the southeast, afterward to the northeast as a severe storm, the area of rain including the entire country east of the Rocky Mountains. Signals were ordered, and generally verified, at the stations on the Lakes and on the Atlantic coast, north of Cape Hatteras.

No. XIV moved rapidly from Nebraska to the Gulf of Saint Lawrence during the 27th, 28th, and 29th, and was the most violent storm of the month, the winds increasing in force until the center passed to the North Atlantic. Marine disasters occurred in the Gulf of Saint Lawrence, causing great loss of life and property. The signals ordered at the several stations for this storm were observed, and are reported by those interested in navigation as having been particularly advantageous to the shipping interests of the country.

TEMPERATURE OF THE AIR.

The isothermal lines on Chart No. II show the mean distribution of temperature for the month, and also that the decrease of temperature, with the increase of latitude, is uniform, and averages, in the districts east of the Rocky Mountains, 2° for each degree of latitude. The table shows that the temperature has been decidedly below the mean in New England, the Saint Lawrence Valley, and Minnesota, and above the mean in the Gulf States. The temperature has fallen below freezing at all stations north of a line passing from Shreveport north of Vicksburg, following the thirty-third parallel. The temperature on the Pacific coast was slightly above the mean, and north of San Diego averaged 12° higher than the temperature of the corresponding latitude on the Atlantic coast.

Ranges of temperature.—The ranges of temperature have been unusually great in the interior, that of Breckenridge being 87°; Cheyenne, 80°; Dodge City, 84°; Duluth, 76°; Mount Washington, 77°; North Platte, 76°; Malone, 70°; Omaha, 75°; Pembina, 65°; Saint Paul, 80°; and Yankton, 80°.

PRECIPITATION.

Chart No. III shows, in a graphic manner, the precipitation for the month. This has been mostly in the form of rain south of the forty-second parallel of latitude. North of this line considerable snow has fallen, particularly in Canada and the northern portion of the Upper Lake region. Regions of large precipitation are shown in Nova Scotia, portions of New England and New Jersey, from the Gulf northward to the Lower Ohio Valley, and on the Pacific coast. The heaviest rains have fallen in the last-named district, amounting to 7.27 inches at San Francisco and 15.75 at Portland, Oreg., which is very much in excess of the mean for the month. The largest rain-falls east of the Rocky Mountains have occurred in the Central Mississippi Valley, amounting to 7.96 inches at Cairo and 9.36 at Memphis. A large deficiency is noticeable in the Northwest, and at several stations in Kansas no rain or snow fell during the entire month.

Rainy days.—The number of days during the month on which rain or snow fell averages as follows: In New England, the Middle States, the Ohio Valley, and Tennessee, 12; South Atlantic and Gulf States, 11; Lake region, 14; Northwest, 6.

Cloudy days.—The average number of cloudy days (other than those on which rain or snow fell) is: In New England, 3; Middle Atlantic States, 2; South Atlantic States, 6; Gulf States, Ohio Valley, and Tennessee, 4; Lake region, 5; Northwest, 7.

RELATIVE HUMIDITY.

The mean relative humidity for the month ranges between 60 and 70 per cent. in the Northwest and thence southward to Northern Texas. At nearly all of the stations elsewhere east of the Rocky Mountains, the mean for the month ranges between 70 and 80 per cent., except in Florida and on the Gulf coast, where it varies from 79 to 85. At the Rocky Mountain stations, the figures run from 54 at Santa Fé to 63 at Cheyenne. On the summit of Mount Washington the mean is 91 and on Pike's Peak 77. This moist atmosphere at these elevated stations is due to their very low temperature.

WINDS.

The prevailing winds for the month are indicated by the arrows, flying with the wind, on Chart No. II. West and northwest winds have predominated in the Middle States, New England, and the Lower Lake region, and northerly winds in Indian Territory, Arkansas, Tennessee, and the Ohio Valley, Central Mississippi and Lower Missouri Valleys. Southerly winds have prevailed in the Gulf States, but elsewhere variable winds.

The total movements of the air for the month, independent of direction, average as follows in the various districts: New Jersey and New England coasts, 8,740 miles; interior of New England and the Middle States, 4,600; South Atlantic and Gulf coasts,

6,250; interior of Southern States, 3,515; Lake region, 7,100; Ohio Valley, 4,750; Northwest, 6,910.

The following are the maximum velocities at several stations: Mount Washington, November 17th, 8 a. m., 150 miles per hour; 12.22 p. m., 144; 29th, 3.40 p. m., 168 miles per hour; 5 p. m., 156, and 6 p. m., 170, the highest velocity reported from any station of the Signal Service. A velocity of 65 miles per hour occurred at Boston during the storm of the 28th and 29th, which is also the highest velocity reported from that station. A velocity of 54 miles per hour is reported from Indianola during the "norther" of the 29th.

WATER TEMPERATURES.

The monthly maximum and minimum temperatures of water in the lakes, rivers, and on the Gulf and Atlantic coasts, from observations taken at the bottom, may be found in the table on Chart No. II. These figures show that the air has been colder than the water at nearly all stations, the only exceptions being Key West, San Francisco, Toledo, Savannah, and Saint Louis, for which places the mean monthly temperature of the two elements is the same. It is, however, only in the extreme northern sections of the country that a considerable difference is shown, and at most stations in the Southern States and on the western rivers the water has averaged but two degrees warmer than the air. At the stations in the northern portion of the Upper Lake region, on Lake Champlain, and the coast of Maine, the water has averaged from seven to thirteen degrees above that of the air.

NAVIGATION.

On Chart No. III is given the usual table showing the highest and lowest water-marks, from which it will be seen that the Ohio and the Lower Mississippi Rivers rose slowly during the latter portion of the month, and that the Upper Mississippi and Lower Missouri declined and were unusually low at the close of the month.

The following notes, obtained from the reports of the observers, give the time of the closing of navigation, condition of harbors as regards the ice, and depth of water in rivers: Saint Paul, Minn., anchor ice in river 16th and 17th; navigation closed 17th; frozen over 21st. La Crosse, the water was low on the Eau Claire Rapids 8th; floating ice 17th, 18th, 19th, and 20th; closed 22d. Dubuque, Iowa, ice in river on the 8th; full of ice 19th and 21st. Davenport, Iowa, floating ice 21st. Rock Island, Ill., the ferry-boat went into winter-quarters 27th; river closed 29th. On the 27th, the water was lower in the Mississippi River than ever before known. Keokuk, Iowa, ice in river sufficient for skating 21st; floating ice 22d, 24th, 26th, 29th, and 30th; navigation closed 27th; not sufficient water for boats to run on the 30th. Saint Louis, Mo., floating ice 30th. At Fort Sully and Yankton, Dak., the Missouri River was frozen up the 15th. At Omaha, Nebr., there was floating ice 16th, 17th, and 19th; river gorged 18th and 20th; frozen over the 24th. Leavenworth, Kans., frozen over the 23d. Plattsmouth, Nebr., floating ice 15th and 16th, and west channel gorged 17th and 21st. At Breckenridge, Minn., the Red River of the North closed on the 3d. Moorhead, Minn., floating ice on the 1st; frozen over 16th. Pembina, Dak., navigation closed on the 4th. Hennepin, Ill., the Illinois River was closed by ice 24th. Wappinger's Falls, N. Y., the Hudson about closed 30th. South Hartford, N. Y., canal-navigation about closed 30th. Brownsville, Pa., creeks frozen over 30th. West Charlotte, Vt., anchor ice in Lake Champlain 30th. Shelburne, N. H., the Androscoggin was crossed by persons on foot 22d and with horses 27th. Gardiner, Me., the Kennebec River was closed 22d. Alpena, Mich., Thunder Bay River was frozen over 22d, and the harbor frozen the 29th. Cleveland, Ohio, ice formed on the canal and river 30th.

VERIFICATION OF "PROBABILITIES" AND CAUTIONARY SIGNALS.

A critical comparison of the published "Probabilities" with the following reports shows that, on the average for all the districts of the United States, 92.18 per cent. of the predictions have been verified. During the month, 188 cautionary signals have been displayed at the several ports on the Lakes and Atlantic coast, of which 75 per cent. have been fully justified by the occurrence of dangerous winds. Reports have been received from various sources showing that vessels were retained in port by the display of the signals, thereby avoiding the dangers of the violent gales during the latter portion of the month. Storm-warnings were forwarded to the Canadian stations for storms of the 10th, 14th, 17th, 23d, 25th, 26th, 28th, and 29th.

ATMOSPHERIC ELECTRICITY.

(1) *Thunder-storms.*—These have been more numerous for the month than has occurred generally in the areas of low barometer; those particularly reported are as follows: At Detroit, Mich., on the 1st; Bloomfield, Wis., 2d; Louisville and Benersville, Ky., Indianapolis and Fort Wayne, Ind., Memphis, Tenn., Marion, Westerville, Kenton, Bethel, Carthagena, Jacksonburg, Ringgold and Olive Furnace, Ohio, Brownsville and Canonsburg, Pa., and Alta Vista, Va., 3d; Smithville, Tenn., 3d, 13th, and 26th;

Wilsonville, Ala., and Point Pleasant, La., 4th, 18th, and 23d; Montgomery, Ala., 4th and 18th; Mobile, Ala., 6th and 7th; Charleston, S. C., 7th and 21st; Austin, Texas, 8th, 23d, and 28th; Corsicana, Texas, 8th, 28th, and 29th; Cairo, Ill., and Nashville, Tenn., 13th; Forsyth, Ga., Asheville, N. C., Greenville and Spartansburg, S. C., 19th; Wytheville, Va., 20th; Goldsboro', Wilmington, and Smithville, N. C., and Shreveport, La., 23d; Afton, Iowa, Atchison, Kans., and Rolla, Mo., 25th; Belmont Farm, Texas, 27th.

(2) *Auroras.*—The most brilliant displays occurred on the 18th, 21st, and 22d, being generally observed at the northern stations from Maine to the Upper Mississippi River. In detail they have been seen as follows: At Escanaba, Mich., on the 1st; North Argyle, N. Y., Carthagena, Ohio, and Lunenburgh, Vt., 2d; Buffalo, N. Y., 5th; Troy, N. Y., 6th; Detroit, Mich., 7th; Corsicana, Texas, and Eastport, Me., 8th; Rockford, Iowa, 12th; Winchester, Ky., 15th; Corsicana, Texas, 17th; Omaha, Neb., Dodge City, and Burlingame, Kans., 18th; Mount Forest, Canada, Fall River, Springfield and Boston, Mass., Detroit, Alpena, Port Huron, Marquette, and Escanaba, Mich., New Germantown, N. J., Stapleton and Malone, N. Y., Duluth, Minn., Burlington, Vt., and La Crosse, Wis., 21st; Waltham, Springfield, and Boston, Mass., North Argyle, N. Y., Woodstock and Lunenburg, Vt., and Utica, Wis., 22d; Nora Springs, Iowa, 25th; Gardiner and Eastport, Me., and Springfield, Mass., 29th; Boston, Mass., 30th.

OPTICAL PHENOMENA.

(1) *Solar halos* were observed in Connecticut on the 7th; Delaware, 3d and 13th; Illinois, 2d, 12th, 18th, 19th, 20th, 22d, 25th, 27th, 28th, and 30th; Indiana, 10th; Iowa, 10th, 15th, 21st, and 28th; Kentucky, 8th, 24th, and 29th; Louisiana, 27th; Maine, 9th and 20th; Minnesota, 16th, 19th, 20th, 23d, and 26th; Nebraska, 13th and 19th; New Hampshire, 5th, 9th, 13th, 20th, and 28th; New Jersey, 7th; New York, 3d, 6th, 7th, 9th, 13th, 18th, and 19th; Ohio, 2d, 5th, 9th, 12th, 18th, 24th, and 29th; Pennsylvania, 3d, 7th, and 30th; Tennessee, 13th; Vermont, 18th; Virginia, 13th, 22d, and 30th.

(2) *Lunar halos* were observed in Alabama on the 3d; Canada, 13th; Connecticut, 7th and 9th; Illinois, 7th, 8th, 10th, 11th, and 21st; Indiana, 5th, 10th, 11th, 12th, and 25th; Iowa, 4th, 6th, 7th, 8th, 10th, 11th, 12th, and 13th; Kentucky, 6th, 8th, and 15th; Louisiana, 8th; Maine, 9th; Maryland, 6th and 13th; Massachusetts, 3d, 7th, 9th, and 12th; Michigan, 8th, 10th, 12th, 13th, and 14th; Minnesota, 9th; Missouri, 7th; Nebraska, 7th, 11th, 12th, 13th, and 17th; New Hampshire, 9th; New Jersey, 8th, 9th, 10th, 12th, 14th, and 17th; New York, 7th, 9th, 11th, 12th, 15th, 18th, and 20th; North Carolina, 13th and 14th; Ohio, 6th, 7th, 11th, and 12th; Pennsylvania, 6th and 9th; Texas, 14th; Vermont, 9th, 13th, and 14th; Virginia, 13th, 14th, and 15th.

(3) *Mirage.*—Fort Niagara, N. Y., on the 13th; New London, Conn., 6th, 18th, and 22d; and Atlantic City, N. J., 30th.

MISCELLANEOUS PHENOMENA.

(1) *Prairie and forest fires* were reported at Wytheville, Va., 2d and 3d; Corsicana, Texas, 9th; Breckenridge, Minn., 6th, 12th, and 20th; Dodge City, Kans., 1st, 14th, 17th, 24th, and 30th; Ellinwood, Kans., 12th, 21st, and 24th; De Soto, Neb., 10th to 18th; and Richmond, Neb., 18th to 30th.

(2) *Meteors* were reported at Newport, R. I., 22d; Morgantown, W. Va., 22d and 25th; Logansport, Ind., 8th; Jacksonville, Fla., 17th and 20th; Milford, Del., 8th and 21st; Forsyth, Ga., 20th; Wyanet, Ill., 20th; Lyndon, Ill., 6th, 21st, and 30th; Belvidere, Ill., 22d; Somonauk, Ill., 5th and 21st; Rock Island, Ill., 27th; Davenport, Iowa, 1st, 3d, 5th, 7th, 9th, 16th, 23d, and 28th; Muscatine, Iowa, 26th; Fort Madison, 6th; Dodge City, Kans., 11th, 18th, and 19th; Ellinwood, Kans., 8th; Benersville, Ky., 12th and 21st; Point Pleasant, La., 20th and 22d; Woodlawn, Md., 22d; Fallston, Md., 25th; Florida, Mass., 4th, 20th, and 27th; Fall River, Mass., 23d; Corning, Mo., 10th and 11th; Howard, Neb., 24th and 30th; Atco, N. J., 17th, 24th, and 25th; New York City, 20th and 29th; Waterburgh, N. Y., 17th; North Volney, N. Y., 4th; Flushing, N. Y., 22d; Carthagena, Ohio, 8th; Canonsburg, Pa., 25th; Woodstock, Vt., 22d; Strafford, Vt., 27th; Wautoma, Wis., 24th.

(3) *Polar bands.*—Wytheville, Va., 13th, 14th, 17th, 24th, and 29th; Cleveland, Ohio, 29th; Charleston, S. C., 4th; Smithville, N. C., 10th and 13th; Breckenridge, Minn., 10th and 17th; Dodge City, Kans., 14th and 30th; Fort Madison, Iowa, 15th; Iowa City, Iowa, 1st, 4th, 13th, 25th, and 30th; Point Pleasant, La., 4th; Freehold, N. J., 18th; Richmond, Va., 28th.

(4) *Earthquakes* were reported at Knoxville, Tenn., 12th; San José, Cal., 14th; San Francisco, Cal., 14th and 27th; Leavenworth, Burlingame, (at 4.40 a. m., motion from SW. to NE.,) Lawrence, and Manhattan, (about 5 a. m., motion from W. to E., and lasting a minute,) Kans., 8th; Forsyth, Gainesville, Macon, and Agusta, Ga.; Aiken, (at 10 p. m., motion from S. to N.,) Spartanburg and Columbia, S. C., 1st, 10.20 p. m., sufficient shock to shake doors and windows.

Published by order of the Hon. Wm. W. Belknap, Secretary of War.

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MONTHLY WEATHER REVIEW, DECEMBER, 1875.

INTRODUCTION.

The present review of the atmospheric phenomena during December, 1875, is based upon, first, the tri-daily simultaneous observations charted at this office for the study and preparation of the weather predictions, (the international simultaneous observations have not been used;) second, the reports of monthly means and abstracts from 475 stations classified as Canadian, naval hospitals, Army posts, volunteer, marine, and United States Signal Service; third, such newspaper reports as seemed reliable.

The month of December has been, in general, marked by the following peculiarities:

First, the high barometric pressure, with infrequent and feeble storms in the United States.

Second, the high temperature, the average of the month being in the Ohio Valley and Northwest, ten degrees above the normal. In the Southwest and Mississippi Valley and westward to the Pacific, the month has been one of, if not the warmest on record.

Third, the large excess of rain-fall in Oregon.

Fourth, almost total absence of auroras.

BAROMETRIC PRESSURE.

In general.—The general distribution of atmospheric pressure during the month is shown by the isobars of Chart No. II. With scarcely an exception, the average pressure for this month is from 0.15 to 0.20 inch below that for December, 1874, and somewhat below the mean for the past five years. The areas of low and high pressure have been neither numerous nor intense; the paths of the former have kept to the northward of their average route; the areas of high pressure have appeared to follow the Mississippi Valley southward rather than southeastward until they reached the Gulf coast.

Areas of low barometer.—During the month, eight important barometric minima have occurred at Portland, Oreg., six of which, those of the 1st, 3d, 18-19th, 24th, 27-28th, and 31st, were of sufficient extent, or were central in such southern latitudes, as to produce sensible effects among our stations on the east side of the Rocky Mountains. Several small and temporary minima seem to have originated during the month on the plains of the West and the Southwest. These were, however, the necessary results of the warm southerly winds blowing over these plains northward toward such regions of low barometer as passed from the Pacific coast into British America. Thus the storms west of the Mississippi have frequently been due to those occurring a few days earlier on the Pacific coast, and might, with some propriety, be traced backward to them; they have first appeared as long, narrow, barometric depressions, parallel to the mountain-ranges; but soon losing this feature, became more nearly circular as they passed eastward. Several minor depressions in the Northwest and the Southwest have been too local or evanescent, or too indefinite, to allow of a presentation of their tracks on the accompanying Chart No. I. The month seems to have been exceptionally stormy on the North Atlantic, and the period of unusually numerous severe storms that seems to have prevailed in the Pacific during October and November has, we judge, extended into the month of December; on the 1st a typhoon passed northward over the island of Luzon, East Indies.

I. This small depression moved from the Texas coast on the afternoon of December 4 to the Ohio Valley, where it joined No. II.

II. A very general depression west of the Mississippi lasted during the first four days of the month; it was followed on the 5th by cold northwest winds and rising barometer at the Rocky Mountain stations. Of the extensive depression that formed to the eastward and extended from the Missouri Valley to Virginia, one branch, that in the Indian Territory, appears to have moved northeastward and formed a nucleus for the rest. The gradients attending this low barometer were at no time steep, nor the wind severe, and in the course of its slow eastward progress the central depression gradually filled up until lost in New England on the 9th.

III. A similar ill-defined area of low barometer presented itself in the Northwest at the 11 p. m. report of the 9th. This remained on the northern limits of the weather-charts, and was lost sight of in Canada on the 11th.

IV. The high pressure prevailing in Oregon from the 7th to the 11th may, to judge from the rain-fall on the 11th, have been accompanied by a low barometer to the northward, and one that would explain the sudden appearance at the 4.35 p. m. report of indications of a storm then central in Manitoba. The violent winds and steep gradients of this depression enable its path to be given with corresponding accuracy, although almost entirely confined to the region north of our stations until the 13th, when it passed into New England, and was there lost sight of in the greater region of very low barometer that had prevailed on the East Atlantic and Newfoundland coasts since the 8th.

V. This depression appeared first in Manitoba under circumstances very similar to

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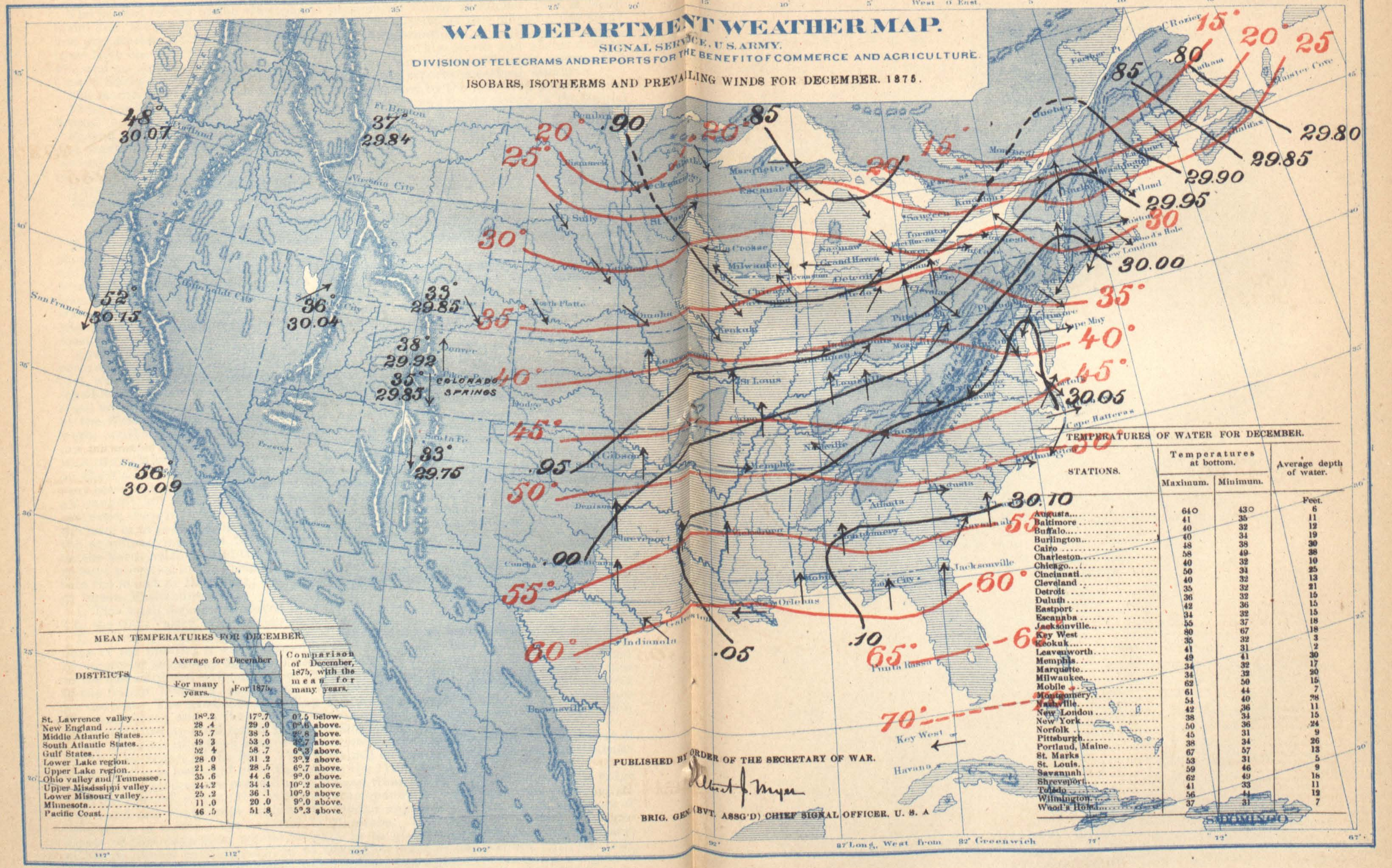

MEAN TEMPERATURES FOR DECEMBER.

DISTRICTS.	Average for December: For many years.	Average for December: For 1875.	Comparison of December, 1875, with the mean for many years.
St. Lawrence valley	18°.2	17°.7	0°.5 below.
New England	28 .4	29 .0	0°.6 above.
Middle Atlantic States	35 .7	38 .5	2°.8 above.
South Atlantic States	49 3	53 .0	3°.7 above.
Gulf States	52 4	58 .7	6°.3 above.
Lower Lake region	28 .0	31 .2	3°.2 above.
Upper Lake region	21 .8	28 .5	6°.7 above.
Ohio valley and Tennessee	35 .6	44 .6	9°.0 above.
Upper Mississippi valley	24 .2	34 .4	10°.2 above.
Lower Missouri valley	25 .2	36 .1	10°.9 above
Minnesota	11 .0	20 .0	9°.0 above.
Pacific Coast	46 .5	51 .8	5°.3 above.

TEMPERATURES OF WATER FOR DECEMBER.

STATIONS.	Temperatures at bottom. Maximum.	Temperatures at bottom. Minimum.	Average depth of water. Feet.
Augusta	64°	43°	6
Baltimore	41	35	11
Buffalo	40	32	12
Burlington	40	34	19
Cairo	48	38	30
Charleston	58	49	38
Chicago	40	32	10
Cincinnati	50	34	25
Cleveland	40	32	13
Detroit	35	32	21
Duluth	36	32	15
Eastport	42	36	15
Escanaba	34	32	15
Jacksonville	55	37	18
Key West	80	67	18
Keokuk	35	32	3
Leavenworth	41	31	2
Memphis	49	41	30
Marquette	34	32	17
Milwaukee	34	32	20
Mobile	62	50	15
Montgomery	61	44	7
Nashville	54	40	28
New London	42	36	11
New York	38	34	15
Norfolk	50	36	24
Pittsburgh	45	31	9
Portland, Maine	38	34	26
St. Marks	67	57	13
St. Louis	53	31	5
Savannah	59	46	9
Shreveport	62	49	18
Toledo	41	33	11
Wilmington	56	41	12
Wood's Hole	37	31	7

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NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

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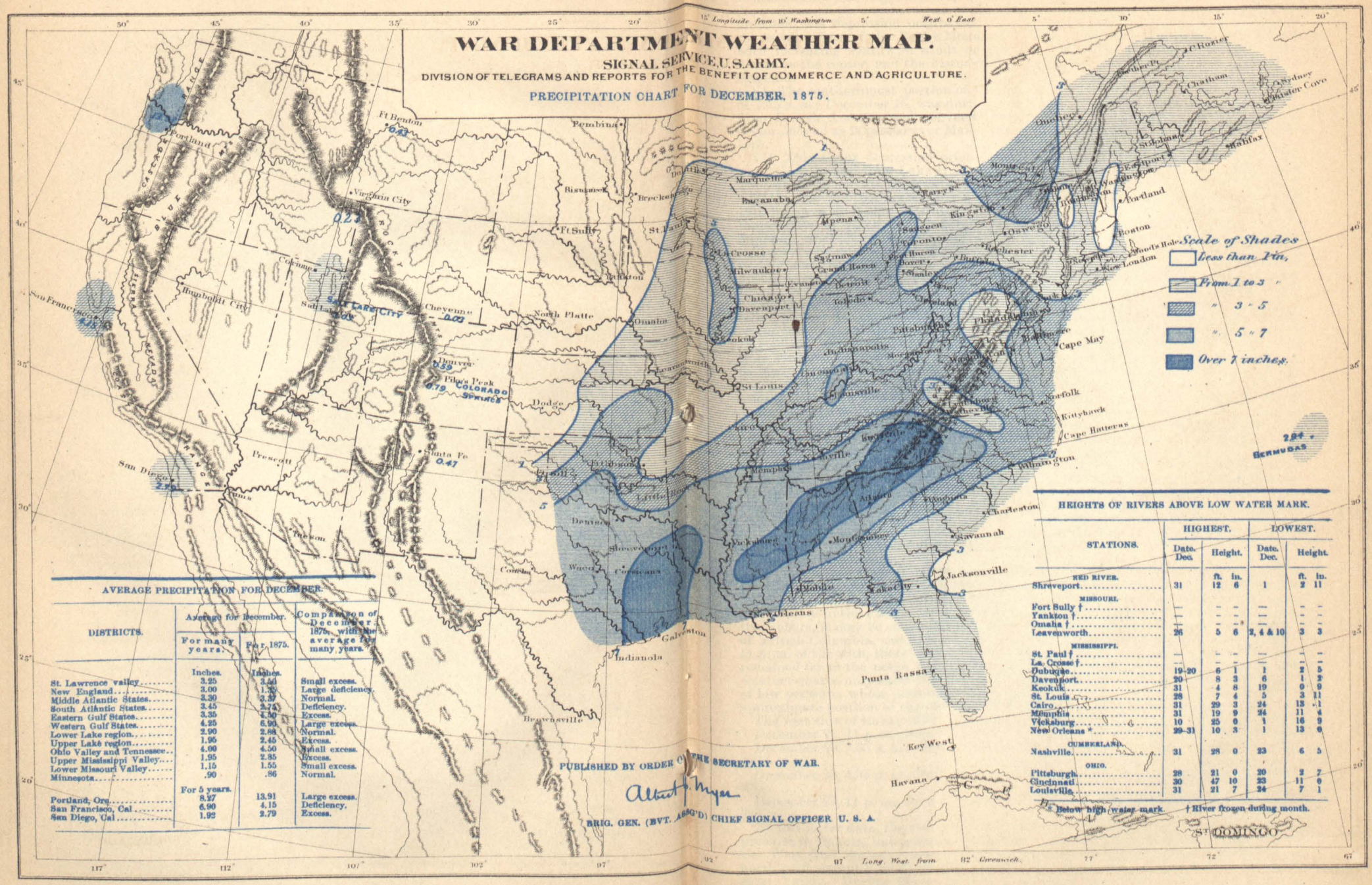
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR DECEMBER, 1875.



AVERAGE PRECIPITATION FOR DECEMBER.

DISTRICTS.	Average for December. For many years.	For 1875.	Comparison of December, 1875, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	3.25	3.50	Small excess.
New England	3.00	1.35	Large deficiency.
Middle Atlantic States	3.30	3.37	Normal.
South Atlantic States	3.45	2.75	Deficiency.
Eastern Gulf States	3.35	4.50	Excess.
Western Gulf States	4.25	6.90	Large excess.
Lower Lake region	2.90	2.88	Normal.
Upper Lake region	1.95	2.45	Excess.
Ohio Valley and Tennessee	4.00	4.50	Small excess.
Upper Mississippi Valley	1.95	2.35	Excess.
Lower Missouri Valley	1.15	1.55	Small excess.
Minnesota	.90	.86	Normal.
	For 5 years.		
Portland, Ore	8.27	13.91	Large excess.
San Francisco, Cal	6.90	4.15	Deficiency.
San Diego, Cal	1.92	2.79	Excess.

HEIGHTS OF RIVERS ABOVE LOW WATER MARK.

STATIONS.	HIGHEST. Date. Dec.	Height. ft.	in.	LOWEST. Date. Dec.	Height. ft.	in.
RED RIVER.						
Shreveport	31	12	6	1	2	11
MISSOURI.						
Fort Sully †	—	-	-	—	-	-
Yankton †	—	-	-	—	-	-
Omaha †	—	-	-	—	-	-
Leavenworth	26	5	6	2, 4 & 10	3	3
MISSISSIPPI.						
St. Paul †	—	-	-	—	-	-
La Crosse †	—	-	-	—	-	-
Dubuque	19-20	6	1	1	2	5
Davenport	20	8	3	6	1	2
Keokuk	31	4	8	19	0	9
St. Louis	28	7	4	5	3	11
Cairo	31	29	3	24	15	1
Memphis	31	19	9	24	11	4
Vicksburg	10	25	0	1	16	9
New Orleans *	29-31	10	3	1	13	0
CUMBERLAND.						
Nashville	31	28	0	23	6	5
OHIO.						
Pittsburgh	28	21	0	20	2	7
Cincinnati	30	47	10	23	11	0
Louisville	31	21	7	24	7	1

* Below high water mark. † River frozen during month.

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those attending the preceding one. The barometer fell decidedly at Bismarck, Pembina, and Garry, from 4 to 11 p. m., December 13, and then very rapidly until 7 a. m., December 14, at which time the center of the depression may be placed approximately at latitude 51° and longitude 104½°; which, on the other hand, may also be said to be the position of the southern end of an elongated belt of low pressure, in case, as seems probable, this depression originated, as many others do, in such a belt at the base of the eastern slope of the Rocky Mountains. The central pressure continued at 29.30, with increasing southwest winds on the lakes, until the evening of the 15th, when it rose at the center, and the disturbance was lost either in Lower Canada or in New England.

VI. The southernmost portion of that remnant of No. V which appears on the map of 7.35 a. m., December 16, was during that day evidently inclosed by the flow of air from British America and converted into a separate area, which gradually became better defined as it passed over Maine and the Gulf of Saint Lawrence on the 17th and 18th.

VII. This slight depression originated in a manner similar to that of No. VI, and can only be traced from Lake Huron, on the 17th, 11 p. m., to Northern New York on the 18th, 11 p. m. Its track is too uncertain to justify presentation on Chart No. I.

VIII. The low barometer prevailing on the 18th on the Pacific coast was on the 19th followed by falling pressure in Manitoba, where it remained low until the 21st, on the morning of which day the depression was apparently central to the north of Lake Superior, where it remained until midnight of the 22d, and then disappeared before the cold northwest winds, and without perceptibly running into the general depression prevailing over the regions to the eastward of New England. As in the case of the preceding area, the path of this storm-center cannot be satisfactorily given on Chart No. I.

IX. The origin of this well-marked area of low barometer may, with some plausibility, be traced back to Northern Mexico and the most southern portion of Texas, where, on the 19th, there prevailed southeast winds and threatening weather followed by northerly gales. This condition of affairs was due to the low barometer then prevailing from Texas to Manitoba and to Oregon, and the consequent high barometer over the Gulf and South Atlantic States. The area of rain extended slowly northward, reaching Indian Territory 4.35 p. m. December 22, while cold northerly winds were beginning to prevail in Nebraska and Minnesota. By the afternoon of the 23d, the pressure had fallen decidedly from Kansas to Texas, and the region of lowest barometer may be apparently placed as given on Chart No. I. Steep gradients and brisk winds prevailed over the Lakes on the 24th, but the storm passed rapidly northeastward on the 25th, beyond our limits.

X. Following closely in the rear of No. IX, we find No. X in Kansas at 11 p. m. December 25. Its progress northeastward on the 26th was quite rapid, with steadily falling barometer and brisk winds on the Lakes. On the morning of the 27th, the central depression was probably over the Gulf of Saint Lawrence.

In connection with this disturbance there have been reported: At Owensville, Ind., at 3 p. m. on the 26th, a very destructive gusty wind from the southwest lasting five minutes and having the force of a tornado; at Boston, at 9.30 p. m., a thunderstorm and electric phenomena.

XI. A notable barometric depression, with heavy rain and brisk southwest winds, prevailed in California and Oregon during the morning of the 28th; by midnight its influence was seen in the falling pressure throughout the whole region from the Mississippi Valley to the Pacific, and apparently also in British America. From the trend of the isobars, it may be concluded that the lowest pressure was at this time central east of British Columbia, and approximately in latitude 55° and longitude 110°. If, after 11 p. m. of the 28th, there were any well-defined area of low barometer, it must have remained far to the north and passed over Hudson's Bay; the limits of the present weather-charts only show the V-shaped southern end of a remarkably extended area of low pressure, whose position may be defined by the following data, which give the approximate position of the east side of the visible portion of the isobar of 29.50.

The east side of isobar of 29.50 extends—

December 28, 11 p. m., from longitude 95°, latitude 50°, to longitude 98°, latitude 44°.

December 29, 7.35 a. m., from longitude 92°, latitude 48°, to longitude 97°, latitude 40°.

December 29, 4.35 p. m., from longitude 87°, latitude 48°, to longitude 96°, latitude 37½°.

December 29, 11 p. m., from longitude 87°, latitude 47½°, to longitude 97°, latitude 39°.

By this latter date, the rising barometer on the Oregon coast had begun to affect the pressure in Dakota, but pressure continued low in Southern California and thence to the West Gulf States; consequently the area of 29.50 just considered retired to the northward, except a small portion which was cut off and isolated in the Lower Missouri Valley. During the remaining last two days of the month there remained

between two areas of high barometer a belt of low pressure, strongly contrasted temperatures, and cloud or rain, extending from Texas to Missouri and to the Lower Lakes, bordered on either side by opposing north or northwest and south or southeast winds. On the 21st, the steadily-increasing rains in the Southwest culminated in a well-marked storm that was central at midnight in Western Arkansas, but whose history belongs properly to the following month of January.

It often happens that cold northeast winds on the Atlantic coast can be attributed to the flow of abnormally cold air from areas of high barometer over the Saint Lawrence Valley and Gulf; but, on the other hand, these winds have equally often a more direct dependence on the presence of a low barometer off the South Atlantic coast. In some cases, the cold northern current evidently underruns the warmer air of the sea and thus initiates a storm; in other cases, it seems probable that we must look to the advancing hurricane as the prime cause of the northeast winds, since, by its presence, it gives occasion for the southern flow of the colder air, precisely as a deficiency of pressure over the Mississippi Valley and Gulf States makes room for the cold northers and high pressures that travel from Manitoba southward. The following instances of this class of storms have occurred during the month:

XII. The barometer rose with northeast winds on December 2, both at the Bermuda and the South Atlantic stations, under the influence of a region of high pressure that was central at 11 p. m. in New York; by 7.35 a. m. of the 3d, the barometer had fallen slightly on the North Carolina coast, where marine reports show a destructive gale from the northeast and southeast in progress; at 4.35 p. m., the barometer had fallen at both Hatteras and Bermuda; a hurricane was reported in latitude 33°, longitude 73°, and the central depression was approximately in latitude 29°, longitude 76°. December 3, 11 p. m., the center is estimated to have been at latitude 32°, longitude 78°. Possibly, however, a long belt of pressure was now developed; for, by the morning of the 5th, the barometer had fallen on the North Carolina coast sufficiently to render it probable that the storm-center was then east of Norfolk; and, at 11 p. m., it appears to have been midway between Capes Henry and May; at 7.35 a. m. of the 6th, a disturbance was evidently central east of New Jersey, and this may have been the remnant of the storm previously described. Equally possible is it that this was but one of several fragments into which the original storm became subdivided; for, at this same time, December 6, 7.35 a. m., the pressure had, at the Bermudas, fallen to 29.76; at 4.35 p. m., it was at 29.50; and, at 11 p. m. of the 6th, 29.54; showing that either several storms were in progress or that the isobar of 29.60 surrounded a much larger area, including Bermuda and Nova Scotia as its western boundary. The latter supposition is confirmed by the fact that the European weather-maps of the 6th and 7th show that, at this time, an area of high pressure was rapidly descending over Ireland and Great Britain, so that at 8 a. m., Greenwich time, of the 7th, (about 3 a. m., Washington time,) the isobar 30.50 passed through Northern Scotland with higher pressure to the northward and westward. For the three subsequent days, the positions of the isobars over Ireland moved slowly southward, showing that the motion of the areas of high pressure was more to the southwest than to the southeast; we should therefore expect that the low pressure located east of the Bermudas moved northeastward past Nova Scotia and Newfoundland on the 7th and 8th, toward Iceland on the 9th or 10th.

XIII. In intimate connection with the preceding disturbance, there appears on the 7th, at 4.35 p. m., a storm-center near Cape Hatteras. The reports of that time show: Cape Hatteras, barometer, 29.17; wind direction, north; velocity, 17 miles; Bermuda, barometer, 29.71; wind direction, south; velocity, 7 miles. This, like its predecessor, seems to have passed northeastward up the coast.

XIV. The reports of December 11, 4.35 p. m., from the South Atlantic coast, suggested the possibility of there being, at that time, a small storm to the east of North Carolina, a suspicion that was confirmed by the Bermuda and the marine reports, from which the following estimates of its position have been compiled:

December 11, 11 p. m., latitude 30°, longitude 75°.
December 12, 7 p. m., latitude 32°, longitude 75°.
December 12, 4 p. m., latitude 34°, longitude 70°.
December 12, 11 p. m., latitude 36°, longitude 65°.

On the morning of the 13th, the storm may have been central not far from latitude 44°, longitude 61°; but, in the absence of further data, it cannot be decided whether two distinct areas or one elongated area of low pressure then existed.

NOTE.—The uncertainty of the positions given for the tracks of the three storms, XII, XIII, and XIV, renders it improper to present them upon Chart I. They are, however, instructive as showing, on the one hand, how frequently a northeast wind at our Atlantic stations points to a storm-center a few hundred miles eastward; and, on the other, what valuable knowledge, as to their existence and movements, we obtain by means of the reports from the Bermudas.

Areas of high barometer.—These have, as a rule, either passed southward west of the Mississippi, or passed eastward to Labrador, and thence southward along the Atlantic States. The Ohio Valley and Middle States have been singularly free from their pres-

ence. Testimony is afforded this month, as usual, to the conclusion that our cold areas are formed in consequence of radiation of heat through extremely dry air, and that a layer of cold, dry, and therefore dense air, by underrunning and uplifting warmer, moister air, gives rise first to an area of high pressure, and subsequently to condensation of vapor and the initiation of an area of low pressure.

I. Appears as an area of cold air flowing southward over Upper Canada. Its center passed as follows:

December 1, 7.35 a. m., Upper Canada.
December 2, 7.35 a. m., Saint Lawrence Valley.
December 3, 7.35 a. m., New England.
December 4, 7.35 a. m., Middle and Eastern States.
December 5, 7.35 a. m., Saint Lawrence Valley.

Cold northeast winds extended southward along the Atlantic coast, with fog, cloud, and rain or snow as far as North Carolina on the 4th.

II. Following in the rear of low barometer No. II, we find the rising pressure culminating on the 7th, at 7.35 a. m., at the Pacific coast stations, and on the 8th, at 7.35 a. m., in Manitoba and Dakota, where a temperature of —25° was reported. This high barometer rapidly spread out to the south and east, and cannot be definitely traced. It evidently contributed its quota to the high pressure then beginning to extend over the Southern States and Ohio Valley.

III. The rising barometer and low temperature on the 9th in Manitoba were, on the morning of the 10th, central in the Missouri Valley, and flowing thence southward, disappeared in the southwest on the 11th. A remnant was apparently left at midnight in Southern Texas, whence it on the 12th spread over the Gulf and Gulf States, while the barometer was abnormally low over the Lake region.

IV. On the afternoon of the 13th, the rising barometer in the rear of low No. IV presented its culmination as a belt of high pressure, extending over Arkansas and Missouri; December 13, 11 p. m., this area extended from Mississippi to Southeastern Dakota; December 14, 7.35 a. m., it included Missouri, Louisiana, and South Carolina; December 14, 4.35 p. m., it included Mississippi and Louisiana; December 14, 11 p. m., it extended from Louisiana to South Carolina and Florida; December 15, 7.35 a. m., it extended over Mississippi, Georgia, and Florida; December 15, 4.35 p. m., it covered Florida, and became wholly identified with the Atlantic tropical belt of high pressure, of which it then formed the western end.

V. While high No. IV was, on the 15th, in Florida and low No. V was over the Lakes, the barometer rose in Oregon, Manitoba, and Wyoming. The maximum pressure was attained in Manitoba by midnight of the 16th, by which time the cold air had, in its southern flow, reached the coasts of Texas as a "norther." On the morning of the 17th, the area of high barometer was central in the Lower Missouri Valley, and by that afternoon had passed southeastward so as to cover Arkansas and Missouri, and by 11 p. m. it extended from Cairo to Vicksburg. On the 18th, 7.35 a. m., the highest pressure was in Northern Mississippi and Alabama; by 4.35 p. m., it had apparently moved southeastward; by 11 p. m., it was in Northwestern Florida, and on the 19th, 7.35 a. m., in Southern Alabama and Georgia, after which it becomes indistinguishable from the general tropical area of high pressure over the Atlantic. The average rate of movement of the well-defined central highest pressure was 31 miles hourly from the 16th, 11 p. m., to the 18th, 11 p. m.; but the advancing edge of the outer portion of the area moved much more rapidly southward and eastward.

VI. This area of low temperature and high barometer appeared in Manitoba on the 18th; it moved eastward over the British Provinces, and was central in Canada north of Lake Ontario at 4.35 p. m. December 19; the temperature fell —25° at Ottawa at 11 p. m., and continued below zero over New England on the mo ing of the 20th, being the lowest temperature of the month at most places in that district, and varying from 0° at the southern to —29° at the northern stations. The rapid flow southward over the Atlantic of the comparatively small area of cold air, and the development in the west of low barometer No. VIII, allowed this cold period to change rapidly into one of comparative warmth; the central area of high pressure was lost sight of on the 21st as it reached the coast of South Carolina and Georgia, and joined the already extended tropical area of high barometer.

VII. On the morning of the 23d, the rapid barometric rise in Manitoba and cold north winds indicated there the southern edge of another area of high pressure, which, however, like its predecessor, kept well to the north of our stations, until, in its eastward progress, it arrived at the Saint Lawrence Valley at 11 p. m., December 23. On the 24th, at 7.35 a. m., it covered the Lower Saint Lawrence and greater part of New England and New Brunswick. Its path continued eastward over Labrador and Newfoundland until 7.35 a. m. December 25, when it was apparently central to the southeast of the Gulf of Saint Lawrence. Meanwhile, a large volume of air flowed southward along the coast as far as Cape Hatteras, producing, with the help of low No. IX, continued northeast winds, cloud, rain, snow or fog during the 24th.

VIII. On the 26th, the rising pressure to the northward of low No. X passed rapidly

southward from Dakota and Minnesota to the Missouri, and thence eastward, until, on the 27th, 7.35 a. m., it was central in Illinois and Michigan. It was re-enforced during this afternoon by an additional flow of air from the north, and continued increasing in extent and intensity as it moved eastward. December 28, 7.35 a. m., it was central over Maine, with pressure 0.25 inch higher than in Illinois the previous morning. As usual, the air now began to flow with greater freedom southward over the Atlantic, and there was inaugurated a long series of foggy and rainy days along the East and Middle Atlantic coast, which, beginning with northeast winds and clear weather on the evening of the 27th, continued with fog, &c., until cleared away by the westerly winds on January 2. During this time, the central high moved to the southeast of the Gulf of Saint Lawrence, and the central low barometer, No. I of January, advanced to the Lake region, while the winds on the Atlantic coast veered from northeast to southwest and subsequently to west.

TEMPERATURE OF THE AIR.

The isothermal lines on Chart No. II show the distribution of the mean temperatures of the month. While the average temperature has in the Saint Lawrence Valley and extreme northern portion of New England and probably throughout Lower Canada, &c., been below the normal, it has in all the other portions of the country been above the average and sometimes above December, 1853; the greatest excess is 10° in the Northwest. An examination of the available records of the warm Decembers of previous years shows that, for the entire Pacific coast, this is the warmest of which we have record. The isotherm of 32° passes through the northwest corner of Nebraska; a little north of Omaha, La Crosse, the middle of Lake Michigan, between Port Huron and Detroit, along the southern border of Lake Ontario, the centers of Connecticut and Rhode Island.

A general idea of the isotherms of maximum temperatures of the month may be had by tracing the isotherm of 70°. This begins at the southeast corner of New Mexico; runs north to the northeast corner of Wyoming; then drops to the northern border of Kansas and trends eastward on the 40th parallel to Pennsylvania; whence it turns southeastward between Baltimore and Washington to Cape Henry.

The distribution of the minimum temperatures of the month has been, at least in the northern part of the United States, regulated by a rule previously announced, that the coldest air flowing southward remains in the lowest valleys accessible to it. Thus, minima of from 0° to —5° are found at Leavenworth and Omaha, while minima of only 10° to 15° occur in the higher regions of Kansas and Nebraska, immediately to the west. One of the most remarkable illustrations of the rule occurred on the 16th and 17th, when were reported the minima of —18° at Breckenridge and —22° at Fort Randall, Dak., —15° at Yankton and —5° at Omaha; while 0° was the minimum at Fort Sully, (150 miles northwest of Yankton,) a little higher and protected by intervening ridges, over which the coldest air did not flow. At Pembina, large fluctuations of temperature occur during the still nights within a few minutes, according as the coldest air reaches the thermometers or remains below them. The 0° isotherm of monthly minima, starting from the headwaters of the Missouri, passes southward between Idaho and Montana; eastward through the northern part of Utah; northward along the east boundary of Wyoming to latitude 45 and longitude 102; thence southeast a little west of the Missouri River to Omaha and Southern Illinois; northwest to Chicago and Central Michigan, and thence in a wavy curve to Long Island Sound. The average monthly minimum for fifteen stations representing the elevated plains of Nebraska, Colorado, and Kansas, is + 0°, being very nearly the same as in Delaware and Maryland.

Ranges of temperature.—The largest ranges of temperature have been at Madison Barracks, N. Y., 99°; Malone, 94°; Mount Washington, 80°; Oswego, 79°; Rochester, 78°; Saint Louis and Yankton, 77°.

The smallest ranges of temperature have been, as usual, on the Pacific coast, San Francisco, 26°. For stations in the interior of Idaho and Nevada, 36°; for Key West, 25°; for the Texas coast, 33° and 37°; for Cape Hatteras, 48°; Cape Henry, 54°.

PRECIPITATION.

Chart No. III shows the general distribution of precipitation for the month. The regions of unusually large precipitation are the Western Gulf States and the Pacific coast; the excess at Portland, Oreg., was, as in November, somewhat remarkable, and probably stands in intimate connection with the decidedly southerly tracks pursued by the Pacific storms. A deficiency is reported for New England and the South Atlantic States.

Rainy days.—The average number of days on which rain or snow fell in December is, for the Upper Mississippi Valley, 11; Lower Mississippi, 12. Westward of this river, the number diminishes very regularly to 2 in Colorado. Going eastward, the number increases to from 10 to 19 on Lake Michigan; from 12 to 17 in the Ohio Valley; from 11 to 16 in the Eastern Gulf States; from 8 to 13 in the South Atlantic States; from 14 to 20 in the Middle Atlantic States; from 17 to 24 in the Lower Lakes; from 10 to 15 in Northern New England.

Small regions of drought are shown in New England.

Foggy days.—From 4 to 11 foggy days are reported from Cape Cod to Cape Hatteras, the majority of which occurred during the last week in the month. At other stations, the reports were: Wilmington and La Crosse, 9 days; Wytheville, Salt Lake City, and Saint Paul, 7; Galveston, 8; Saint Louis and Cleveland, 6. The largest number of foggy days are: Washington, New York, and Philadelphia, 10 or 11.

RELATIVE HUMIDITY.

The mean relative humidity for the month ranges between 51 at Cheyenne, 56 at Virginia City, and 63 at Yankton, up to 85 at Albany, 84 at Indianola, 82 at Marquette, 84 at Peck's Beach, and 81 at San Francisco. For the summit of Mount Washington the average is 89, uncorrected for elevation.

WINDS.

The prevailing wind-directions for the month have been: In the Gulf States, southerly; in the South Atlantic States, the Ohio Valley, and Lower Lake region, southwest; in the Northwest and Upper Lake region, northwest; in the Middle and Eastern States, northwest to northeast.

The *total movements* of the air for the month, independent of direction, have been, at Breckenridge, 10,914; Cheyenne, 11,049; Erie, 10,682; Grand Haven, 10,470; Indianola, 10,313; Long Branch, 11,182; Sandy Hook, 12,545; Augusta, 2,776; Baltimore, 2,948; Lynchburg, 2,800; and Salt Lake City, 2,031 miles.

Maximum wind velocities exceeding 45 miles were reported as follows: Erie, south, 52 miles; Long Branch, on the 13th, northwest, 56; Grand Haven, 12th, east, 45; Mount Washington, northwest, 108; Malone, west, 50; Sandy Hook, 13th, west, 52.

WATER TEMPERATURES.

The monthly maximum and minimum temperatures of water at the river and coast stations are given in a table on Chart No. II. A minimum of 31° or 32° has been recorded at Buffalo, Chicago, Cleveland, Detroit, Duluth, Escanaba, Keokuk, Leavenworth, Marquette, Milwaukee, Pittsburgh, Saint Louis, and Wood's Hole.

NAVIGATION.

The table on Chart No. III gives the highest and lowest readings of the river-gauges during the month, from which it will be seen that the Mississippi from Davenport to New Orleans rose with some variations, until at the close of the month it was from 4 to 15 feet higher than at the middle of the month. A sudden rise accompanied by occasional destructive floods occurred in the Ohio and its tributaries during the last five days of the month. In the Middle States, the early closing of canals and rivers was followed by one or more subsequent openings and closings; Boston Bay, temporarily frozen over on the 19th; the Hudson at West Point, covered with floating ice on the 19th; Sacket's Harbor, N. Y., frozen on the 1st, thick enough to bear travel, but ice all cleared away on the 11th; at Muscatine, Iowa, ice broken up on the 4th, closed again on the 18th, and opened again on the 21st; at Trenton, N. J., the canal was frozen over on the 1st; the Lower Susquehanna, in Maryland, closed on the 2d, opened on the 5th, closed on the 18th, and opened on the 26th; the Hudson, at Garrison's, N. Y., was closed on the 19th, but opened subsequently; the Upper Susquehanna opened on the 6th and 7th, closed on the 19th, and opened on the 22d; the Delaware closed at Trenton on the 2d, opened on the 4th, closed on the 20th, and opened again on the 24th; the Upper Susquehanna, at Tioga, Pa., closed on the 3d, opened on the 8th, closed on the 21st, opened on the 26th; the lake and river at Cleveland, well filled with ice, 20th; at La Crosse and Saint Paul, river frozen during month; at Davenport floating ice 3d, 17th, 18th, 20th, 27th, and 28th; at Barnegat, ice in bay 20th, broke up 22d; at Morgantown, floating ice 18th and 19th, river closed 20th, opened 22d; at Portland, Me., harbor frozen 20th; at Philadelphia, river frozen 19th, broken ice in river 21st and 22d; at Buffalo, ice in river 17th and 18th, lake frozen 20th, ice breaking up 21st, lake almost clear of ice 22d; at Atlantic City, floating ice in sea 20th; at Detroit, floating ice in river 1st; at Albany, canal opened 14th, river 23d; at Springfield, river froze over 21st; at Burlington, Vt., floating ice in lake 22d; at Sandy Hook, bay partly covered with floating ice 21st; at Rochester, ice went out of river 23d; navigation closed on the 13th at Milwaukee, on the 2d at Duluth, and on the 14th at Alpena; at Omaha, river closed during the month; at Keokuk, floating ice on the 6th, 7th, 12th, 17th, and 20th.

VERIFICATION OF "PROBABILITIES" AND CAUTIONARY SIGNALS.

The customary comparison of the published probabilities with the weather of the following twenty-four hours shows that on an average for all the districts of the United States 84.12 per cent. of the predictions have been verified. During the month, 148 displays have been made of cautionary signals at the United States stations, of which 85 were reported by the observers as verified by measured wind velocities of 25 miles or more

during the display. In 13 of the remaining 63 cases, storms have prevailed within 100 miles that justified the signal, although no strong winds were felt at the stations. Of 69 cases of brisk winds that were not signaled, about one-half were westerly winds.

ATMOSPHERIC ELECTRICITY.

Thunder-storms were reported as follows: On the 3d in Texas; 4th, Arkansas; 6th Illinois, Indiana, Kentucky, Mississippi, and Ohio; 7th, Indiana; 11th, Georgia and South Carolina; 12th, North Carolina; 13th, Kansas; 16th, Alabama, Louisiana, and Mississippi; 20th, Kansas, Louisiana, and Texas; 21st, Louisiana, Mississippi, and Texas; 23d, Kansas, Tennessee, and Texas; 24th, Alabama, Kentucky, and Mississippi; 25th, Alabama, New York, and Tennessee; 26th, Alabama, Arkansas, Georgia, Illinois, Indiana, Kentucky, Louisiana, Maine, Massachusetts, Mississippi, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Vermont, and Virginia; 27th, Georgia, Louisiana, Maine, Massachusetts, Mississippi, New Jersey, North Carolina, Ohio, South Carolina, and Virginia; 28th, Alabama, Georgia, Louisiana, Mississippi, Nebraska, and Texas; 29th, Georgia, Iowa, Michigan, North Carolina, and Texas; 30th, Indiana, Iowa, Kansas, and Wisconsin; 31st, Illinois, Indiana, and Texas.

Auroras have been very indefinite, and rarely reported, and the displays have sometimes been of a doubtful character. They were observed on the 7th at Gardiner, Me., and Carthagena, Ohio; 19th, Woodstock, Vt., and Bismarck, Dak.; 24th, Minneapolis, Minn.; 25th, Alpena, Mich., and Malone, N. Y.; 26th, Pembina, Minn.; 28th, Detroit, Mich.

OPTICAL PHENOMENA.

Solar halos were observed as follows: On the 1st in Connecticut; 2d, Iowa, New York, and Virginia; 3d, New Jersey and New Hampshire; 4th, New Hampshire, New York, and Virginia; 5th, New Jersey, Massachusetts, New York, Ohio, and Vermont; 6th, Dakota Territory, Maine, New Hampshire, and Virginia; 7th, Minnesota; 8th, Minnesota and New Jersey; 9th, Alabama; 10th, Dakota Territory and Ohio; 11th, Kansas, Maine, Massachusetts, and North Carolina; 12th, Wisconsin; 13th, Illinois, Iowa and Ohio; 14th, Dakota Territory, Iowa, and Tennessee; 15th, New Jersey, New York, and Tennessee; 16th, Dakota Territory, Minnesota, New York, Virginia, and Wisconsin; 17th, Iowa and Tennessee; 18th, Dakota Territory, Kansas, and Wisconsin; 19th, Wisconsin; 20th, Georgia and New Hampshire; 21st, Iowa, Minnesota, New Jersey, New York, (anthelia at Springfield, Mass.,) and Virginia; 22d, Connecticut, Georgia, and Maine; 23d, Illinois, Iowa, Minnesota, and Virginia; 24th, Connecticut, Illinois, Kansas, Maine, Massachusetts, North Carolina, New Hampshire, New York, Vermont, and Wisconsin; 25th, Georgia, Minnesota, and Wisconsin; 26th, Kansas and Virginia; 27th, California; 28th, Georgia and Minnesota; 29th, New York.

Lunar halos were observed on the 4th in New York and Rhode Island; 5th, Maine, Massachusetts, Alabama, New York, Florida, and Minnesota; 6th, Illinois, Kansas, Nevada, Massachusetts, and Rhode Island; 7th, Nebraska; 8th, Iowa, Maine, Colorado, Alabama, Rhode Island, Indian Territory, New Hampshire, and California; 9th, Alabama, Colorado, Kansas, Pennsylvania, Iowa, Maine, and New Hampshire; 10th, Alabama, Colorado, Iowa, Louisiana, New Jersey, Pennsylvania, North Carolina, Virginia, Utah, Kansas, Mississippi, and Dakota Territory; 11th, Alabama, Illinois, Iowa, Tennessee, Vermont, Virginia, Colorado, North Carolina, Minnesota, Maine, and New Hampshire; 12th, Alabama, Ohio, Tennessee, Virginia, North Carolina, Connecticut, and Pennsylvania; 13th, Alabama, Dakota Territory, Indiana, Kentucky, Tennessee, Michigan, North Carolina, and Maine; 14th, Alabama, Iowa, New York, North Carolina, Ohio, Tennessee, and Colorado; 15th, Iowa, Maine, Wisconsin, Tennessee, North Carolina, New Jersey, Michigan, and Ohio; 16th, Iowa, Massachusetts, New York, North Carolina, and Maine; 17th, Georgia and New York; 21st, Ohio; 31st, Massachusetts.

Mirage was observed on the 1st at Atlantic City, N. J.; 1st, 2d, 20th, New London, Conn.; 12th, 13th, 15th, 20th, 22d, Breckenridge, Minn.; 14th, 15th, 19th, 21st, 28th, 29th, Ellenwood, Kans.; 15th, 16th, 17th, 18th, Atlanta, Kans.; 28th, Moorhead and Saint Paul, Minn.

MISCELLANEOUS PHENOMENA.

Polar bands were recorded on the 13th, 14th, 15th, 24th, 27th, at Iowa City, Iowa; 20th, King's Mountain, Ky.; 2d, Freehold, N. J.; 25th, 27th, Carthagena, Ohio; 6th, 25th, Wytheville, Va.; 21st, Richmond, Va.; 13th, Fort Sully, Dak.

Plants.—On 23d, at Brownsville, Pa., dandelions in bloom; 24th, at Brookhaven, Miss., pinks and hyacinths in bloom; 1st, orange-trees budding at New Orleans; 25th, peach-trees in bloom at New Orleans, La.; 31st, peach-trees budding and swelling at King's Mountain, Ky.; 31st, hyacinths in bloom and fruit-trees budding at Gainesville, Ga.; 31st, peach and cherry buds swelling at Litchfield, Mich.; 31st, at Green Springs, Ala., roses in bloom.

Animals.—On the 1st, 2d, 3d, and 4th wild geese were observed going north at Carthagena, Ohio; 1st, 2d, and 5th, robins, bluebirds, and blackbirds at Le Roy, Kans.; 2d, 4th, and 5th, wild geese flying east, and on 26th north, at Wilsonville, Ala.; 6th, wild

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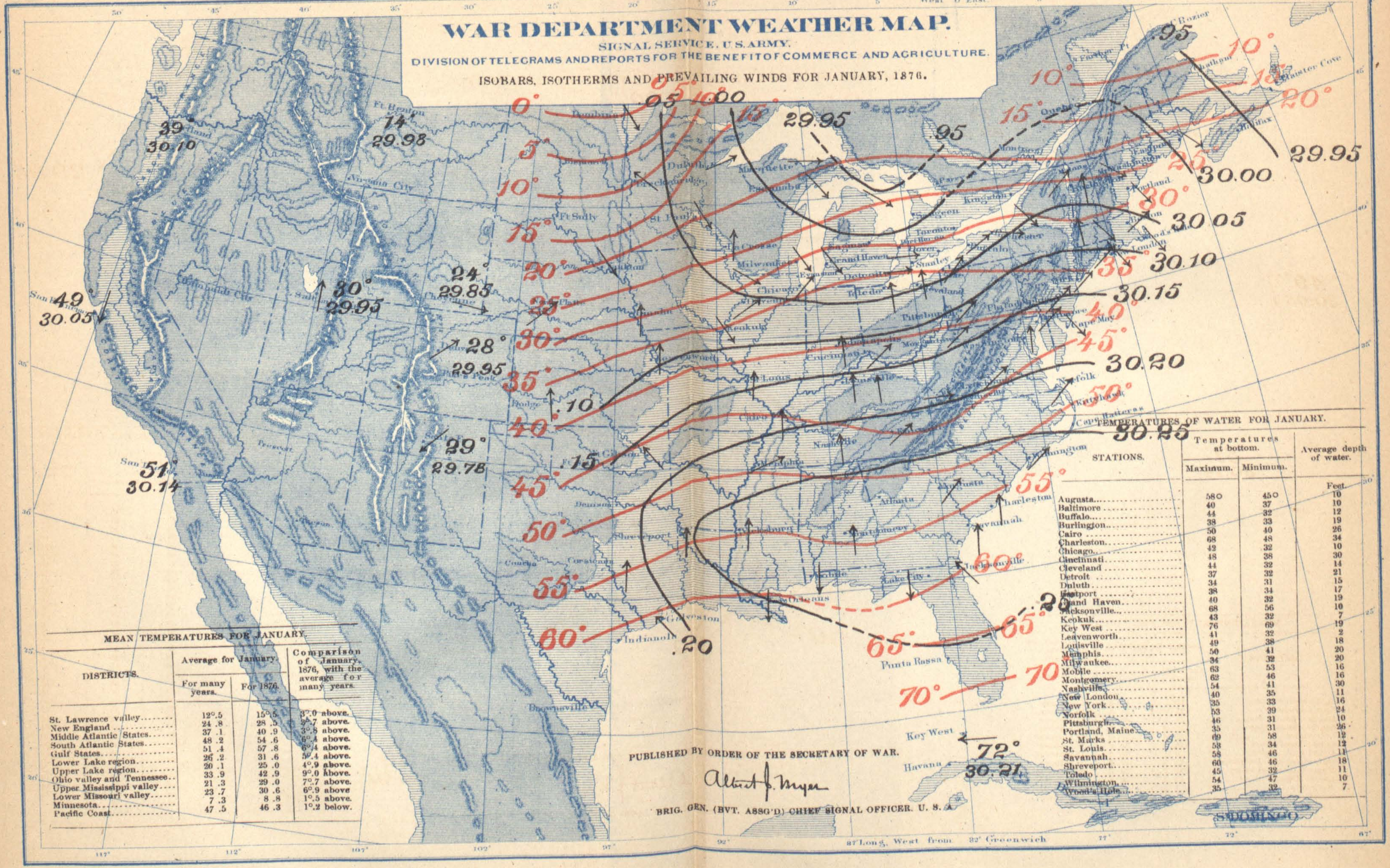

MEAN TEMPERATURES FOR JANUARY.

DISTRICTS.	Average for January. For many years.	Average for January. For 1876.	Comparison of January, 1876, with the average for many years.
St. Lawrence valley	12°.5	15°.5	3°.0 above.
New England	24 .8	28 .5	3°.7 above.
Middle Atlantic States	37 .1	40 .9	3°.8 above.
South Atlantic States	48 .2	54 .6	6°.4 above.
Gulf States	51 .4	57 .8	6°.4 above.
Lower Lake region	26 .2	31 .6	5°.4 above.
Upper Lake region	20 .1	25 .0	4°.9 above.
Ohio valley and Tennessee	33 .9	42 .9	9°.0 above.
Upper Mississippi valley	21 .3	29 .0	7°.7 above.
Lower Missouri valley	23 .7	30 .6	6°.9 above
Minnesota	7 .3	8 .8	1°.5 above.
Pacific Coast	47 .5	46 .3	1°.2 below.

TEMPERATURES OF WATER FOR JANUARY.

STATIONS.	Temperatures at bottom. Maximum.	Temperatures at bottom. Minimum.	Average depth of water.
			Feet.
Augusta	58°	45°	10
Baltimore	40	37	10
Buffalo	44	32	12
Burlington	38	33	19
Cairo	50	40	26
Charleston	68	48	34
Chicago	42	32	10
Cincinnati	48	38	30
Cleveland	44	32	14
Detroit	37	32	21
Duluth	34	31	15
Eastport	38	34	17
Grand Haven	40	32	19
Jacksonville	68	56	10
Keokuk	43	32	7
Key West	76	69	19
Leavenworth	41	32	2
Louisville	49	38	18
Memphis	50	41	20
Milwaukee	34	32	20
Mobile	63	53	16
Montgomery	62	46	16
Nashville	54	41	30
New London	40	35	11
New York	35	33	16
Norfolk	53	39	24
Pittsburgh	46	31	10
Portland, Maine	35	31	26
St. Marks	69	58	12
St. Louis	58	34	12
Savannah	58	46	11
Shreveport	60	46	18
Toledo	45	32	11
Wilmington	54	47	10
Wood's Hole	35	32	7

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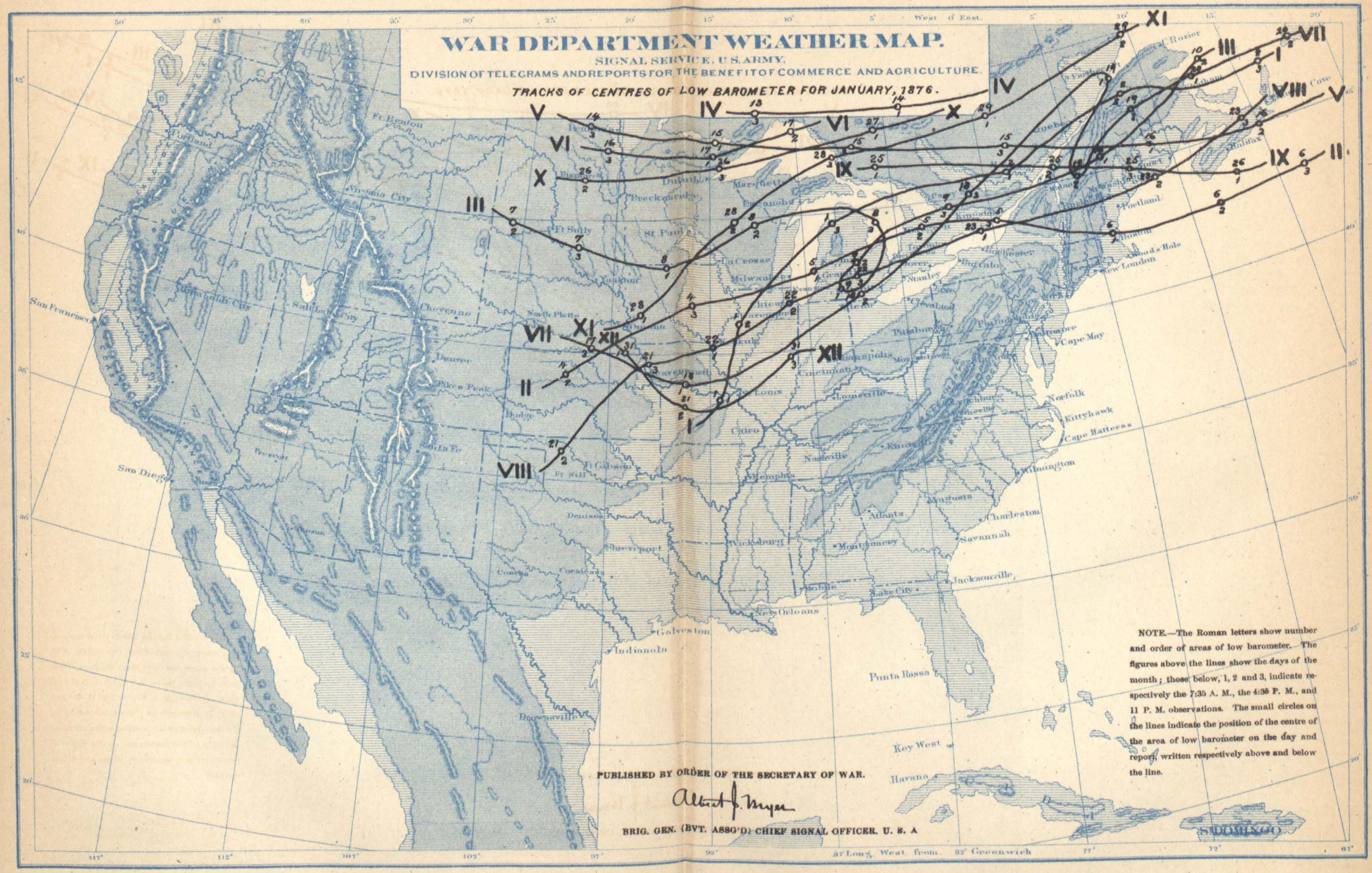
WAR DEPARTMENT WEATHER MAP.
SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.
TRACKS OF CENTRES OF LOW BAROMETER FOR JANUARY, 1876.
NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
BRIG. GEN. (BVT. ASSG'D) CHIEF SIGNAL OFFICER, U. S. A
Ft. Benton
Portland
Virginia City
San Francisco
Salt Lake City
Cheyenne
Denver
Pike's Peak
Santa Fe
San Diego
Prescott
Tucson
Ft. Sully
Yankton
North Platte
Omaha
Ft. Gibson
Ft. Sill
Denison
Shreveport
Corsicana
Galveston
Indianola
Brownsville
Duluth
Breckenridge
St. Paul
La Crosse
Milwaukee
Chicago
Cairo
Memphis
Nashville
Louisville
Cincinnati
Indianapolis
Pittsburgh
Cleveland
Buffalo
Rochester
Stanley
Dover
Kingston
Portland
Boston
Wood's Hole
New London
Cape May
Norfolk
Kittyhawk
Cape Hatteras
Wilmington
Charleston
Savannah
Augusta
Atlanta
Montgomery
Jacksonville
Lake City
Mobile
New Orleans
Vicksburg
Punta Rassa
Key West
Havana
S. DOMINGO
West 0° East
87° Long. West from 82° Greenwich

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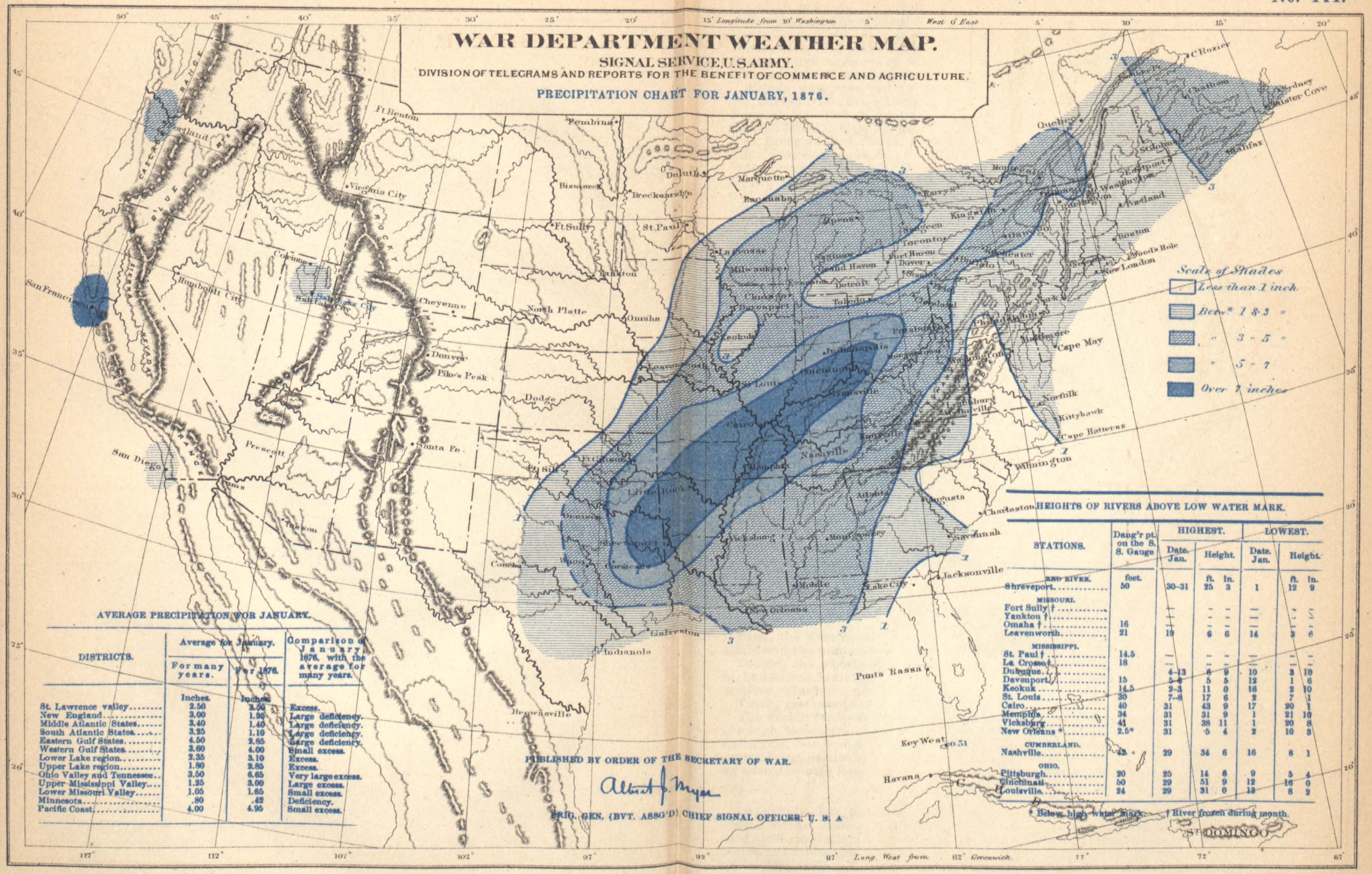
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR JANUARY, 1876.



AVERAGE PRECIPITATION FOR JANUARY.

DISTRICTS.	Average for January. For many years.	Average for January. For 1876.	Comparison of January, 1876, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	2.50	3.50	Excess.
New England	3.00	1.95	Large deficiency.
Middle Atlantic States	3.40	1.40	Large deficiency.
South Atlantic States	3.25	1.10	Large deficiency.
Eastern Gulf States	4.50	2.85	Large deficiency.
Western Gulf States	3.60	4.00	Small excess.
Lower Lake region	2.35	3.10	Excess.
Upper Lake region	1.80	2.85	Excess.
Ohio Valley and Tennessee	3.50	6.65	Very large excess.
Upper Mississippi Valley	1.25	3.00	Large excess.
Lower Missouri Valley	1.05	1.65	Small excess.
Minnesota	.80	.42	Deficiency.
Pacific Coast	4.00	4.95	Small excess.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN. (BVT. ASS'D) CHIEF SIGNAL OFFICER, U. S. A.

HEIGHTS OF RIVERS ABOVE LOW WATER MARK.

STATIONS.	Dang'r pt. on the S. S. Gauge	HIGHEST. Date. Jan.	HIGHEST. Height.		LOWEST. Date. Jan.	LOWEST. Height.	
	feet.		ft.	in.		ft.	in.
RED RIVER.							
Shreveport	50	30–31	25	3	1	12	9
MISSOURI.							
Fort Sully †		—	-	-	—	-	-
Yankton †		—	-	-	—	-	-
Omaha †	16	—	-	-	—	-	-
Leavenworth	21	19	6	6	14	3	6
MISSISSIPPI.							
St. Paul †	14.5	—	-	-	—	-	-
La Crosse †	18	—	-	-	—	-	-
Dubuque		4–13	6	9	10	3	10
Davenport	15	5–6	5	5	12	1	6
Keokuk	14.5	2–3	11	0	16	2	10
St. Louis	30	7–8	17	6	2	7	1
Cairo	40	31	43	9	17	20	1
Memphis	34	31	31	9	1	21	10
Vicksburg	41	31	38	11	1	20	8
New Orleans *	2.5*	31	5	4	2	10	3
CUMBERLAND.							
Nashville	42	29	34	6	16	8	1
OHIO.							
Pittsburgh	20	25	14	6	9	5	4
Cincinnati	50	29	51	9	12	16	0
Louisville	24	29	31	0	13	8	2

* Below high water mark. † River frozen during month.

ducks at Wytheville, Va.; 6th, wild geese at Goldsborough, N. C.; 7th, wild geese flying south at Purdy, Tenn.; 10th, wild geese flying south at Nichols, N. Y.; 23d, bats and cedar-birds flying about Accotink, Va.; 24th, grasshoppers on the wheat at Belmont Farm, Texas; 24th, wild geese and ducks flying in various directions at Marquette, Mich.; 27th, wild geese flying north at Hennepin, Ill.; 31st, frogs heard at Decatur, Ill., and large numbers of wild geese about at Leesburg, Ind.

Prairie-fires occurred at De Soto, Neb., from 19th to 31st.

Meteors were observed on the 2d at Freehold, N. J., Florida, Mass., and Key West; 8th, Jacksonville, Fla.; 10th, Jackson, Miss.; 11th, Kansas; 12th, Fall River, Mass., and Norwich, Vt.; 13th, Muscatine, Iowa; 14th, Firesteel, Dak., Dodge City, Kans., and Fort Gibson, Ind. T.; 15th, Morgantown, W. Va.; 16th, Holton, Kans., and Carthagena, Ohio; 17th, Freehold, N. J.; 19th, Stapleton, N. Y.; 20th, Rockford, Iowa, and Jacksonville, Fla.; 21st, Somonauk, Ill., Carthagena, Ohio, and Norfolk, Va.; 22d, Sandwich, Ill., and Waterburgh, N. Y.; 23d, Detroit, Mich.; 24th, King's Mountain, Ky.; 25th, King's Mountain, Ky., Fall River, Mass., and Carthagena, Ohio; 26th, Leavenworth and Dodge City, Kans., and South Hadley Falls, Mass.; 27th, Fort Hartsuff and Plattsmouth, Neb., Afton, Iowa, Corning, Mo., Sibley, Minn., Carthagena, Ohio, Belmont Farm, Texas, Leavenworth, Le Roy, and Atchison, Kans., and Omaha, Neb.; 28th, Austin, Texas, and Jacksonville, Fla.; 29th, (an unusually bright meteor, lighting up the country like midday,) Muscatine, and Davenport, Iowa, King's Mountain, Ky., Carthagena, Ohio, and Erie, Pa.; 30th, King's Mountain, Ky., and Waterburgh, N. Y.; 31st, King's Mountain, Ky., and Jacksonville, Fla.

Zodiacal light.—On the 17th and 18th, at Ellinwood, Kans.; 19th, Ateo, N. J.; 21st, Bellefontaine, Ohio; 22d, Waterburgh, N. Y.; 23d, Ateo, N. J.; 26th, Ellinwood, Kans.; 27th, Ateo, N. J., Waterburgh, N. Y.; 29th, King's Mountain, Ky.; 30th, Waterburgh, N. Y.; 31st, King's Mountain, Ky.

Earthquakes.—On the 3d, 3 p. m., slight shock at Carson City, Nev.; 15th, 2.45 p. m., at Maricopa Wells, Ariz.; 21st, Santa Barbara, Cal.; 22d, two shocks, at 11.30 p. m., at Fortress Monroe, Va.; about 11.30 p. m., at New Market, Ind.; shock lasting twenty seconds, at 11.45 p. m., Greensborough, N. C.; two shocks from east-southeast to north-northwest, the first lasting five or six seconds, the second not quite so heavy, at 11.40 p. m., (Washington time,) at Alto Vista, Va.; two shocks from east to west, first lasting ten or fifteen seconds, the second milder, at 11.33 p. m., at Petersburg, Va.; shock, from the northeast to southwest, with rushing, roaring noise, at Weldon, N. C.; it was also reported as felt at Lynchburg, Accotink, and Norfolk, Va., Washington, D. C., Wilmington, N. C., Annapolis, Md., and possibly at Kensico, N. Y.

Published by order of the Secretary of War.

ALBERT J. MYER,
Brig. Gen., (Brevet Assigned,) Chief Signal-Officer, U. S. A.

MONTHLY WEATHER REVIEW, JANUARY, 1876.

INTRODUCTION.

The present review of atmospheric phenomena during January, 1876, is based upon—

First, the simultaneous observations, charted three times a day at this office for study and the preparation of the published weather predictions.

Second, the reports of monthly means and abstracts from four hundred and forty-eight stations, which are classified as Canadian, naval hospitals, Army post-surgeons, civilian volunteers, marine records, and those of the United States Signal Service.

Third, manuscript and printed documents and reliable newspaper reports.

The month of January has been marked by the following general features: First, the high barometric pressure in the South Atlantic, Eastern Gulf States, and Southern California, but low pressure in Oregon and Canada; second, high temperature, the excess being particularly marked in the Northwest, Ohio Valley, and Tennessee; third, an excess of rain from Arkansas northeastward over the Ohio Valley.

BAROMETRIC PRESSURE.

In general.—The general distribution of atmospheric pressure during the month is shown by the isobars upon Chart No. II. The pressure has been higher than in January, 1875, in the South Atlantic States; its distribution over the Northwest and Lake region resembles that which prevailed in January, 1874, but differs entirely from that of January, 1875. The pressure in Oregon averages one-tenth below that of January, 1875; but at San Diego is five hundredths above that of January, 1875, which latter month seems, in these respects, to have been quite abnormal. The paths of the areas of high pressure have been somewhat farther to the eastward than during December, 1875. The paths of the areas of low barometer resemble, in many respects, those of

January, 1875, having all passed the 95° meridian between the latitudes 38° and 55°, and the 65° meridian between the latitudes 42° and 55°.

Areas of low barometer.—No. I. The origin of this storm, on the 31st of December, was indicated in the review for the month. During the 1st of January, it moved from Missouri to Lake Huron, and thence, on the 2d, eastward to the Saint Lawrence Valley. The lowest recorded pressure at its center was 29.30, and high winds prevailed over Wisconsin, Iowa, Lake Michigan, Indiana, Illinois, Ohio, Kentucky, and Tennessee.

No. II. Originated on the 4th in the Southwest. There prevailed during the 3d on the Pacific coast very low barometer, with rain, in consequence of which air flowing from the north, from British America, caused the pressure to rise over the Upper Lakes and Northwest during the 3d, but the air flowing from the south and east over the Gulf States, after causing a slight rise, was followed by a decided fall over the Southwest and Northwest; the central lowest pressure being in the Missouri Valley, as the depression moved northeast and eastward over the Lake region, its elongated outline became more nearly circular. During the 6th, it passed northeastward along the coast of Nova Scotia. This storm was followed by a very extensive area of rather high pressure and clear, cold weather.

No. III. The pressure having fallen on the 5th in Oregon, a low pressure appears on the 7th in Dakota and northward, with northeast and southeast winds from the Missouri River to the Upper Lakes; the depression rapidly developed into a trough, extending, on the morning of the 8th, from Kansas to Lake Superior and beyond, southwest winds, clouds, and rain prevailing, as usual, to the south and eastward. By the morning of the 9th, the depression had extended irregularly southwestward and eastward. During the rest of the 9th, the great quantity of air flowing southward to fill up this depression converted it into a well-defined small elongated area, whose center was, on the afternoon, in Southern Michigan, where the lowest pressure was 29.10. At this time, southerly winds and rain prevailed from Louisiana to Lake Huron and New York, but northwest winds and snow from Lake Superior to Illinois. High winds were reported on the 9th from Minnesota, Iowa, Kansas, Lake Michigan, Lake Erie, Illinois, Indiana, Ohio, Kentucky, Tennessee, West Virginia, Pennsylvania, and Maine. The storm passed over Lake Ontario and down the Saint Lawrence Valley, and the subsequent area of high barometer passed southward down the Mississippi Valley to the Gulf. A second area of high barometer followed nearly in the same course on the 12th and 13th.

No. IV appears at midnight of the 13th north of Lake Superior; its path lies along the extreme northern limit of our stations, and is marked only by southerly winds, rain, and snow over the Lake region and the Middle and Eastern States.

No. V. Although the pressure continued high in Oregon and Montana during the 14th, yet it fell decidedly in Dakota, where this storm-area seems to have originated, whence it passed rapidly eastward over the Upper Lakes and Canada to the Saint Lawrence Valley, and was, on the morning of the 16th, central in Maine. During its progress, cloudy weather, with rain or snow, extended gradually southward, and prevailed during the 15th and 16th at times at all stations, except on the South Atlantic coast, where the highest pressure remained.

Nos. VI and VII. The barometer fell slowly during the 16th in Oregon and eastward, and at midnight area No. VI extended northward into British America from Minnesota, where, as appears usually to be the case under such circumstances, we must place the southern limit of a trough of low pressure. During the 17th, the area of low barometer extended southwestward, and at midnight the axis of the trough stretched from Kansas to Lake Superior and beyond; this extension southwestward appears to have been merely the result of the flow of cold northwest winds toward the Gulf from the plateaus of Colorado, New Mexico, and Western Texas, which underran the warm southerly winds then prevailing over Eastern Texas, producing heavy rains during the 16th, 17th, and morning of the 18th. During the rest of the 18th, the cold, dry northerly winds having prevailed over the country west of the Mississippi, the barometric trough became a well-defined depression, No. VII, central in Lower Michigan, whence it moved slowly north and eastward with steadily diminishing central pressures, reaching New Brunswick on the morning of the 20th, where the lowest pressure, 28.95, was reported. High winds were reported on the 18th in Tennessee, West Virginia, Lake Erie, Pennsylvania, New Jersey, Long Island Sound, Rhode Island, Massachusetts, and Maine, and continued to a less extent on the 19th.

No. VIII. The high pressure that prevailed on the 19th throughout the Mississippi Valley had its maximum in the Gulf States, and a steady flow of air prevailed during the morning of the 20th, from the southeast over Texas, and from the northeast over the Lower Missouri Valley. By 4.35 p. m., the temperature had risen rapidly, with a large increase in cloudiness, and diminution of pressure at most stations from Southern California eastward to the Lower Mississippi, while northerly winds, with snow, prevailed to the northward of this region. During the night, the pressure rose rapidly, with falling temperature; cold northerly winds prevailed at the northerly stations, but

warm southeast, with rain, in Texas. The irregular area (or more probably trough) of low pressure, which, on the afternoon of the 20th, extended from Southern Kansas to Central Texas, moved slowly northward, and was, on the morning of the 22d, a well-defined oval area, central in Northern Missouri, while an area of high pressure was central over New England. The storm-center moved north and then eastward, passing over the north of Lake Erie, was central in Maine the afternoon of the 23d, and disappeared to the east of Nova Scotia on the morning of the 24th.

No. IX. After the passage of the preceding storm, the pressure remained rather evenly distributed over the Lakes and Middle States, but at midnight had begun to fall at the extreme northern stations, and, on the morning of the 25th, the depression No. IX was central north of and near Lake Huron, while southwest winds, clouds, and snow prevailed on the Lower Lakes. This slight depression passed eastward, keeping to the south of Nova Scotia, and perhaps developed after passing beyond the limits of our map.

No. X. The barometer fell on the 25th, slowly in Oregon, but much more rapidly in Dakota and Manitoba, and low barometer, No. X, was central there on the morning of the 26th. The pressure continued during the 26th to fall decidedly at the stations in Oregon, Montana, and Dakota, while the central depression moved eastward, and was at midnight central north of and near Lake Superior. During the next twenty-four hours, this depression passed northeastward beyond our cognizance, giving rise to a subordinate low barometer, central at midnight of the 27th, off the coast of Maine. During the morning of the 27th, southwest winds, clouds, and rain or snow prevailed very generally from the Eastern Gulf coast to the Saint Lawrence Valley, while the pressure remained stationary in the South Atlantic States. The steamship City of Limerick passed through the center of a violent hurricane (minimum barometer 28.00; wind ceased from 10.30 p. m., January 27, to 2.30 a. m., January 28) in latitude 47½° N., longitude 40° W.

No. XI. The warm, moist southerly winds prevailing throughout the country east of the Rocky Mountains on the 27th, and the southwest winds at the Pacific coast and Rocky Mountain stations, conspire in indicating that the depression No. XI was central on the morning of the 27th in Dakota and Montana, where it slowly developed during the rest of the day, and at midnight presents a belt of low barometer, extending from Indian Territory to Dakota, which, on the morning of the 28th, had become an oval area central in Northwestern Iowa, whence it moved northeastward over Lake Superior, followed rapidly by northwest gales. At midnight of the 28th, the barometer was 29.20 on Lake Superior and 30.35 in Western Minnesota. The central depression moved north and northeastward, and disappeared at midnight of the 29th over the Gulf of Saint Lawrence, while an area of high pressure, having moved southward, was central in Southern Illinois. High winds were reported on the 28th in Minnesota, Missouri, Iowa, Tennessee, Lake Michigan, North Carolina, and New Jersey; on the 29th in Iowa, Michigan, Lake Erie, West Virginia, Maryland, North Carolina, Texas, Long Island Sound, Rhode Island, Massachusetts, and Maine.

No. XII. The barometer fell rapidly and rose again on the 29th in Oregon, and was at midnight lowest apparently in Montana and Manitoba, the gradient being steep, with high southeast winds in Dakota and Minnesota. On the 30th and 31st, this depression, having moved slowly southeastward, gradually developed into a very much elongated oval or trough of barometric depression, whose longer axis extended, at midnight of the 31st, from Northern Texas northeastward a thousand miles to the Straits of Mackinaw, being bounded on its southeast side by a high pressure of 30.25 along the Atlantic coast, and on its northwest side by a high pressure of 30.55 in Dakota and Manitoba. The further history of this depression, which subsequently developed into a remarkable storm, belongs to the month of February.

Areas of high barometer.—In general, these have not passed southward over the Mississippi Valley so uniformly as was the case during December. The tropical area of highest pressure has, excepting two short intermissions, remained persistently off the South Atlantic coast.

No. I moved on the 3d of January southward; was, on the morning of the 4th, over the Lake region, and, on the morning of the 5th, over New England, where its highest pressure was attained.

No. II appears on the morning of the 4th in the Southwest, whence it extended eastward, spreading over the Gulf and South Atlantic States, and on the 7th joined the area off the South Atlantic coast.

No. III appears on the 9th in Dakota, following the rising pressure on the Pacific coast of the preceding day; advanced south and then southeastward, and was, on the morning of the 11th, central over Arkansas and Tennessee. During the next three days, the pressure remained higher throughout the Mississippi Valley than over the South Atlantic States; but on the 14th the pressure fell at the northern stations and rose at the southern, so that on the morning of the 15th the normal condition was again attained; the highest barometer being on the South Atlantic, and diminishing thence to the west and northwest.

Nos. IV and V. On the 18th, the low barometer No. VII, then central in Upper Canada, had caused so great a depression throughout the Atlantic States that, on the morning of the 19th, the highest pressure, No. IV, is again found in Texas. During the next twenty-four hours, northerly winds and rising barometer prevailed from the Gulf States to Manitoba. During the 20th, area No. IV moved eastward to the South Atlantic coast, and a second area, No. V, very slowly southward over the Northwest. During the 21st, No. V extended eastward over British America, then southeastward over New England and over North Carolina, joined No. IV, which had remained over the South Atlantic States, leaving low barometer No. VIII to develop in the Missouri Valley. On the 22d, the advance of low barometer No. VIII again separated high pressures Nos. IV and V, which, on the morning of the 23d, were respectively central off the South Atlantic and the Nova Scotia coasts.

No. VI formed in the Northwest, immediately in the rear of high barometer No. VIII, and extended southward during the 23d, with steadily-increasing pressure in the Northwest. On the morning of the 24th, the pressure was generally high, and northerly winds prevailed from the Alleghanies westward to the 100th meridian. The remnant of this area extended, on the afternoon of the 26th, along the Atlantic coast.

No. VIII followed in the rear of low barometer No. XI; at midnight of the 28th it extended from Dakota to Kansas; at midnight of the 29th it was central in Illinois; at midnight of the 30th it was off the East Atlantic coast, after which it remains as a ridge of high pressure, that extended at midnight of the 31st from Florida to Newfoundland.

TEMPERATURE OF THE AIR.

In general.—The distribution of mean temperatures for the month is shown by the isothermal lines upon Chart No. II. While the average temperature has been slightly below its normal value on the Pacific coast, it appears, in all other sections of the country, to have been decidedly above, the excess amounting to 9° for Tennessee and the Ohio Valley, and diminishing as we proceed thence in all directions, it being 7°.7 for the Upper Mississippi, 6°.9 for the Lower Missouri, 6°.4 for the Gulf and South Atlantic States, 4°.9 for the Upper Lakes, 5°.4 for the Lower Lakes, 3°.8 for the Middle and Eastern States, 3° for the Saint Lawrence Valley, 1°.5 for Minnesota.

It should, however, be stated that, although above the average and among the warmest months, yet the past January was, except perhaps in Kansas, by no means the warmest January of which we have records; thus, January, 1828, appears to have been warmer in Tennessee and throughout the Atlantic and Gulf States. The January of 1843 was warmer from New Jersey to Maine, but colder in the southern stations; January, 1855, was warmer in the West and Southwest; January, 1853, was warmer on the Pacific coast.

Maximum temperatures.—The maximum temperature at Pembina was 34°; at Mount Washington, 41°; at Key West, 83°. The maximum of 70° has been reported from stations on the line passing through the center of Kansas, the southern border of Wisconsin, the Lower Ohio Valley, the southwest border of Kentucky, and thence north to Erie, Pa., thence east, and then south between Maryland and Delaware to Cape Charles.

Minimum temperatures.—The minimum temperatures have been, for northern stations: — 43° at Pembina, Dak., — 30° at Mount Washington, — 25° at Breckenridge, — 17° at Yankton, and for southern stations, 58° at Key West, 43° at Galveston, 39° at New Orleans. Minimum temperatures of 20° have been reported from stations on the line passing through Central Texas and Arkansas, the southeast corner of Tennessee, and Central North Carolina.

Ranges of temperatures.—The least ranges of temperatures have been: San Francisco, 22°; Key West, 24°; Galveston, 32°. The greatest ranges have been: Pembina, 77°; Yankton, 76°; Mount Washington, 71°; Malone, 69°; North Platte, 65°; Evanston, 66°; Boston, Fort Dodge, and Colorado Springs, 65°.

PRECIPITATION.

Rainfall.—Chart No. III shows the general distribution of precipitation for the month. The regions of unusually large rain or snow are: Lower Ohio Valley, Central Mississippi, Lower Arkansas, and Red Rivers. Deficiencies are reported throughout the Atlantic States.

Rainy days.—From ten to twelve rainy days are reported from Tennessee, the Ohio Valley and Lake region, and New England; from three to ten rainy days in the South Atlantic and Gulf States.

Cloudy days.—From eight to twelve cloudy days are reported from the South Atlantic and Gulf States, and from twelve to sixteen over the Lake region.

RELATIVE HUMIDITY.

The mean relative humidity for the month averages as follows: Breckenridge, 53; Cape May and Cheyenne, 58; Colorado Springs, 39; Denver, 41; Dodge City, 56; Albany, 85; Alpena, 81; Marquette, 82; Mount Washington, 90; Pembina, 92; Peck's Beach, 82; Rochester, 81.

WINDS.

Wind directions.—The prevailing winds are shown by the arrows upon Chart No. II, from which it will be seen that these have been southwest in the South Atlantic and Middle States, northwest in New England and the Upper Lake region, southerly in the Gulf States, Ohio and Missouri Valleys.

Total movements.—The sum total of the movements of the air, from all directions, have been: Sandy Hook, 13,160; Erie, 12,991; Grand Haven, 11,762; Long Branch, 11,251; Breckenridge, 10,153; Cheyenne, 10,017; Cleveland, 10,175; Lexington, 10,158 miles, and at Augusta, 2,600; Charleston, 1,936; Lynchburg, 3,140; Salt Lake City, 2,915.

Highest winds.—The maximum velocities exceeding 45 miles per hour were reported as follows: Boston, 45; Colorado Springs, 47; Davenport, 1st, southwest, 60; Denver, 46; Dodge City, 48; Duluth, 48; Erie, 9th to 11th, southwest, 56; Grand Haven, 48; Keokuk, 50; Long Branch, 6th, northwest, 58; Lexington, 48; Milwaukee, 48; Mount Washington, 132; New York, 9th, west, 48; Malone, 50; Evanston, 49; Omaha, 45; Port Huron, 58; Rochester, 48; Saint Louis, 48; Sandy Hook, 9th, west, 60; Squan Beach, 9th, west, 60; Springfield, 45; Toledo, 9th and 10th, west, 52; Washington, 45.

WATER TEMPERATURES.

The monthly maximum and minimum temperatures of water in rivers and harbors are given in a table on Chart No. II. A minimum of 31° or 33° has been reported at Buffalo, Chicago, Cleveland, Detroit, Duluth, Grand Haven, Keokuk, Leavenworth, Milwaukee, Pittsburgh, Portland, Me., Toledo, and Wood's Hole. The maximum temperatures have been at Charleston, Galveston, and Jacksonville, 68; Mobile, 63; Montgomery, 62; Saint Mark's, 69; Shreveport, 60.

NAVIGATION.

Depth of water in rivers.—A table on Chart No. III gives the highest and lowest readings of the river-gauges during the month, from which it will be seen that at the end of the month the Red River was thirteen feet higher than at the beginning. The Upper Mississippi fell during the first half of the month from three to five feet, and subsequently remained about stationary. The Ohio was lowest from the 9th to the 13th, and subsequently rose, especially in consequence of the warm weather and rains, from the 18th to the 25th, after which date the flood-wave passed down the river, giving maximum readings on the 29th at Cincinnati and Louisville, and then passing down the Lower Mississippi, gave maximum readings slightly above the "danger-line" at Cairo on the 31st, and Memphis and Vicksburg in February.

Ice in rivers and harbors.—The reports of ice in harbors and rivers are as follows: Buffalo, 20th, ice; January 21st, frozen up; 31st, but little ice remains. Detroit, on the 11th, 12th, 13th, 22d, 25th, 26th, 28th, 30th, floating ice. Philadelphia, 13th, river frozen; 16th, ice broken up. Albany, 2d, river open. Davenport, 12th, 13th, 14th, 19th, 20th, 21st, 22d to 27th, 29th, 30th, 31st, floating ice. La Crosse, river frozen during the month, ice from one to two inches thick. Fort Niagara, N. Y., river nearly full of floating ice, 22d and 26th. Madison Barracks, Sacket's Harbor, N. Y., bay full of drifting ice, 6th. Afton, Iowa, on 31st, pond-ice fourteen inches thick. Plattsmouth, Nebr., on the 9th, ice cleared out of west channels; on the 11th, west channel closed, east channel partly clear; 18th, west channel clear; 22d to 31st, heavy floating ice. Cooperstown, N. Y., Otsego Lake closed 13th, for the second time. North Hammond, N. Y., 21st, Saint Lawrence frozen; 28th, river clear. Trenton, N. J., 14th, Delaware River closed; 19th, opened again. West Charlotte, Vt., 22d and 25th, Lake Champlain partly closed, anchor-ice in lake every day. Lunenburg, Vt., pond-ice twenty inches thick. Bloomfield, Wis., 10th, Geneva Lake frozen over the second time and permanently. Middletown, Conn., Connecticut River opened 3d and closed the 8th. Rockford, Ill., Rockford River frozen over, 11th.

VERIFICATION OF "PROBABILITIES" AND CAUTIONARY SIGNALS.

(1) *Probabilities.*—A comparison of the published "Probabilities" with the weather following shows that the average percentage of verifications was, for January, for all the districts of the United States, 89.5 per cent.

(2) *Cautionary signals.*—Of 132 cautionary signals that have been made during the month at the United States stations, 113 were verified and 19 not verified by wind velocities of twenty-five miles at or near the stations; 71 cases are reported of brisk winds for which signals were not previously reported.

ATMOSPHERIC ELECTRICITY.

(1) *Thunder* or *lightning* were reported as follows: On the 1st, Iowa; 2d, New Jersey; 9th, Michigan, Illinois, Indiana, Iowa, Ohio, Kansas, and Tennessee; 16th, Pennsylvania; 17th, Illinois and Texas; 18th, Alabama, Georgia, Illinois, New York, Mississippi, Iowa, and Texas; 19th, Massachusetts, New York, North Carolina, Maryland,

and New Jersey; 21st, Arkansas; 22d, Kansas, New York, and Illinois; 23d, Tennessee; 26th, Michigan and Nebraska; 27th, Indian Territory, Illinois, Indiana, Kansas, Ohio, Texas, and Arkansas; 28th, Tennessee, Alabama, Indiana, Iowa, Kansas, Kentucky, Louisiana, Ohio, Texas, Wisconsin, Arkansas, Illinois, and Mississippi; 29th, North Carolina, Alabama, and Georgia; 30th, Arkansas. Atmospheric electricity was reported on the 26th and 31st at Golden City, Colo.

(2) *Auroras* have been reported as follows: On the 2d at Abington, Ill., North Argyle, N. Y.; 3d, Abington, Ill., North Platte, Nebr.; 5th, Abington, Ill.; 12th, Fort Abercrombie, Dak.; 13th, Pembina, Dak.; 14th, Golden City, Colo., Cornish, Standish, Eastport, and Mount Desert, Me., Contoocookville, N. H., Rocky Run, Wis., Wautoma, Wis., Pembina, Dak.; 15th, Wautoma, Wis., Augusta, Ga.; 17th, Fort Sully, Dak.; 19th, Pembina, Dak.; 21st, Starkey, N. Y., Contoocookville, N. H.; 22d, Cornish, Me., West Charlotte, Vt., Pembina, Dak.; 26th, West Charlotte, Vt.; 27th, Standish, Me., Rocky Run, Wis., Eastport, Me.; 31st, Dodge City, Kans.

OPTICAL PHENOMENA.

(1) *Mirage* was observed as follows: 1st, Moorhead, Minn.; 5th, Moorhead, Minn.; 7th, New London, Conn.; 10th, Ellinwood, Kans.; (observer makes an interesting study of the attending strata of cold air;) 11th, Moorhead, Minn., Ellinwood, Kans.; 12th, Atlanta, Kans., Ellinwood, Kans., Pembina, Dak.; 13th, Atlantic City, N. J., Breckenridge, Minn., New London, Conn.; 14th, Ellinwood, Kans., Breckenridge, Minn.; 16th, Ellinwood, Kans.; 22d, New London, Conn.; 23d, Atlanta, Kans.; 24th, Atlanta, Kans., Breckenridge, Minn.; 25th, New London, Conn.; 26th, Breckenridge, Minn., New London, Conn.; 27th, Ellinwood, Kans., Breckenridge, Minn.; 30th, Atlanta, Kans., New London, Conn.; 31st, Standish, Me., Ellinwood, Kans.

(2.) *Solar halos* were observed on the 2d at Dakota; 3d, Connecticut, Minnesota, and Kansas; 4th, Illinois, Kentucky, Michigan, Ohio, Pennsylvania, and California; 5th, Connecticut, Maine, Massachusetts, New Hampshire, and New York; 6th, Illinois, Iowa, Nebraska, New York, Ohio, and Wisconsin; 7th, Iowa, Kentucky, Maine, Massachusetts, Michigan, New Hampshire, New York, Ohio, Pennsylvania, and Vermont; 8th, Connecticut, Indiana, Kentucky, Maine, Massachusetts, New Hampshire, New York, Ohio, Pennsylvania, Vermont, New Jersey, and Michigan; 9th, Iowa, Minnesota, Ohio, and Wisconsin; 10th, Illinois, Kansas, Minnesota, and Wisconsin; 12th, Connecticut, Iowa, and Wisconsin; 13th, Kansas; 14th, California and Mississippi; 15th, Connecticut, Massachusetts, Nebraska, New Hampshire, New York, Ohio, Pennsylvania, New Jersey, and Maine; 16th, New York, Wisconsin, Minnesota, New Jersey, and Georgia; 17th, New Jersey; 18th, New Jersey and Georgia; 19th, Alabama and New York; 20th, Kansas, Minnesota, Ohio, and Nebraska; 21st, New Hampshire, Ohio, and Tennessee; 22d, Maine, Massachusetts, New York, and Vermont; 23d, California; 24th, Illinois, Nebraska, and Kansas; 25th, Massachusetts, New Hampshire, New Jersey, New York, and Connecticut; 26th, Illinois, Michigan, Ohio, Wisconsin, Mississippi, and West Virginia; 27th, Illinois, Nebraska, Pennsylvania, Wisconsin, and Kansas; 28th, Nebraska, Dakota, and Maine; 29th, Illinois, Wisconsin, New Jersey, Georgia, and Nebraska; 30th, Iowa and California; 31st, Kansas, Illinois, Iowa, Michigan, Nebraska, Wisconsin, and New York.

(3) *Lunar halos* were observed on the 2d in Illinois, Iowa, and Florida; 3d, Illinois, Iowa, Nebraska, Wisconsin, Minnesota, Wyoming Territory, and Philadelphia; 4th, Illinois, Indiana, Kentucky, Michigan, New York, Ohio, Pennsylvania, Nevada, Minnesota, Virginia, North Carolina, Tennessee, Alabama, and California; 5th, Illinois, Maine, New Jersey, New York, California, Minnesota, Wyoming Territory, Alabama, Colorado, and North Carolina; 6th, Illinois, Indiana, Iowa, Kentucky, Michigan, Nebraska, New Jersey, North Carolina, Ohio, Wisconsin, Maine, New Mexico, Texas, Minnesota, California, Wisconsin, Tennessee, Kansas, West Virginia, and Rhode Island; 7th, Delaware, Illinois, Iowa, Kansas, Kentucky, Maryland, Michigan, Missouri, West Virginia, Pennsylvania, Georgia, Wisconsin, Colorado, North Carolina, Ohio, Wisconsin, California, Indiana, Nebraska, New Jersey, New York, Texas, Virginia, Florida, Dakota, and Alabama; 8th, Delaware, Illinois, Indiana, Kentucky, Minnesota, Missouri, Nebraska, New Jersey, New York, North Carolina, Ohio, Pennsylvania, West Virginia, Tennessee, Virginia, Wisconsin, Mississippi, New Mexico, Texas, Michigan, Florida, and Maine; 9th, Illinois, Nebraska, New Jersey, Ohio, Texas, Virginia, Wisconsin, Mississippi, Missouri, Georgia, California, North Carolina, South Carolina, and Minnesota; 10th, Alabama, Illinois, Indiana, Kansas, Kentucky, Minnesota, Missouri, New York, North Carolina, Virginia, Maine, Dakota, Tennessee, Massachusetts, Georgia, and Wisconsin; 11th, Colorado, Indiana, Iowa, New York, Arkansas, Nebraska, New Mexico, Massachusetts, North Carolina, and Kansas; 12th, Indiana, Arkansas, New York, Minnesota, Massachusetts, Alabama, Tennessee, and North Carolina; 13th, New Jersey, Indiana, Massachusetts, Alabama, Wisconsin, North Carolina, and Kansas; 14th, Illinois, Indiana, Nebraska, Colorado, and Iowa; 15th, Illinois, Iowa, Kentucky, Michigan, New York, and Ohio; 16th, Wisconsin and Minnesota; 17th, Georgia; 18th, Georgia, Nebraska, Wyoming Territory, and North Carolina; 19th, Wyoming Terri-

tory; 20th, Tennessee and Minnesota; 22d, Illinois; 30th, California; 31st, Illinois, Iowa, Kentucky, Massachusetts, Missouri, New York, North Carolina, Tennessee, Wisconsin, Nebraska, Minnesota, and Indiana.

MISCELLANEOUS PHENOMENA.

(1) *Polar bands* were reported on the 3d at Wytheville, Va., and Newport, R. I.; 5th, Guttenberg, Iowa, Carthagena, Ohio, and Cleveland; 7th, Milwaukee, Wis.; 11th, Charleston, S. C., and Vicksburg, Miss.; 13th, Wytheville, Va., and Wilmington, N. C.; 20th, Carthagena, Ohio, and Knoxville, Tenn.; 21st, Boston, Mass.; 22d, Charleston, S. C.; 23d, Wytheville, Va.; 24th, Carthagena, Ohio, and Wytheville, Va.; 29th, Wytheville, Va.; 20th, Wytheville, Va.

(2) *Vegetable phenomena.*—Plum-trees were in bloom on the 15th at Troy, Ala.; 31st, (?) Forsythe, Ga.; 25th, Edgefield, S. C.; 31st, Clarksville, Tex.; 20th, McMinnville, Tenn.; 31st, Spartanburg, S. C.; 31st, Augusta, Ga. Peach-trees were in bloom on the 24th at Troy, Ala.; 8th, Mount Ida; 31st, (?) Forsythe, Ga.; 31st, (?) Cleaveland, Tenn., Clarksville, Texas, and Laconia, Ind.; 23d, Aiken, S. C., and Cairo, Ill.; 29th, Nashville, Tenn. Orange-trees budding on the 29th at Newport, Fla. Almond-trees in full bloom on the 1st at Macon, Ga. Jessamine, on the 16th, at Macon, Ga.; 19th, Fallston, Md.; 6th, Aiken, S. C.; 31st, (?) Cleaveland, Tenn. Hyacinths, 10th, Prospect Hill, Va.; 31st, (?) Clarksville, Tex.; 22d, McMinnville, Tenn. Violets, crocus, and daisies, 29th, at Attaway Hill, N. C. Violets, 1st, at Clarksville, Tenn. Daisies, 1st, at McMinnville, Tenn. Dandelions, 31st, at Tarentum, Pa. Wild strawberry, 1st, at Shelburne, N. H. Wheat and blue grass green and growing, 2d, at Bethel, Ohio, and Decatur, Ill. Maple-trees, 31st, at Mount Holly, N. J., budding. Post-oak in bloom, 25th, at Gilmer, Tex. Spirea blossom, 1st to 31st, at Aiken, S. C. Spirea and jonquils, 19th, at McMinnville, Tenn. Jonquils and narcissus, 31st, at Spartanburg, S. C. Jonquils, 17th, at Clarksville, Tenn.; jonquils, at Clarksville, Tex. Daffodils, 29th, at Prospect Hill, Va., and Clarksville, Tex. Nectarine and apricot budding, 31st, at Cleaveland, Tenn. Japonica bloom, 16th, at Macon, Ga. Hops sprouting and pansies blooming, Malone, N. Y., on 1st.

(2) *Animal phenomena.*—Frogs were heard on the 1st at Decatur, Ill., Margaretta, Ringgold, and Bellefontaine, Ohio; 3d, Weldon, N. C.; 26th, Louisville, Ill.; 27th, Mount Sterling, Ill.; 28th, Butler Springs, Kans. Wild geese, on the 2d, were at Fort Randall, Dak.; 16th, flying north, Emerson, Nebr.; 23d, flying south, Fort Gibson and Carthagena, Ohio; 30th, flying north, Louisville, Ill.; 15th and 19th, Charleston, S. C.; 22d, flying northeast, New London, Conn. Wild ducks, 16th, flying north, Hightstown, N. J.; seen during month at Havana, Ill., and Corning, Mo.; 4th, flying north, Corsicana, Tex. Snowbirds, immense numbers, 3d, Breckenridge, Minn. Snakes seen on the 1st at Bellefontaine, Ohio, and White Plains, N. Y.; at various times at Mount Sterling, Ill. Bluebirds seen on the 2d at Ringgold, Ohio; 3d, White Plains, N. Y., and Chambersburg, Pa.; 8th, Chambersburg, Pa. Robins were seen on the 3d at White Plains, N. Y.; 7th, Plattsmouth, Nebr. Mocking-birds, 15th, Welborn, Fla. Ricebirds, 19th and 20th, Southington, Conn. Snow-buntings, 24th, Fort Randall, Dak. Grasshoppers seen on the 1st at Fort Wayne, Ind.; 2d, at Benettsville, Ky. Butterflies seen on the 1st at Fort Wayne, Ind.; 4th, Benettsville, Ky. Caterpillars seen on the 1st at Shelburne, N. H.

(3) *Prairie fires* occurred 16th and 17th near Fort Randall, Dak.; 26th, to the northeast of Fort Lyon, Colo.; 4th and 27th, Corsicana, Tex.; a smoky atmosphere at Fort Madison, Iowa, on the 5th.

(4) *Meteors* were observed on the 1st at College Hill, Ohio, (brilliant southwest to northeast,) Jacksonburg, Ohio, Salem, W. Va., Cincinnati, Ohio; 2d, Friendsville, Ill., Trenton, N. J., Waterburg, N. Y., Carthagena, Ohio; 3d, Carthagena, Ohio, Morgantown, W. Va., Cincinnati, Ohio; 4th, Fall River, Mass.; 5th, Holton, Kans., Hightstown, N. J., Mount Auburn, Ohio; 11th, Mount Auburn, Ohio; 15th, Nora Springs, Iowa; 16th, Corning, Mo.; 24th, Freehold, N. J., and Jacksonville, Fla.; 25th, Dubuque, Iowa; 26th, Carthagena, Ohio; 27th, Somonauk, Ill., Auburn, N. H.; 30th, Freehold, N. J., and North Platte, Nebr.; 31st, Danville, Ky., and Carthagena, Ohio.

(5) *Zodiacal light* was observed on the 4th at Atco, N. J.; 11th and 12th, Bellefontaine, Ohio; 13th, Adrian, Mich., Atco, N. J., Bellefontaine and Carthagena, Ohio; 14th, Atco, N. J., and Carthagena, Ohio; 16th and 17th, Clear Creek, Nebr.; 17th, Waterburg, N. Y.; 19th, Benettsville, Ky.; 20th, Atco, N. J., Carthagena, Ohio, and Rocky Run, Wis.; 21st, Somerset, Mass., and Atco, N. J.; 24th, Somerset and Andover, Mass., Adrian, Mich., Freehold and Atco, N. J.; 25th, Andover, Mass., Adrian, Mich., Atco, N. J., Bellefontaine and Carthagena, Ohio; 26th, Andover, Mass.

(6) *Earthquakes* were observed as follows: 21st, San José, Santa Cruz, and San Francisco, Cal., between 3 and 4 a. m.; 7th, 2.20 p. m., Contoocookville, N. H.; 8th, 4.30 a. m., Lockport, N. Y.; 27th, Adrian, Mich., two shocks; 29th, 9.05 p. m., Annapolis, Md.

Published by order of the Secretary of War.

ALBERT J. MYER,
Brig. Gen., (Brevet Assigned,) Chief Signal-Officer, U. S. A.

MONTHLY WEATHER REVIEW, FEBRUARY, 1876.

INTRODUCTION.

The present review of atmospheric phenomena during February, 1876, is based upon—

First, the simultaneous observations as telegraphed from one hundred and thirty-four stations and charted three times a day at this office for study, and the preparation of the published weather predictions.

Second, the reports of means and abstracts from four hundred and forty-two stations, which are classified as Canadian, naval hospitals, Army post-surgeons, civilian volunteers, marine records, and those of the United States Signal Service.

Third, manuscript and printed documents and reliable newspaper reports.

The principal features of the weather for the month have been: First, the average northerly courses of the areas of low barometer and the formation of barometric troughs and ridges; second, the high barometer in the Southern States; third, the high temperature in all districts except the extreme northern stations; fourth, the gales of February 1, 2, and 15, and the tornadoes in Missouri, Illinois, and Indiana of the 13th and 27th.

BAROMETRIC PRESSURE.

In general.—The general distribution of atmospheric pressure during the month is shown by the isobars upon Chart No. II. The general distribution of pressure resembles that of February, 1875, but the barometer has averaged from 0.05 to 0.15 of an inch lower in the extreme northern sections of the country, and the area of maximum pressure, (30.20,) which in the past month covered a large portion of the Gulf States from Louisiana to Georgia, was, in 1875, confined to a very small portion of Northern Georgia and Alabama. The isobars for February, 1875 and 1876, show that during these months the area of high barometer over the tropical portion of the Atlantic encroached upon the North American continent to a very much larger extent than in February, 1874. The areas of high barometer have advanced eastward over more extensive regions than in December, 1875, or January, 1876, but have not had the extent recorded in previous winters. The paths of the areas of low barometer differ in many respects from those recorded in February, 1874 and 1875. They have been confined to the northern half of our territory, and have moved eastward rather than northeastward.

In general, it would seem that, during the present winter, extensive areas of cold air have pressed outward from the northern and interior portions of the eastern and western continents, but, owing to preponderating extent and influence of the former continent, the air over the Atlantic has been pushed westward, so that there has been a tendency toward higher pressures and moister, warmer air in the Southern and Atlantic States, while lower temperatures and higher pressures have prevailed in British America.

Areas of low barometer.—No. I. Average movement, 37 miles per hour. The beginning of this depression was chronicled as area No. XII in January, which, at midnight of the 31st, appears as a barometric trough, extending from Northern Texas northeastward to the Straits of Mackinac, and possibly still farther. During the 1st of February, this trough contracted into a well-defined oval area, which moved eastward to Pennsylvania and thence northeastward over Maine and the Gulf of Saint Lawrence. The central barometric depressions were: February 1, 7.35 a. m., 29.65; 4.35 p. m., 29.25; 11 p. m., 29.15; February 2, 7.35 a. m., 28.75; 4.35 p. m., 28.25, or less. The velocity of the warm southerly winds that prevailed over a large extent of territory, in advance of this storm-center, was nowhere recorded as higher than 32 miles an hour, but remarkably severe north and northwest winds followed the depression, whose limits may be defined as follows: February 1, 7.35 a. m., north and northwest winds, of from 25 to 35 miles per hour, prevailed over the country between Lake Superior and Northern Texas; February 1, 4.35 p. m., north and northwest winds, from 25 to 40 miles per hour, prevailed from Central Michigan and Wisconsin on the north, to the coast of Louisiana and Texas on the south; February 1, 11 p. m., north and northwest winds of 25 miles per hour prevailed from Central Michigan and Lake Erie to Tennessee, also a northerly wind of 30 miles on the Texas coast, and a west or southwest wind of 30 miles on the Carolina and Middle Atlantic coasts; February 2, 7.35 a. m., the wind continued north, 30 miles, on the Texas coast, and was reported northwest, from 25 to 40 miles, on portions of Lakes Erie and Ontario and the upper portions of the Saint Lawrence, and from 25 to 70 miles in the Middle Atlantic States, Southeastern New York, and Connecticut; a southeast wind of 38 miles prevailed at Eastport; February 2, 4.35 p. m., northwest winds, 25 to 40 miles, prevailed on the Middle and East Atlantic coast, the Saint Lawrence Valley, and intermediate stations; southwest and south winds, 25 to 30 miles, prevailed in Nova Scotia and New Brunswick; February 2, 11 p. m., north and west winds, 25 to 50 miles, prevailed in the Lower Saint Lawrence, New Brunswick, and Nova Scotia.

Nos. II and III. Average movements, 36 and 44 miles per hour, respectively. Depression No. II developed during the 2d of February on the eastern slope of the Rocky Mountains, in the region between Nebraska and the Indian Territory, over which

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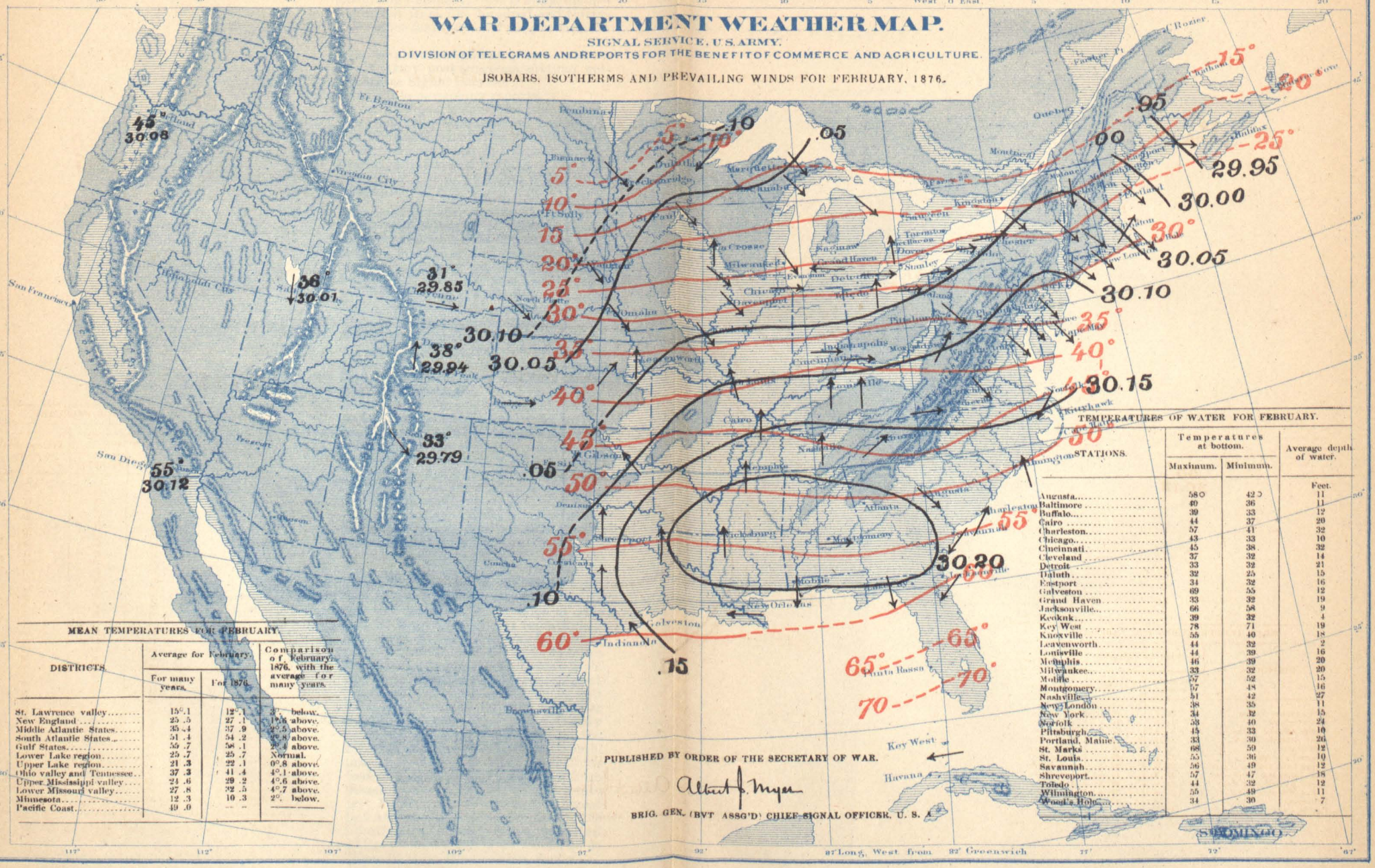
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR FEBRUARY, 1876.



MEAN TEMPERATURES FOR FEBRUARY.

DISTRICTS.	Average for February. For many years.	Average for February. For 1876.	Comparison of February, 1876, with the average for many years.
St. Lawrence valley	15°.1	12°.1	3°. below.
New England	25 .5	27 .1	1°.6 above.
Middle Atlantic States	35 .4	37 .9	2°.5 above.
South Atlantic States	51 .4	54 .2	2°.8 above.
Gulf States	55 .7	58 .1	2°.4 above.
Lower Lake region	25 .7	25 .7	Normal.
Upper Lake region	21 .3	22 .1	0°.8 above.
Ohio valley and Tennessee	37 .3	41 .4	4°.1 above.
Upper Mississippi valley	24 .6	29 .2	4°.6 above.
Lower Missouri valley	27 .8	32 .5	4°.7 above.
Minnesota	12 .3	10 .3	2°. below.
Pacific Coast	49 .0	— —	

TEMPERATURES OF WATER FOR FEBRUARY.

STATIONS.	Temperatures at bottom. Maximum.	Temperatures at bottom. Minimum.	Average depth of water.
			Feet.
Augusta	58	42	11
Baltimore	40	36	11
Buffalo	39	33	12
Cairo	44	37	20
Charleston	57	41	32
Chicago	43	33	10
Cincinnati	45	38	32
Cleveland	37	32	14
Detroit	33	32	21
Duluth	32	25	15
Eastport	34	32	16
Galveston	69	55	12
Grand Haven	33	32	19
Jacksonville	66	58	9
Keokuk	39	32	4
Key West	78	71	19
Knoxville	55	40	18
Leavenworth	44	32	2
Louisville	44	39	16
Memphis	46	39	20
Milwaukee	33	32	20
Mobile	57	52	15
Montgomery	57	48	16
Nashville	51	42	27
New London	38	35	11
New York	34	32	15
Norfolk	58	40	24
Pittsburgh	45	33	10
Portland, Maine	33	30	26
St. Marks	68	59	12
St. Louis	55	36	10
Savannah	56	49	12
Shreveport	57	47	18
Toledo	44	32	12
Wilmington	55	49	11
Woods Holl	34	30	7

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Albert J. Myer

BRIG. GEN. (BVT ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.

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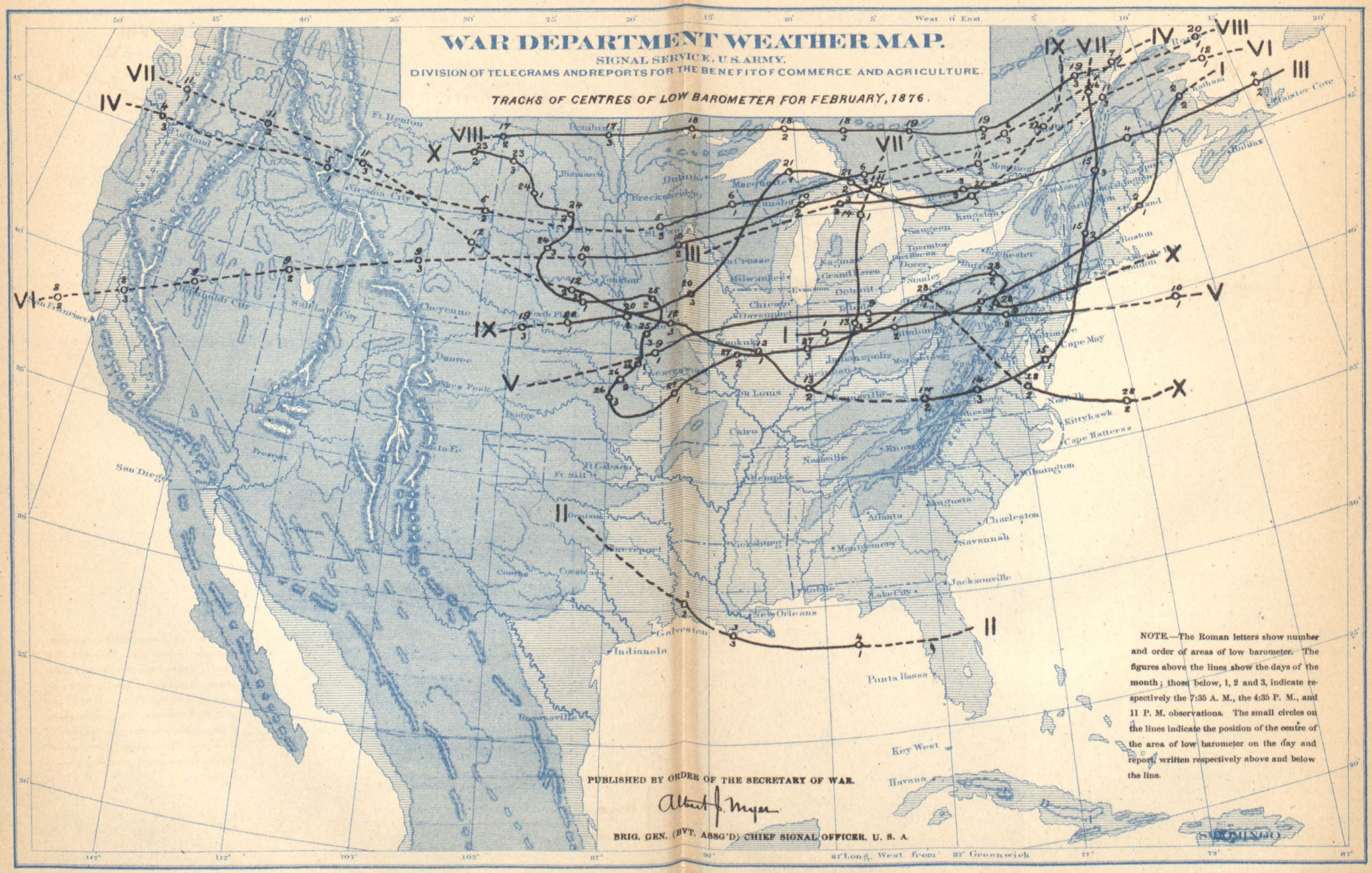
WAR DEPARTMENT WEATHER MAP.
SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.
TRACKS OF CENTRES OF LOW BAROMETER FOR FEBRUARY, 1876.
NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.
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Albert J. Myer
BRIG. GEN. (BVT. ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.
Ft. Benton
Portland
Virginia City
Salt Lake City
Cheyenne
Denver
Pike's Peak
Santa Fe
San Diego
Ft. Gibson
Ft. Sill
Shreveport
Galveston
Indianola
Brownsville
Bismarck
Duluth
Breckenridge
Yankton
Milwaukee
Chicago
Davenport
Keokuk
St. Louis
Cairo
Memphis
Nashville
Vicksburg
Mobile
New Orleans
Montgomery
Atlanta
Augusta
Savannah
Charleston
Wilmington
Jacksonville
Lake City
Punta Rassa
Key West
Havana
Cape Hatteras
Kittyhawk
Norfolk
Cape May
Philadelphia
Pittsburgh
Cleveland
Detroit
Toledo
Indianapolis
Cincinnati
Louisville
Kingston
Toronto
Rochester
Boston
Halifax
Chaister Cove
West 0° East
87° Long. West from 32° Greenwich

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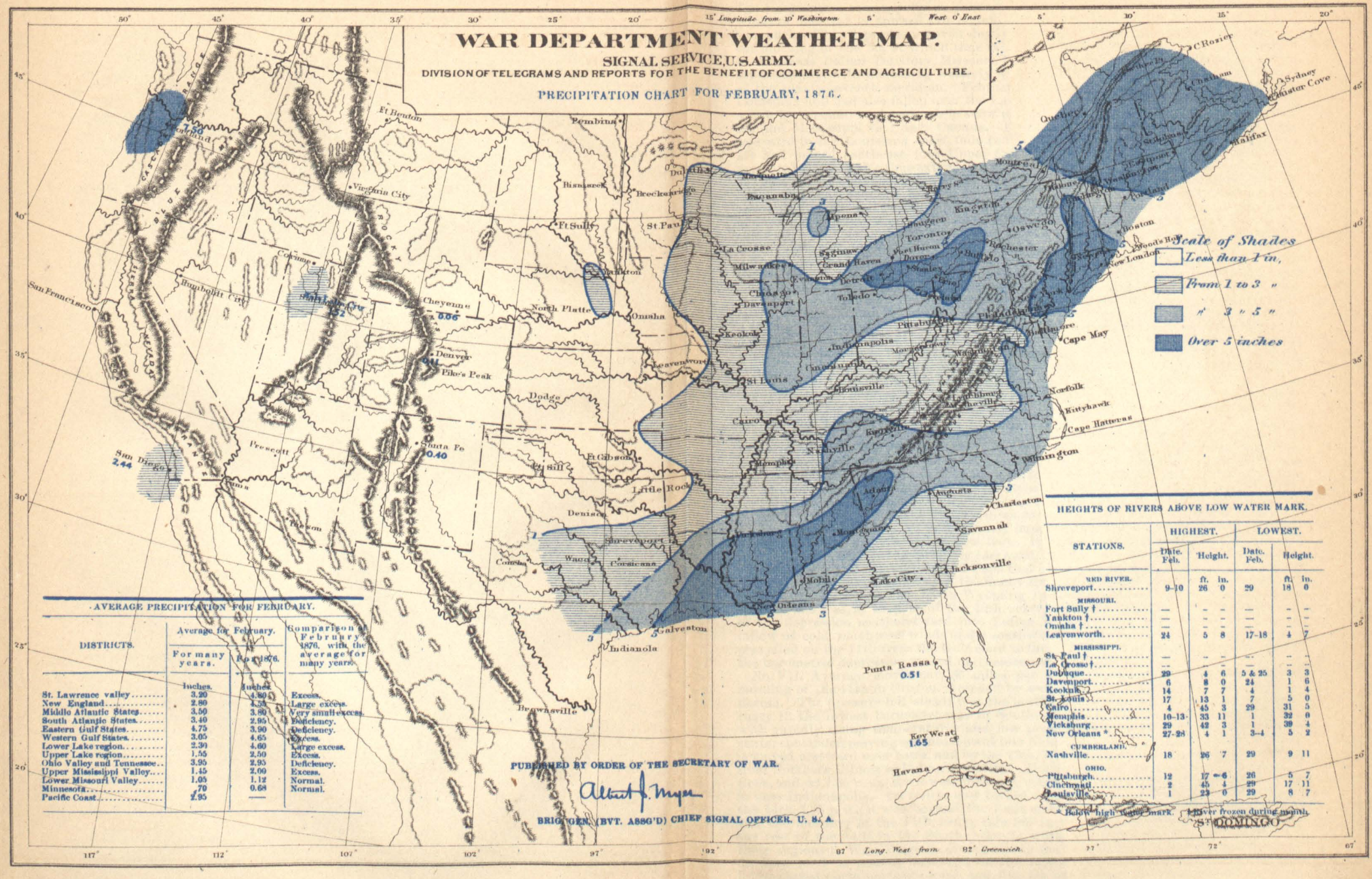
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR FEBRUARY, 1876.



AVERAGE PRECIPITATION FOR FEBRUARY.

DISTRICTS.	Average for February. For many years.	For 1876.	Comparison of February, 1876, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	3.20	4.80	Excess.
New England	2.80	4.55	Large excess.
Middle Atlantic States	3.50	3.80	Very small excess.
South Atlantic States	3.40	2.95	Deficiency.
Eastern Gulf States	4.75	3.90	Deficiency.
Western Gulf States	3.05	4.65	Excess.
Lower Lake region	2.30	4.60	Large excess.
Upper Lake region	1.55	2.50	Excess.
Ohio Valley and Tennessee	3.95	2.95	Deficiency.
Upper Mississippi Valley	1.45	2.00	Excess.
Lower Missouri Valley	1.05	1.12	Normal.
Minnesota	.70	0.68	Normal.
Pacific Coast	2.95	—	

HEIGHTS OF RIVERS ABOVE LOW WATER MARK.

STATIONS.	Highest. Date. Feb.	Highest. Height. ft.	Highest. Height. in.	Lowest. Date. Feb.	Lowest. Height. ft.	Lowest. Height. in.
RED RIVER.						
Shreveport	9-10	26	0	29	18	0
MISSOURI.						
Fort Sully †	—	—	—	—	—	—
Yankton †	—	—	—	—	—	—
Omaha †	—	—	—	—	—	—
Leavenworth	24	5	8	17-18	4	7
MISSISSIPPI.						
St. Paul †	—	—	—	—	—	—
La Crosse †	—	—	—	—	—	—
Dubuque	29	4	6	5 & 25	3	3
Davenport	6	8	0	24	1	6
Keokuk	14	7	7	4	1	4
St. Louis	17	13	1	7	5	0
Cairo	4	45	3	29	31	5
Memphis	16-13	33	11	1	32	6
Vicksburg	29	42	3	1	39	4
New Orleans *	27-28	4	1	3-4	5	2
CUMBERLAND.						
Nashville	18	26	7	29	9	11
OHIO.						
Pittsburgh	12	17	6	26	5	7
Cincinnati	2	45	4	29	17	11
Louisville	1	23	0	29	8	7

* Below high water mark. † River frozen during month.

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Albert J. Myer

BRIG. GEN. (BVT. ASS'G'D) CHIEF SIGNAL OFFICER, U. S. A.

southeast winds were blowing, while high barometer No. I was central in Arkansas. The temperature rose rapidly in Kansas and Nebraska during the day, and increasing winds at once set in toward this region, both from Dakota on the north and Texas on the south. This depression moved slowly southward, and was in Indian Territory on the morning of the 3d, at which time rain prevailed in Texas, but snow was reported in Arkansas, Indian Territory, Missouri, Illinois, and Michigan; the temperature had fallen rapidly, with increasing westerly winds on Pike's Peak and at most stations west of the ninety-seventh meridian. February 3, 4.35 p. m., the depression was central in Louisiana and had also fallen over the Lake region, over the northern portion of which a new storm-center appears, while snow prevailed over the belt extending from Arkansas and Mississippi to Upper Canada. February 3, 11 p. m., No. II had moved southeastward to the Louisiana coast, followed by a "norther" to the westward, while No. III had moved southeast into Upper Canada, with falling barometer. The lowest pressure, which at this time extended from Louisiana to Upper Canada, was bounded on the east by the remnant of high barometer No. I, the maximum pressure being in Nova Scotia, and was bounded on the west by high barometer No. II. Depression No. II seems during the next twenty-four hours to have moved eastward through the Gulf, and to have disappeared after degenerating into local rain-storms. No. III moved eastward over the Gulf of Saint Lawrence, (the pressure fell to 29.50 at Cape Breton,) and possibly developed into larger proportions on the Atlantic Ocean.

No. IV. Average movement, 50 miles per hour. The great development of high barometer No. II was, as usual, attended by a steady fall of pressure on the Pacific coast, which reached its minimum in Oregon at 11 p. m. of the 4th, at which time, also, the pressure was low in Dakota, Colorado, and Nevada, this whole region being apparently on the southern border of a depression that extended far northward into British America. February 5, 4.35 p. m., the central depression appears as extending from Nebraska northeastward over Minnesota, and at 11 p. m. stretched as a barometric trough from Kansas to Lake Superior, with decidedly higher pressures to the northwest. During the 6th, the pressures fell, with warm southerly winds, followed by cloud and rain, over the Gulf and South Atlantic States and Lower Lakes, and a small portion of the barometric depression disappeared in Texas, while the greater portion passed northeastwardly over the Upper Lakes into Canada, and was, on the morning of the 7th, beyond our cognizance.

Nos. V and VI. Average movements, 56 and 50 miles per hour respectively. The pressure remained high throughout the country, and especially in the Atlantic States, and southeast winds prevailed in the Gulf States during the 7th, 8th, and 9th, but northeast winds over the Upper Lakes and, to some extent, over the Northwest, while an area of very low pressure advanced upon Northern California and Oregon. The resulting northeast and southerly winds, at 11 p. m., February 8, met along a line of rain and strongly contrasted temperatures, extending from Northern Kansas eastward to Southern Michigan. As so frequently happens in these cases, the lowest pressure appeared at the western end of this belt. It is marked as area No. V on the accompanying chart, and traveled rapidly eastward, passing over Lake Erie on the afternoon of February 9, and disappearing off Cape Cod on the morning of the 10th. Meanwhile the barometer fell continuously at the Rocky Mountain stations, and area No. VI appears central on the 9th, at 11 p. m., in Wyoming Territory, whence it moved eastward into Dakota, and was, at 11 p. m. of the 10th, central on Lake Superior, while an extension of the depression southeastward into Indian Territory was accompanied by a rapid inflow of cold northwest winds and a southward extension of the area of rain. Rain prevailed on the 11th from the Gulf coast to the Middle States and New England, while the barometric depression moved northeastward into Canada.

No. VII. Average movement, 36 miles per hour. This depression appears on the morning of the 11th in Oregon, attended by southerly winds and rain in Northern California. The pressure fell steadily at the northwestern stations till, at 7.35 a. m., February 12, the lowest barometer was in Southeastern Dakota and Northwestern Iowa, with rapidly rising temperatures and low pressures to the north of it. The storm-center continued moving southeastward into Nebraska until the 12th, 4.35 p. m., whence it moved eastward over Iowa, and by the 13th, 7.35 a. m., covered an oval area, reaching from Northern Illinois to Indian Territory. During the day, this area trebled its dimensions, and, at 4.35 p. m., the lowest pressure, which had fallen 0.20, extended from Cairo to near Indianapolis. Its course now turned north-northeast over Lake Huron, and on the 14th, 4.35 p. m., it was beyond the limit of our maps. Between the 13th, 11 p. m., and the morning of the 14th, heavy rain fell in the Eastern Gulf States, and, during the rest of the 14th, in the South Atlantic, while the barometer fell decidedly from those regions to West Virginia, giving rise to the subsidiary storm-center represented on Map No. I as passing eastward on the 14th over Virginia. During the 15th, this latter moved north-northeastward, and, like its predecessor, developed into a storm of remarkable severity. It moved with an average velocity of 30 miles per hour, and disappeared on the morning of the 16th to the north of the Lower Saint Lawrence. The tornado that accompanied the storm-center on the 13th from Missouri to Indiana

is mentioned in the chapter on local storms. The barometric depression attending the second branch of this storm was as follows: 14th, 11 p. m., 29.50; 15th, 7.35 a. m., 29.20; 4.35 p. m., 28.75; 11 p. m., 28.90, or less. The high winds attending this storm were as follows: February 15, 7.35 a. m., northeast winds, 20 to 45 miles, over Maine and the Saint Lawrence Valley; northwest winds, 20 miles, from Northern New York to North Carolina; southeast winds, 20 to 30 miles, on the Middle Atlantic coast; February 15, 4.35 p. m., northwest winds, 25 to 35 miles, in New York and Pennsylvania; southwest winds, 25 to 40 miles, in New Jersey and Connecticut; south and east winds, 25 to 50 miles, on the coasts of Massachusetts and Maine; February 15, 11 p. m., northwest winds, 25 to 35 miles, Lake Ontario; southwest winds, 25 to 35 miles, on the New England coasts; northeast winds, 25 to 35 miles, over New Brunswick and the Lower Saint Lawrence.

No. VIII. Average movement, 30 miles per hour. The pressure fell rapidly on the 17th in Dakota and Manitoba, while it rose also rapidly in Oregon, indicating that No. VIII was at that time moving southeastward toward Manitoba, if indeed it did not originate near that station. On the 18th, 7.35 a. m., while high barometer and calms prevailed on the Pacific coast, the depression moved eastward toward Lake Superior, over which its southern extremity was central at 4.35 p. m., while brisk, cold northwest winds and clear weather rapidly followed in its rear. In its further progress this depression remained almost entirely to the north of our stations. It was, on the 20th, 7.35 a. m., north of the Gulf of Saint Lawrence, after which it seems to have turned southeastward, as indicated by a rapid fall in the barometer at Cape Breton.

No. IX. Average movement, 29 miles per hour. This depression is first located on the 19th, 4.35 p. m., near the Black Hills of Wyoming and Dakota, and it most probably was initiated on the previous day in the country to the northwestward of that region. The central depression moved slowly eastward until, on the 20th, at 4.35, p. m., it extended from Kansas northeastward into the southern portion of Minnesota. On its eastern side, warm southerly winds prevailed, while cold northwest winds were reported from stations a little farther westward. In its eastward progress, this depression rapidly developed into a very long trough, extending from Texas to beyond Lake Superior, which trough was, by the rapid advance of northwest winds, divided into two portions, of which the southern one appears only as an area of cloud and rain, moving southeastward over Texas and the Gulf of Mexico on the 21st, 22d, and 23d, while the northern portion pursued the course marked on Chart No. I over the lakes and the Saint Lawrence Valley. It was accompanied by rains and southerly winds over the Lower Lakes, and at 11 p. m., February 21, while central near Lake Ontario, gave rise to a slight depression in North Carolina. On the 23d, when central over the Gulf of Saint Lawrence, the barometer began there to fall rapidly, accompanied by very cold, brisk northwest winds in the Middle and Eastern States.

No. X. Average movement, 19 miles per hour. A rapid fall in the barometer, on the 23d, in Manitoba and Dakota and a much more moderate fall in Oregon and Montana, indicate that depression No. X was on that day in British America, on the eastern slope of the Rocky Mountains. On the 24th, 7.35 a. m., it was central in Western Dakota; at 4.35 p. m., in Eastern Dakota, and at 11 p. m., in Southern Dakota. The temperature had risen decidedly in Minnesota, Dakota, and southward to the Gulf States. During the 25th and 26th its course was south-southeastward, until, at 7.35 a. m. of the 27th, it was central in Northwestern Missouri. Up to this time northeast winds, increasing to a gale on Lake Superior, stationary or rising barometer, with cloud and rain or snow, had prevailed over the Lake region and Minnesota, and on the 26th, at 11 p. m., the belt of strongly-contrasted temperatures, separating the area of warm southerly from that of cold north and east winds, extended from Pennsylvania and Lake Ontario westward over Iowa, and thence southerly over Nebraska and Kansas. On the 27th the storm-center moved rapidly eastward over Northern Illinois, Indiana, and Ohio, accompanied by high northeast winds on the Lakes and by local storms or tornadoes in Southern Missouri, Illinois, Indiana, and Ohio, which are referred to in their appropriate places. During the 28th a subsidiary depression was formed on the Middle Atlantic coast, and the original one seems to have disappeared in passing over the Alleghanies.

No. XI. This depression appears off the coast of California on the 27th, at which time the barometer rose at most of the Rocky Mountain stations, apparently under the influence of the flow of air from the northeast. The minimum pressure was experienced at San Francisco and Portland, Oreg., during the evening of the 27th and the early morning of the 28th. Brisk and high southerly winds prevailed on the California coast, with rain throughout its whole extent. The depression became sensible by 11 p. m. of the 28th in Colorado, Wyoming, and Montana; a high pressure was then prevailing, with cold northeast winds in Dakota and Manitoba and eastward. While northerly winds and high pressure continued to prevail in these latter Territories, the barometric depression extended rapidly southward into Texas, but was, at 11 p. m. of the 29th, central in Eastern Kansas and Nebraska. The subsequent history of this depression belongs to March.

Areas of high barometer.—The great depression recorded as storm-center No. I was accompanied not only by an inflowing air and temporary rise of pressure on the Atlantic coast, but by a still more marked rise at the Pacific and some of the Rocky Mountain stations. On the morning of the 1st, the maximum pressure probably extended from Fort Garry southwestward into Dakota, the lowest temperatures being —37°, or lower, and the winds nearly calm, while to the southward brisk northwest winds prevailed, as has been previously stated. February 1, 4.35 p. m., the area of highest pressure and calms was confined to the northeastern corner of Dakota; at midnight the area of calms included pretty much all of Minnesota, while the area of highest pressure had moved rapidly southward into Missouri and Northern Texas. February 2, 7.35 a. m., the highest pressure of 30.50 was central in Arkansas; 2d, 4.35 p. m., the highest pressure, 30.40, was central from Tennessee to Ohio; 2d, 11 p. m., the highest pressure, 30.50, was central in Pennsylvania and Northern Virginia; 3d, 7.35 a. m., the highest pressure, 30.60, was central off the Middle Atlantic coast.

No. II. The cold air on the northern side of low barometer No. III on the morning of the 3d formed a well-defined area of high pressure, which was central in the afternoon in Dakota and at midnight in Nebraska. On the morning of the 4th a pressure of 30.60 is recorded in Missouri, while the area of 30.55 extended thence as a barometric ridge northward to Minnesota and southwestward to Texas. February 4, 4.35 p. m., the highest pressure, 30.60, was central in Southern Illinois; by 11 p. m. an influx of very cold air from Canada gave the area of 30.60 an oval outline, extending from Arkansas to Virginia, thence northward over Upper Canada. February 5, 7.35 a. m., very remarkable increase in the extent of this area had taken place, the isobar of 30.60 having scarcely changed its position on the west, but having pushed rapidly to the southeast and northeast, the highest pressure was now 30.95 in Northern New England; by 4.35 p. m. the isobar of 30.60 had moved decidedly eastward, and the highest pressure, 30.98, was off the New England coast. During the remarkable rise in pressure which had taken place during the preceding twenty-four hours over the Middle and Eastern States the temperature remained abnormally low on the summit of Mount Washington, as compared with stations at sea-level, and the wind continued north and northwest from 80 to 40 miles. February 5, 11 p. m., the isobar of 30.90 included the middle and east Atlantic coasts, New Brunswick, and Nova Scotia, while a higher pressure prevailed to the eastward, as shown by the reports of 30.99 at Halifax, 30.96 to 30.99 on most stations on the East Atlantic coast, and 31.01 at Wood's Hole. It is therefore evident that the pressure in this area of high barometer was the highest on record for that portion of the United States. After this the pressure rapidly diminished.

No. III. This area followed closely in the area of low barometer No. VI, but passed to the southeastward, and, on the morning of the 12th, reached the Atlantic coast.

Nos. IV and V. The flow of cold air from the north in the rear of low barometer No. VII produced a maximum pressure of 30.59 at 4.35 p. m. on the 15th, while the pressure was simultaneously rising both in California and the Northwest. The maximum (30.45) was reached in the latter section on the 16th, at 11 p. m., by which time the pressure had fallen in Oregon to 30.29. The central area of highest pressure was rapidly transferred to the south and east, being, on the 17th at 11 p. m., over the Gulf States and Tennessee, while a new depression, No. VIII, was developed in Dakota and Manitoba. The barometer continued high during the 18th over the Southern and Atlantic States, the highest pressure extending, at 11 p. m., from Mississippi to Virginia. During the 19th, this area moved slightly eastward, and was joined by a small area of high barometer, No. V, which had moved southeastward over the Upper Mississippi in the rear of low barometer No. VIII. The conjoined areas, Nos. IV and V, extended, on the 20th, at 11 p. m., from Upper Canada to Virginia, whence they moved slowly southeastward, and were, on the 21st, at 11 p. m., east of New England and New Brunswick.

No. VI. This area followed closely in the rear of depression No. IX, which, as before stated, extended, on the 21st, as a trough from Texas to the Upper Lakes. The high pressure appeared, at 4.35 p. m. of the 21st, to extend from Manitoba to Kansas and Missouri. Its southern portion, however, moving rapidly southeastward, was, on the 22d, at 4.35 p. m., in Texas, while the northern portion continued stationary, with rising pressure, and was, on the 23d, 7.35 a. m., central in Minnesota, with a maximum pressure of 30.85. Moving southeastward, it was, at 4.35 p. m., central in the Upper Mississippi Valley, with a pressure of 30.60; and, at 11 p. m., central at Cairo, pressure 30.50. During the 24th it moved southeastward, and disappeared on the 25th off the South Atlantic coast.

No. VII. The rising barometer in the rear of depression No. X extended from the Upper Lakes and Northwest southward to the Gulf during the 28th and morning of the 29th, and seems to have been hindered in its progress eastward by the presence of a very remarkable depression (No. XI) on the California coast.

TEMPERATURE OF THE AIR.

The general distribution of the temperature of the air is shown by the isothermal

lines upon Chart No. II. The average temperature has been above its normal value, except for stations in the extreme northern part of Minnesota and the Saint Lawrence Valley. A tendency has been apparent during the month to the formation of an area of cold northeast winds at our northern stations, simultaneously with the prevalence of warm southerly winds at stations south of the Lake region, the dividing belt passing generally eastward from Iowa to New York and Pennsylvania.

Maximum temperatures.—Northern stations: At Pembina, 32°; Saint Paul, 46°; Pike's Peak, 29°; Mount Washington, 34°; Escanaba, 39°; Eastport 45°; Breckenridge, 34°. Southern stations: Jacksonville, Fla., 83°; Key West, 85°; Savannah, 80°; Brownsville, Tex., 83°.

Minimum temperatures.—The minimum temperatures have been for northern stations: Yankton, −18°; Saint Paul, −22°; Pike's Peak, −17°; Pembina, −48°; Omaha, −10°; Alpena, −11°; Burlington, Vt., −12°; Breckenridge, −28°; Du Luth, −28°; Eastport, −20°; Escanaba, −12°; Fort Sully, −28°; Marquette, −16°; Milwaukee, −10°; North Platte, −14°; Malone, −16°; Mount Washington, −42°; and for southern stations: Galveston, 35°; Indianola, 33°; Jacksonville, 36°; New Orleans, 36°; Saint Mark's, 30°; Brownsville, Tex., 42°; Key West, 63°.

Ranges of temperatures.—The least ranges of temperature have been: San Francisco, 26°; Key West, 22°; Galveston, 39°; and Cape May, 22°.

Frosts destructive to vegetation and to the premature buds are reported from Ohio, North Carolina, 24th, Virginia 10th, and subsequently.

PRECIPITATION.

Amount of rain and snow.—Chart No. III shows the general distribution of precipitation for the month, and that there has been in general an excess over the Lake region, New England, and Canada, as also in Louisiana, and a deficiency in the remaining Gulf States, Tennessee, Ohio Valley, and the South Atlantic States. Snow-fall is reported from 13 to 18 inches in Connecticut; 5 or 6 in Indiana, Illinois, Iowa, and Kentucky; 23 to 29 in Maine; 11 to 22 in Massachusetts; 2 to 10 in Minnesota; 4 to 7 in Nebraska; 25 to 35 in New Hampshire; 7 to 48 in New York; 1¾ at Weldon, N. C.; 5 to 8 in Ohio; 6 to 13 in Pennsylvania; 22 in Utah; 20 to 38 in Vermont; 2 to 4 in Virginia; 10 in West Virginia; 8 to 19 in Wisconsin.

Rainy days.—The number of days on which rain or snow fell during February averaged from 14 to 16 on the Middle and East Atlantic coasts; from 16 to 20 in the Lake region; from 8 to 12 in the Upper Mississippi and Ohio Valleys; from 8 to 10 in the Southern States, except 16 in Southern Louisiana. From 2 to 5 rainy days are reported from the plains of Kansas and Nebraska.

Cloudy days.—The number of cloudy days (averaging eight-tenths or more of cloudiness) for the Atlantic States, from Georgia to Maine, varied between 7 and 17, the latter number belonging to Middle Atlantic States and Long Island. From 5 to 11 cloudy days were reported from the region between the Alleghanies and the 100th meridian.

RELATIVE HUMIDITY.

The mean relative humidity for February averages as follows, (not corrected for altitude:) *Dry stations:* Santa Fé, 39; Pike's Peak, 55; Dodge City, 48; Denver, 39; Colorado Springs, 35; Cheyenne, 45. *Damp stations:* Pembina, 92, (?;) Albany, 84; Cleveland, 82; Marquette, 80; Mount Washington, 88.

WINDS.

Wind-directions.—The prevailing winds are shown by the arrows upon Chart No. II, from which it will be seen that these have been decidedly northwesterly in all the northern half of the country, southerly in the southwest, and northeast to southeast on the South Atlantic coast.

Total movements.—The sum-total of the movements of the air from all directions, as given by the daily readings of anemometers, have been as follows, in miles: Large movements: Breckenridge, 10,574; Cheyenne, 11,531; Eastport, 10,110; Erie, 11,080; Grand Haven, 10,359; Indianola, 10,501; Kittyhawk, 10,052; Long Branch, 11,629; Manhattan, 10,228; Pike's Peak, 20,908; Sandy Hook, (?;) Wood's Hole, 10,143; Thatcher's Island, 13,930. The record from Pike's Peak shows decidedly the largest monthly movement recorded there during the past three years. Small movements: Wytheville, 3,982; Savannah, 3,520; Salt Lake City, 2,460; Nashville, 3,588; Mobile, 3,936; Memphis, 3,561; Lynchburg, 2,832; Augusta, 2,899.

The highest winds.—The maximum winds of the month have been very severe, especially those in connection with the extensive storms of the 1st and 2d and the 15th and 16th. Among these the following are worthy of mention: On February 1st or 2d, Albany, northwest, 70 miles; Stapleton, N. Y., west, 60; Boston, southwest, 50; Barnegat, northwest, 60; Vevay, Ind., northwest, 60; Cape Henry, northwest, 52; Cape May, northwest, 56; Long Branch, northwest, 72; Springfield, Mass., northwest, 60; Lexington, Ky., south, 52; Flushing, 74; New York, northwest, 66; Thatcher's Island, northwest, 70; Newport, west, 80; Washington, northwest, 60 to 72. On other dates, maxi-

mum winds of 50 miles per hour or more were experienced as follows: Dodge City, 29th, west, 50 miles; Du Luth, 26th, northeast, 52; Cape Hatteras, 14th, southwest, 56; Kittyhawk, 22d, north, 60; Mount Washington, 24th, northwest, 168; Malone, 12th, west, 60; Pike's Peak, 1st, southwest, 72; Port Huron, 19th, south, 50; Sandy Hook, 15th, northwest, 80. As an interesting instance of the power of a strong wind to produce eddies, in which very low pressure exists, it is reported that on the early morning of the 2d, in Washington, a gust of at least 70 miles velocity, in rushing past an exposed dwelling in the higher part of the city, caused the windows of a small room on the leeward side of the house to burst outward, a result evidently due simply to the expansion of the confined air, as the room-doors were closed, and there was no fire-place or other way of escape.

Local storms.—Storms of the nature of tornadoes or destructive gusts of wind were reported on the 13th near Friendsville, Ill.; 14th, at Buffalo, N. Y.; 27th, Saint Charles Mo., Princeton and Saint Meinrad, Ind.

WATER TEMPERATURES.

The monthly maximum and minimum temperatures of the water in rivers and harbors are given in a table on Chart No. II. Minima of 30° or 32° were reported from Cleveland, Detroit, Du Luth, Grand Haven, Keokuk, Leavenworth, Milwaukee, New York, Portland, Me., Toledo, and Wood's Hole. The maximum temperatures were: Galveston, 69; Jacksonville, 66; Key West, 78; Saint Mark's, 68. The range has been least at San Francisco, 5°; Baltimore, 4°; Buffalo, 4°; Detroit, 1°; Eastport, 2°; Grand Haven, 1°; Louisville, 5°; Milwaukee, 1°; Mobile, 5°; New London, 3°; New York, 2°; Portland, Me., 3°; Wood's Hole, 4°.

NAVIGATION.

Depth of water in rivers.—A table on Chart No. III gives the highest and lowest readings of the river-gauges during the month, from which it will be seen that the Red River was on the 29th 8 feet lower than on the 10th. The Ohio was from 12 to 30 feet below its position in the early part of the month. The Upper and Lower Mississippi had risen slightly, and the Central Mississippi fallen somewhat at Cairo after the 4th, and at Vicksburg after the 25th to 29th. The flood that had come down the Ohio, however, left the water near the "danger line" during a number of days, causing some inconvenience.

Ice in rivers and harbors.—The reports of ice in the harbors and rivers are as follows: Fort Niagara, N. Y., floating ice in the river, 2d, 17th, 20th, 23d; Columbia, S. C., ice formed on the 2d; Middletown, Conn., the river-ice moving on the 14th, river open 17th, closed 23d; Rockford, Ill., river clear 12th, 22d, 26th, frozen over 16th and 20th; Havana, Ill., the Illinois River not closed during the month; Muscatine, Iowa, river gorged the 3d, moved on the 9th, clear on the 10th; Point Pleasant, La., ice formed on the 2d and 5th; New Orleans, ice 2d; Fall River, Mass., Mount Hope Bay, frozen over on the 25th; Traverse City, Mich., Grand Traverse Bay, frozen 22d; Kensico, N. Y., on the 28th, pond-ice 6 inches thick; Starkey, N. Y., ice in Seneca Lake 25th; Trenton, N. J., the Delaware closed 4th, opened 7th; Tioga, Pa., river clear on 15th, frozen on 23d; Pennville, Pa., ice moving out 10th; North Shippen, Pa., pond-ice 5 inches thick on 6th; West Charlotte, Vt., Lake Champlain partly frozen 3d, completely frozen and crossed by skaters on the 4th, and crossed by horsemen on the 12th; Bloomfield, Wis., Geneva Lake, ice 12½ inches thick; Grand Haven, Mich., ice-blockade 4th; Salt Lake City, Utah, railroad trains snow-bound 1st; Philadelphia, Pa., in the Schuylkill River, 5 inches of ice 6th; Delaware River, floating ice 8th and 9th; Albany, ice-gorge 16th; Toledo, river frozen 3d and 23d, cleared 10th; Buffalo, N. Y., in the Erie Canal basin, 8 inches of ice 7th; Erie, Pa., 5 inches of ice on the 4th; Montgomery, Ala., ice on the 2d; Detroit, Mich., ice in the river on the 14th and 24th; Davenport, Iowa, floating ice on 1st, 9th, and 10th, ice-gorge 2d, river frozen over 3d, ice moving on 5th, ferry-boat running 11th; Leavenworth, Kans., river frozen over on the 4th, clear 9th; Pittsburgh, Pa., floating ice 5th; Keokuk, Iowa, much floating ice on the 4th, clear 6th; Omaha, Nebr., river frozen during the whole month; Du Luth, Minn., Lake Superior frozen during the month.

VERIFICATIONS.

(1) *Verifications.*—The comparison of the published probabilities with the weather following gives an average percentage of verifications for February, for the whole region east of the Rocky Mountains, 89.8 per cent.

(2) *Cautionary signals.*—Of 141 cautionary signals displayed during February at the United States stations, 110 were justified and thirty-one were not justified by velocities of 25 miles at or near the stations; 63 cases are reported for which signals were not previously ordered.

ATMOSPHERIC ELECTRICITY.

(1) *Auroras.*—The principal aurora of the month was that of the evening of the 19th and early morning of the 20th, of which reports have already been received from 122

stations, representing the entire country from Kansas and Montana eastward to the Atlantic. The other displays were observed during the month as follows: 5th, Woodstock, Vt.; 11th, Dodge City, Kans.; 16th, Breckenridge and Du Luth, Minn., Rocky Run, Wis.; 17th, Marquette, Alpena, Grand Haven, Mich., Eastport, Me., Mount Washington, N. H., Cornish and Gardiner, Me., South Minneapolis, Minn., Rocky Run and Utica, Wis.; 18th, Bangor, Me., Du Luth, Minn., Fort Sully, Dak., Afton, Guttenberg, and Monticello, Iowa, Gardiner, Me., South Orange, N. J., Cazenovia, N. Y., Ringgold, Ohio, Embarrass and Rocky Run, Wis.; 20th, Waltham, Mass.; 22d, Carthagena, Ohio; 26th, Gardiner, Me.; 27th, Escanaba, Mich.; 29th, Frankfort, Mo.

(2) *Thunder and lightning* occurred on the 1st in Tennessee and New Mexico; 3d, Louisiana and Alabama; 4th, Alabama; 7th, Alabama, Mississippi, Pennsylvania, and Texas; 8th, Illinois, Iowa, Kansas, Nebraska, Pennsylvania, Wisconsin, and California; 9th, Illinois, Indiana, New York, Iowa, Kansas, Michigan, Nebraska, and Ohio; 10th, Illinois, Indian Territory, Iowa, Kansas, Michigan, Missouri, Ohio, and Wisconsin; 11th, Michigan, Alabama, Georgia, Illinois, Indiana, Iowa, Maine, Maryland, New York, Ohio, and Tennessee; 12th, Georgia, Ohio, Virginia, and Indiana; 13th, Alabama, Kentucky, Mississippi, Tennessee, Virginia, Georgia, Illinois, Indiana, Michigan, Louisiana, Missouri, Ohio, South Carolina, North Carolina, and Texas; 14th, Michigan, Rhode Island, South Carolina, Tennessee, Alabama, Delaware, Florida, Georgia, Louisiana, Maryland, Massachusetts, New Jersey, New York, North Carolina, Pennsylvania, Virginia, and West Virginia; 15th, New York, Massachusetts, New Jersey, and Pennsylvania; 16th, Delaware; 20th, Kansas, Georgia, Iowa, Nebraska, and Texas; 21st, Alabama, North Carolina, South Carolina, and Texas; 25th, Michigan and New Jersey; 26th, Illinois, Iowa, Nebraska, and Kansas; 27th, Illinois, Michigan, North Carolina, Georgia, Indiana, Iowa, Kentucky, Missouri, Ohio, Pennsylvania, South Carolina, and Wisconsin; 28th, Delaware, Indiana, Maryland, Michigan, New Jersey, New York, North Carolina, Pennsylvania, Virginia, West Virginia, and Wisconsin; 29th, Kansas and Nebraska.

(3) *Telegraphic ground-currents* were observed at Chicago, Ill., on the 1st, during a light snow and brisk northwest winds, and at Fort Sully, Dak., on the 29th, also during light snow. Telegraphic operations were disturbed on the 1st on the Western Union line running northeast from Santa Fé to Cimarron, N. Mex., and on the 26th on the military line running southward from Santa Fé toward Mesilla, by electrical storms prevailing between those points.

OPTICAL PHENOMENA.

(1) *Mirage.*—The phenomena of mirage were recorded as follows: At New London, Conn., 5th, 21st, 22d, 26th, and 27th; Atlantic City, N. J., 25th; Breckenridge, Minn., 1st, 15th, and 18th; Atlanta, Kans., 3d, 6th, 7th, 10th, 11th, 14th, 16th, 18th, 25th, and 28th; Ellinwood, Kans., 10th, 11th, 16th, 17th, 18th, 19th, and 28th; Moorhead, Minn., 29th.

(2) *Solar halos.*—1st, Nebraska, Iowa, Minnesota, New Hampshire, New York, Vermont, and Wisconsin; 2d, New York, Kansas, Michigan, Nebraska, Illinois, Louisiana, and Ohio; 3d, New York, Massachusetts, New Jersey, Dakota, Connecticut, Iowa, Maine, Minnesota, and Virginia; 4th, Minnesota, Nebraska, Iowa, New Hampshire, Ohio, and Wisconsin; 5th, New York, Michigan, Nebraska, Iowa, Minnesota, Ohio, and Pennsylvania; 6th, North Carolina, Michigan, New York, New Jersey, Wisconsin, Nebraska, Iowa, Maine, Minnesota, and New Hampshire; 7th, New Jersey, Michigan, Iowa, Illinois, Nebraska, New Hampshire, New York, Ohio, Pennsylvania, and Wisconsin; 8th, New York, Michigan, Massachusetts, Pennsylvania, and Vermont; 9th, North Carolina, Maine, Kansas, and Iowa; 10th, Maine, New York, Dakota, Connecticut, and Minnesota; 11th, Mississippi and Ohio; 12th, New York, Michigan, Wisconsin, Illinois, Iowa, Ohio, and Wisconsin; 13th, North Carolina, Maine, Kansas, Illinois, Iowa, New Hampshire, and Ohio; 14th, North Carolina, Minnesota, Nebraska, Indiana, and Kentucky; 15th, North Carolina, Colorado, Iowa, Nebraska, and Wisconsin; 17th, Michigan; 18th, Michigan, Illinois, and Nebraska; 19th, New Jersey, Massachusetts, Connecticut, West Virginia, Iowa, Dakota, Maine, Nebraska, New Hampshire, New York, Ohio, and Pennsylvania; 20th, Nebraska and Indiana; 21st, New Jersey, North Carolina, New York, Massachusetts, Connecticut, Delaware, Iowa, Maine, New Hampshire, Ohio, Pennsylvania, and Vermont; 22d, Minnesota and California; 23d, Ohio and Wisconsin; 24th, Illinois and New York; 25th, Michigan, Minnesota, Nebraska, Illinois, Iowa, New York, Ohio, and Wisconsin; 26th; New York, New Jersey, Kansas, Mississippi, Nevada, New Hampshire, Pennsylvania, and Vermont; 27th, New York, Illinois, and Maine; 28th, Maine, Florida, New Jersey, Texas, and Michigan; 29th, Illinois, Iowa, Connecticut, and Wisconsin.

(3) *Lunar halos.*—1st, Nebraska; 2d, Mississippi, Louisiana, Kansas, Indiana, Texas, Illinois, Iowa, Kentucky, Michigan, Minnesota, and Missouri; 3d, Texas, North Carolina, Maine, Massachusetts, Illinois, Wisconsin, Dakota, Iowa, Minnesota, New Hampshire, and Virginia; 4th, Texas, Massachusetts, Alabama, Illinois, Michigan, North Carolina, and Ohio; 5th, Colorado, Rhode Island, North Carolina, Massachusetts, Illinois, Michi-

gan, Indiana, Kansas, Tennessee, Wisconsin, Ohio, Dakota, Kentucky, Nebraska, Iowa, Minnesota, and Mississippi; 6th, New Mexico, Colorado, Pennsylvania, Ohio, Indiana, Kansas, Tennessee, Iowa, Illinois, Kentucky, Nebraska, and Missouri; 7th, New Jersey, Maryland, New Mexico, Colorado, Maine, Massachusetts, New York, Ohio, Rhode Island, Pennsylvania, Tennessee, Michigan, Illinois, Wisconsin, Kentucky, Nebraska, Connecticut, Delaware, Indiana, Kansas, New Hampshire, and Vermont; 8th, New Jersey, New York, North Carolina, Maine, Pennsylvania, Massachusetts, Virginia, Connecticut, Kansas, Minnesota, Alabama, New Hampshire, Ohio, Vermont, and Wisconsin; 9th, North Carolina, Kansas, Dakota, Texas, Delaware, Nebraska, and Ohio; 10th, New Jersey, Texas, North Carolina, Maine, Connecticut, Illinois, New York, Virginia, Iowa, Indiana, and Pennsylvania; 11th, Massachusetts, Illinois, Minnesota, Dakota, Nebraska, Indiana, Iowa, Louisiana, Virginia, and Wisconsin; 12th, North Carolina, Michigan, Ohio, New York, Connecticut, Illinois, Wisconsin, Delaware, Iowa, and Louisiana; 13th, Illinois and New York; 14th, Iowa; 15th, Kansas; 18th, Nebraska; 19th, Maine and Ohio; 28th, Maine and Illinois; 29th, North Carolina, Illinois, and New Hampshire.

MISCELLANEOUS PHENOMENA.

(1) *Polar bands* were reported on the 5th at Malone, N. Y.; 7th, Carthagena, Ohio; 19th, Abington, Ill., Wytheville and Norfolk, Va.; 20th, Carthagena, Ohio; 22d, Auburn, N. H.; 23d, Charleston, S. C.; 24th, Auburn, N. H.; 26th, Auburn, N. H.

(2) *Vegetable phenomena.—Peach-trees* in bloom at Charleston, S. C., 28th; Montgomery, Ala., 12th; Humboldt, Tenn., 29th; Green Spring, Ala., 1st to 10th; Wellborn, Fla., 18th; Salisbury, N. C., 12th; Aiken, S. C., 7th; McMinnville, Tenn., 25th; Clarksville, Tenn., 27th; Austin, Tex., 7th; Norwich, Vt., 20th; Prospect Hill, Va., 16th; Wytheville, Va., 14th. *Plum-trees* in bloom at Wellborn, Fla., 12th; McMinnville, Tenn., 26th; Clarkesville, Tenn., 27th. *Apricot-trees* in bloom at Norwich, Vt., 20th. *Elm-trees* in bloom at Baxter Springs, Kans., 29th. *Maple-trees* in bloom at Havana, Ill., 27th; budding at Monticello, Iowa, 20th; in bloom at Le Roy, Kans., 10th; in bloom at Baxter Springs, Kans., 18th. *Lilacs* budding at Monticello, Iowa, 20th; leafing out at Wytheville, Va., 14th. *Roses* budding at Morgantown, W. Va., 18th; in bloom at Wellborn, Fla., 24th. *Orange-trees* in blossom at Newport, Fla., 31st; Wellborn, Fla., 28th. *Bananas* budding at Newport, Fla., 31st. *Easter flowers* in bloom at Wellborn, Fla., 20th. *Crocus* in bloom at Freehold, N. J., 12th; Chambersburg, Penn., 13th; Clarkesville, Tenn., 10th; Norwich, Vt., 7th; Prospect Hill, Va., 11th; Wytheville, Va., 29th. *Violets* in bloom at Freehold, N. J., 29th. *Hyacinths* in bloom at Clarkesville, Tenn., 18th.

(3) *Animal phenomena.—Bluebirds:* On the 20th, arrived at West Point, N. Y.; 19th, seen at Southington, Conn.; 12th, at Louisville, Ill.; 10th, at Havana, Ill.; during the month, at Leesburg, Ind.; 14th, at Fort Madison, Iowa; 8th, at Holton, Kans.; 5th, at Le Roy, Kans.; 29th, at Atchison, Kans.; 28th, at Hinsdale, Mass.; 8th, at Westborough, Mass.; 12th, at Wappinger's Falls, N. Y.; 7th, at College Hill, Ohio; 23d, at Jacksonsburg, Ohio; 27th, at Mount Auburn, Ohio; 9th, at Hanover, Penn.; 10th, at Chambersburg, Penn.; 26th, at Salem, W. Va.; 17th, at Morgantown, W. Va. *Ducks:* 17th, canvasbacks seen at Golden, Colo.; 14th, wild ducks seen at Milford, Del.; 14th, flying south at Hennepin, Ill., and 25th, flying north; 12th, flying north at Riley, Ill.; 25th, flying north at Somonauk, Ill.; during the month, at Leesburg, Ind.; during the month, abundant at Corning, Mo.; 11th, flying north at Carthagena, Ohio. *Robins:* 10th, at Southington, Conn.; 27th, at Hennepin, Ill.; 25th, at Louisville, Ill.; 26th, at Somonauk, Ill.; 19th, at Vevay, Ind.; 12th, at Fort Madison, Iowa; 5th, at Le Roy, Kans.; 29th, at Atchison, Kans.; 22d, at Hudson, Mich.; 13th, heard at Freehold, N. J.; 13th, at Wappinger's Falls, N. Y.; 25th, at Marion, Ohio; 27th, at Westerville, Ohio; 26th, at Kenton, Ohio: 29th, at Jacksonsburg, Ohio; 25th, at Mount Auburn, Ohio. *Wild geese:* 5th, 6th, and 9th, flying north at Plattsmouth, Nebr.; 2d, flying south at De Soto, Nebr.; 19th, flying north at Genoa, Nebr.; 15th, flying north at Hightstown, N. J.; 14th, flying north at Flushing, N. Y.; 24th, flying north at College Hill, Ohio; 19th and and 26th, flying south at Carthagena, Ohio; 1st, flying northwest at Jackonsburg, Ohio; 27th, flying north at Hanover, Penn.; 13th, flying east and 29th, southeast at Alto Vista, Va.; 11th, flying north at Goshen Bridge, Va.; 27th, flying north at Salem, W. Va.; 28th, at Bloomfield, Wis.; 11th, flying north at Morgantown, W. Va.; 26th, flying north at Fort Sully, Dak.; 11th, flying north at Davenport, Iowa; 14th, seen at Milford, Del.; 19th, flying southwest at Hennepin, Ill., and 25th, north; on the 12th, flying north at Louisville and Riley, Ill., and 26th, flying north at Peoria, Ill.; 27th, flying northwest at Mount Sterling, Ill.; 25th, flying north at Somonauk, Ill.; during the month, remained at Leesburg, Ind.; 9th, flying north at Afton, Iowa; 10th, flying north at Independence, Iowa; 10th and 29th, flying south at Council Bluffs, Iowa; 10th, flying north at Monticello, Iowa; 9th, flying north at Webster City, Iowa; 9th flying north at Holton, Kans.; 16th, flying north at Baxter Springs, Kans.; during the month, abundant at Corning, Mo. *Sand-hill cranes:* 24th, flying north at Wellborn, Fla. *Larks:* 29th, flying north at Wellborn, Fla.; 27th, appeared at Hennepin, Ill.; 27th, seen at Fort Madison, Iowa; 11th, at Holton, Kans.; 10th, seen at Genoa, Nebr.;

13th, seen at Jacksonsburg. *Swallows:* 19th, at Peoria, Ill.; 8th, 10th, and 11th, seen at Chambersburg, Penn. *Buzzards:* 26th, seen at Jacksonsburg, Ohio. *Crows:* 24th, flying north at College Hill, Ohio. *Brants:* flying northwest at Richmond, Nebr. *Chewink:* 6th, seen at Kensico, N. Y. *Red-birds:* 3d, seen at Westerville, Ohio. *Prairie-chickens:* on the 26th, seen at Somonauk, Ill. *Blackbirds:* on the 19th, seen at Vevay, Ind.; 10th, seen at Monticello, Iowa; 20th, seen at Alto Vista, Va.; 25th, at Colorado Springs, Colo.; 22d, 28th, and 29th, flying southwest, and the 26th, flying north at Morgantown, W. Va. *Wild pigeons:* 10th, seen at Monticello, Iowa; 29th, flying northeast at Jacksonsburg, Ohio; 12th, flying north at Breckenridge, Minn. *Killdeer:* 12th, seen at Fort Madison, Iowa; 10th, at Baxter Springs, Kans. *Wild swans:* 20th, flying north at Vail, Iowa. *Mocking-birds:* 12th, begin to sing at Montgomery, Ala. *Grass-hoppers:* 19th, hatched out at Golden, Colo. 10th, on wheat at Belmont Farm, Tex. *Butterflies and wasps:* on the 26th, at Fort Lyon, Colo. *Butterflies:* 25th, at Corning, Mo. *Bees:* on the 10th, at Havana, Ill.; 9th seen at Afton, Iowa; 8th, Le Roy, Kans.; 10th, at Accotink, Va. *Snakes:* 25th, seen at Hudson, Mich. *Frogs:* 25th, heard at Corning, Mo.; 10th and 11th, heard at Bethel, Ohio; 9th to 29th, at Goshen Bridge, Va.; 9th, 12th, and 14th, at Salem, W. Va.

(4) *Prairie fires* occurred near Fort Lyon, Colo., on the 2d, 12th, 14th to 19th, and 24th; Fort Randall, Dak., 5th and 22d; Council Bluffs, Iowa, 3d to 6th; Monticello, Iowa, 26th; Burlingame, Kans., 17th, 20th, and 27th; Emerson, Nebr., 18th and 19th; De Soto, Nebr., 6th, 24th, and 25th; Genoa, Nebr., 19th and 21st; Dodge City, Kans., 1st, 12th, 15th, and 25th; Corsicana, Tex., 14th. *Forest fires:* near Wappinger's Falls, N. Y., 20th and 21st; Colorado Springs, Colo., 9th; Saint Mark's, Fla., 18th, 19th, and 20th.

(5) *Meteors* were observed on the 1st at Fort Lyon, Colo.; 4th, Ephrata, Penn.; 7th, Davenport, Iowa; 12th, Belmont Farm, Tex., Milwaukee, Wis., and Waterburg, N. Y.; 14th, 16th and 24th, Dodge City, Kans.; 18th, Fall River, Mass., and Newport, R. I.; 19th, Carbondale, Ill.; 19th and 20th, Smithville, N. C.; 22d, Vevay, Ind.; 23d, Ringgold, Ohio; 25th; Vail, Iowa, and Auburn, N. H.

(6) *Zodiacal light* was observed at Abingdon, Ill., on the 16th, 19th, and 26th; Ellinwood, Kans., 14th and 21st; Somerset, Mass., 23d, 24th, 25th, and 26th; Florida, Mass., 12th and 13th; Auburn, N. H., 25th; Hightstown, N. J., 25th; Waterburg, N. Y., 11th and 19th; College Hill, Ohio, 17th, 18th, 19th, 21st, and 24th; Urbana, Ohio, 5th, 17th, 22d, 23d, and 24th; Carthagena, Ohio, 11th, 17th, 18th, 19th, and 21st.

(7) *Earthquakes.*—The only earthquake reported occurred in the city of Mexico on the 7th.

Published by order of the Secretary of War.

ALBERT J. MYER,
Brigadier-General, (brevet assigned,) Chief Signal-Officer, U. S. A.

MONTHLY WEATHER REVIEW, MARCH, 1876.

INTRODUCTION.

In compiling the present review, the following data have been made use of, viz: The charts, constructed from the simultaneous observations taken at one hundred and four Signal-Service, United States Army, stations and fourteen Canadian stations, at 7.35 a.m., 4.35 p. m., and 11 p. m., Washington mean local time, and telegraphed to this office immediately afterward; monthly meteorological records of observations, taken at four hundred and forty-nine stations, including those from the voluntary observers, United States naval hospitals, United States Army posts, Canadian stations, and Signal-Service stations; reliable newspaper extracts; special reports from various sections of the country; and marine records.

The most noticeable features fo 1the month are: The large number of extensive and destructive storms; the excess of precipitation in all the districts but two; the low average temperatures except at the Pacific coast stations; the rising of the Mississippi river above the "danger line" from Cairo to some distance below Vicksburg; and the destructive floods in New England and portions of Illinois at the close of the month.

BAROMETRIC PRESSURE.

In general.—Upon Chart No. II is represented the general distribution of the atmospheric pressure by the isobaric curves in black. Compared with March, 1874, the pressure for March, 1876, has averaged considerably higher in New York, New England, the Eastern British Provinces, and from Lake Superior to Dakota; slightly higher in the Southwest and along the Middle Atlantic coast; somewhat lower from Southern Michigan, Ohio, and West Virginia, westward to Nebraska, Kansas, and Northern Arkansas, and about the same in the South Atlantic and Eastern Gulf States. The same, compared with March, 1875, is greater from .04 to .10 of an inch from Upper Michigan to

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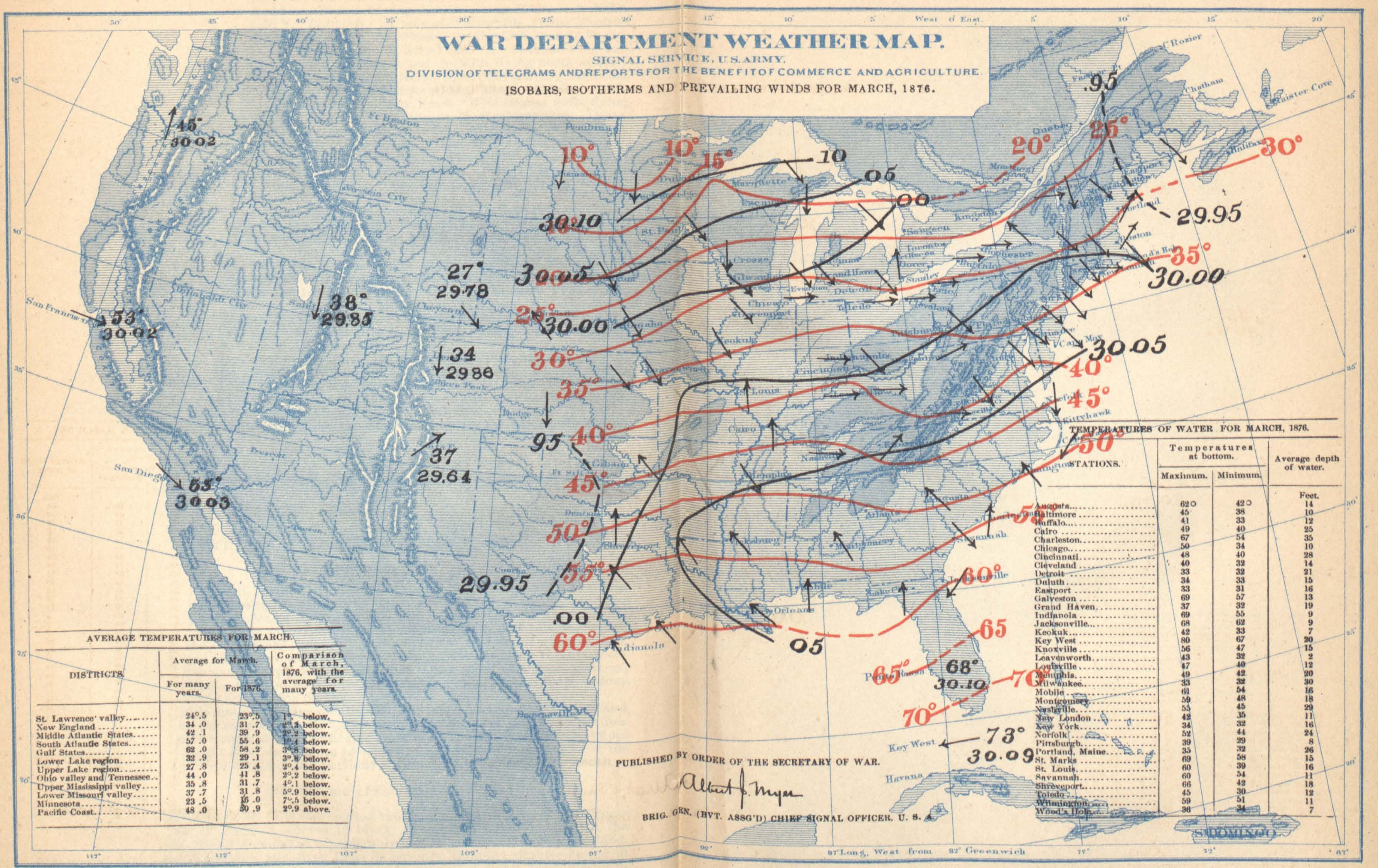
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR MARCH, 1876.



AVERAGE TEMPERATURES FOR MARCH.

DISTRICTS.	Average for March.		Comparison of March, 1876, with the average for many years.
	For many years.	For 1876.	
St. Lawrence valley	24°.5	23°.5	1°. below.
New England	34 .0	31 .7	2°.3 below.
Middle Atlantic States	42 .1	39 .9	2°.2 below.
South Atlantic States	57 .0	55 .6	1°.4 below.
Gulf States	62 .0	58 .2	3°.8 below.
Lower Lake region	32 .9	29 .1	3°.8 below.
Upper Lake region	27 .8	25 .4	2°.4 below.
Ohio valley and Tennessee	44 .0	41 .8	2°.2 below.
Upper Mississippi valley	35 .8	31 .7	4°.1 below.
Lower Missouri valley	37 .7	31 .8	5°.9 below.
Minnesota	23 .5	16 .0	7°.5 below.
Pacific Coast	48 .0	50 .9	2°.9 above.

TEMPERATURES OF WATER FOR MARCH, 1876.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
Augusta	62○	42○	14
Baltimore	45	38	10
Buffalo	41	33	12
Cairo	49	40	25
Charleston	67	54	35
Chicago	50	34	10
Cincinnati	48	40	28
Cleveland	40	32	14
Detroit	33	32	21
Duluth	34	33	15
Eastport	33	31	16
Galveston	69	57	13
Grand Haven	37	32	19
Indianola	69	55	9
Jacksonville	68	62	9
Keokuk	42	33	7
Key West	80	67	20
Knoxville	56	47	15
Leavenworth	43	32	2
Louisville	47	40	12
Memphis	49	42	20
Milwaukee	33	32	30
Mobile	61	54	16
Montgomery	59	48	18
Nashville	55	45	29
New London	42	35	11
New York	34	32	16
Norfolk	52	44	24
Pittsburgh	39	29	8
Portland, Maine	35	32	26
St. Marks	69	58	15
St. Louis	60	39	16
Savannah	60	54	11
Shreveport	66	42	18
Toledo	45	30	12
Wilmington	59	51	11
Wood's Hole	36	34	7

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN. (BVT. ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.

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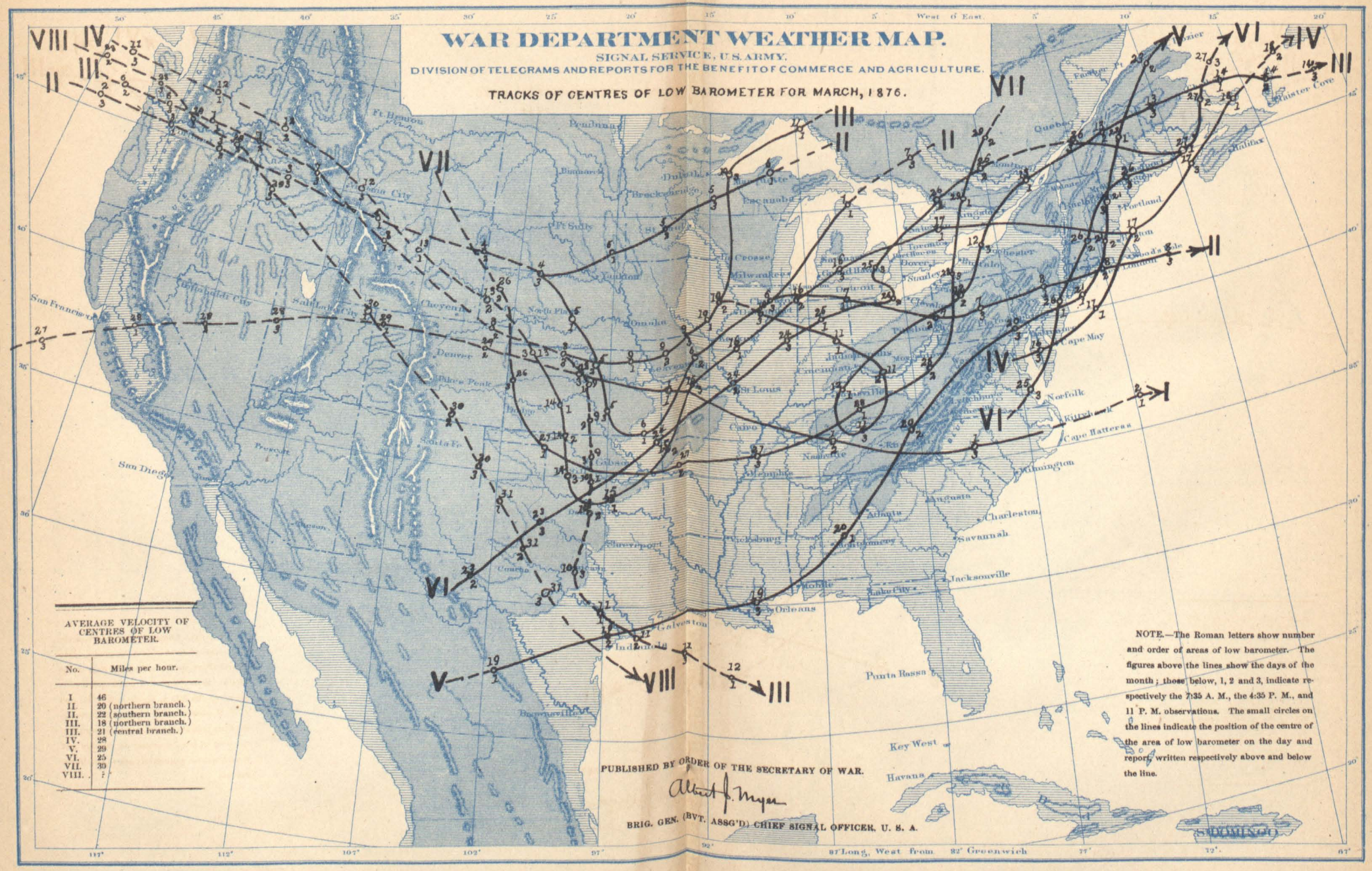
WAR DEPARTMENT WEATHER MAP.
SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.
TRACKS OF CENTRES OF LOW BAROMETER FOR MARCH, 1876.
AVERAGE VELOCITY OF CENTRES OF LOW BAROMETER.
No. | Miles per hour.
I 46
II. 20 (northern branch.)
II. 22 (southern branch.)
III. 18 (northern branch.)
III. 21 (central branch.)
IV. 28
V. 29
VI. 25
VII. 30
VIII. ?
NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
Albert J. Myer
BRIG. GEN. (BVT. ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.
Ft. Benton
Pembina
Bismarck
Duluth
Breckenridge
Escanaba
Ft. Sully
La Crosse
Milwaukee
Yankton
Omaha
Cheyenne
Denver
Pike's Peak
Santa Fe
Prescott
San Diego
San Francisco
Salt Lake City
Bottineldi City
Gibson
Shreveport
Vicksburg
Memphis
Nashville
Cairo
St. Louis
Cincinnati
Indianapolis
Detroit
Toronto
Dover
Stanley
Buffalo
Rochester
Quebec
Montreal
Halifax
Portland
Boston
Cape May
Norfolk
Kittyhawk
Cape Hatteras
Wilmington
Charleston
Savannah
Augusta
Atlanta
Montgomery
Mobile
Lake City
Jacksonville
New Orleans
Galveston
Indianola
Brownsville
Punta Rassa
Key West
Havana
S. DOMINGO
West 0° East
87° Long. West from 82° Greenwich

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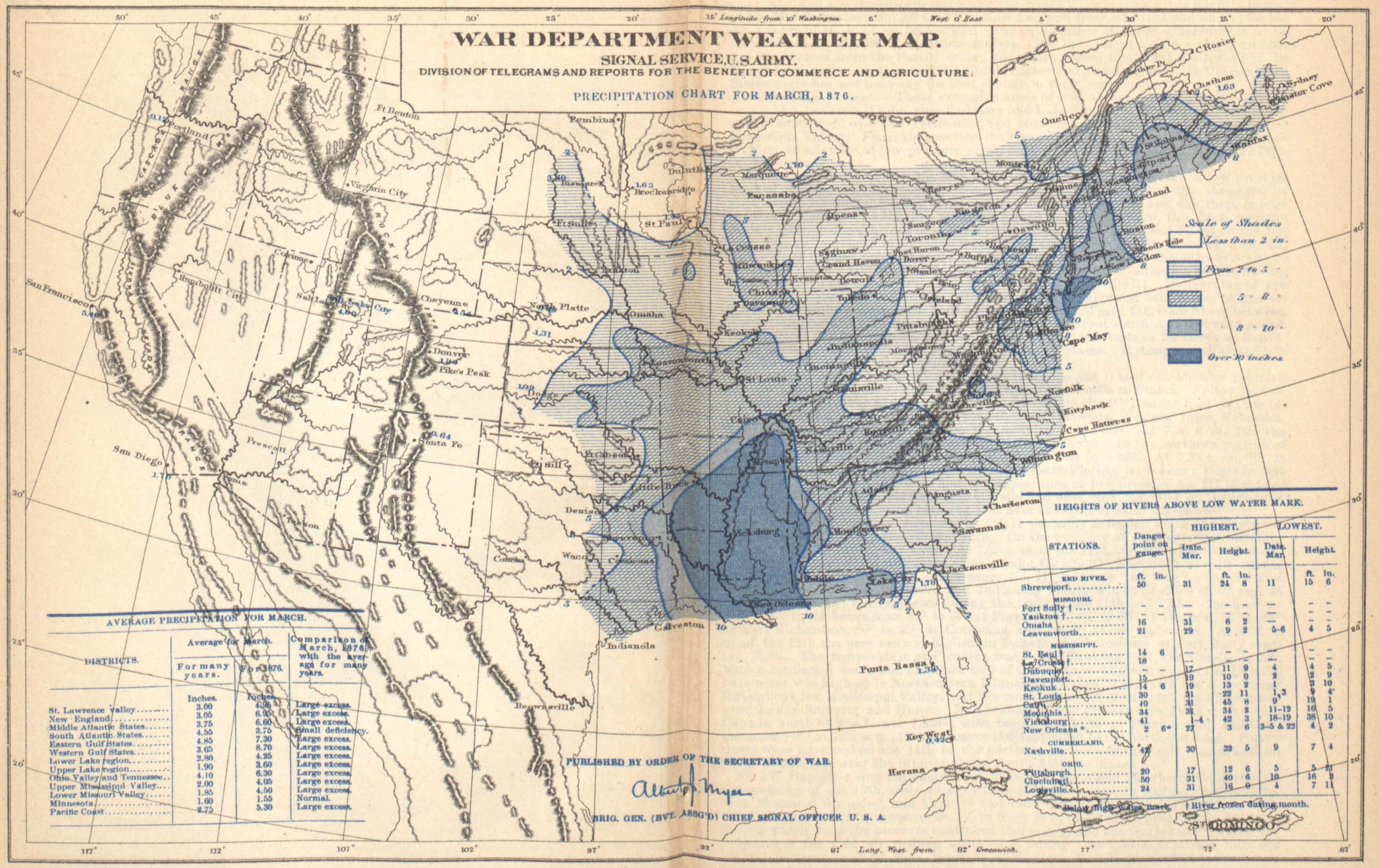
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR MARCH, 1876.



AVERAGE PRECIPITATION FOR MARCH.

DISTRICTS.	Average for March. For many years.	For 1876.	Comparison of March, 1876, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	3.00	4.95	Large excess.
New England	3.05	6.95	Large excess.
Middle Atlantic States	3.75	6.60	Large excess.
South Atlantic States	4.55	3.75	Small deficiency.
Eastern Gulf States	4.85	7.30	Large excess.
Western Gulf States	3.65	8.70	Large excess.
Lower Lake region	2.80	4.25	Large excess.
Upper Lake region	1.90	3.60	Large excess.
Ohio Valley and Tennessee	4.10	6.30	Large excess.
Upper Mississippi Valley	2.00	4.05	Large excess.
Lower Missouri Valley	1.85	4.50	Large excess.
Minnesota	1.60	1.55	Normal.
Pacific Coast	2.75	5.30	Large excess.

HEIGHTS OF RIVERS ABOVE LOW WATER MARK.

STATIONS.	Danger point on gauge.		HIGHEST. Date. Mar.	HIGHEST. Height.		LOWEST. Date. Mar.	LOWEST. Height.	
	ft.	in.		ft.	in.		ft.	in.
RED RIVER.								
Shreveport	50		31	24	8	11	15	6
MISSOURI.								
Fort Sully †	–	–	—	–	–	—	–	–
Yankton †	–	–	—	–	–	—	–	–
Omaha	16		31	6	2	—	–	–
Leavenworth	21		29	9	2	5-6	4	5
MISSISSIPPI.								
St. Paul †	14	6	—	–	–	—	–	–
La Crosse †	18		—	–	–	—	–	–
Dubuque	–	–	17	11	9	4	4	5
Davenport	15		19	10	0	2	2	9
Keokuk	14	6	19	13	2	1	3	10
St. Louis	30		31	22	11	1, 3	9	4
Cairo	40		31	45	8	9	19	1
Memphis	34		31	34	2	11-12	16	5
Vicksburg	41		1-4	42	3	18-19	38	10
New Orleans *	2	6*	27	3	6	3-5 & 22	4	2
CUMBERLAND.								
Nashville	42		30	32	5	9	7	4
OHIO.								
Pittsburgh	20		17	12	6	5	5	11
Cincinnati	50		31	40	6	10	16	3
Louisville	24		31	16	9	4	7	11

* Below high water mark. † River frozen during month.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN. (BVT. ASS'G'D) CHIEF SIGNAL OFFICER U. S. A.

Dakota, and nearly without any change thence southward over the interior of the Southern States and the Southwest, but along the South Atlantic coast it is slightly lower; in the Middle States from .03 to .09, in New England from .09 to .13, and on the Pacific coast from .07 to .16 of an inch lower. The explanation of these differences is to be found in the movement of the storm-centers. For the present month a larger number has been traced from the Pacific coast; they have passed somewhat southward of the Upper Lake region, and crossed the Middle States and New England. In the Southern States there has not been any decided change in their movements.

Areas of high pressure.—These extensive areas of cold air are generally first observed somewhere between Washington Territory and Lake Superior. Thence they gradually extend southward over the Territories, and eastward until they reach Texas and the Mississippi Valley. From that section their general direction is northeastward, disappearing, in advance of low-pressure areas, beyond New England and the Eastern British Provinces.

No. 1. High pressure area No. VII, of February, under the influence of low pressure No. I of this month, disappeared, except in Minnesota and Dakota; the barometer at Fort Garry, Manitoba, reading 30.72 on the morning of the 1st, and the thermometer —21° at Pembina. As the low pressure passed to the eastward, this high pressure rapidly extended southward over the Territories to New Mexico and Texas on the 1st, with a light "norther" in the southwest during the night. On the morning of the 2d, the ridge of highest pressure could be traced from Minnesota south-southwestward to Northern Texas. During the 2d and 3d it was felt in the Atlantic States, having been central in the Lower Ohio Valley on the morning of the 3d. By morning of the 4th it had reached North Carolina, Virginia, and Pennsylvania; 5th, it was central on the North Carolina coast, with high east winds at Key West; 6th, somewhere between North Carolina and the Bermudas. During its movement south and eastward across the country, the temperature fell sufficiently to produce frosts as far south as the interior of the Gulf States and in the South Atlantic States. It disappeared on the 6th and 7th in advance of low pressure No. II.

No. 2. Although not as decided as the previous one, yet it is of considerable interest, in that it produced heavy frosts in the interior of the Southern States. Following low pressure No. II, it was felt in Oregon and California on the 4th; as far East as Dakota, Wyoming, and Utah by morning of the 5th; in Minnesota, Western Iowa, Nebraska, Kansas, and Northwestern Texas on the morning of the 6th. At 7.35 a. m., 7th, the ridge extended from the Red River of the North to Texas. In the northern portion of last the temperature fell to freezing, and at Pembina to —20°. At 7.35 a. m., 8th, it was found reaching from Lake Superior to Northern Florida, with heavy frosts in last section, as well as on the 9th. Upon the appearance of low pressure No. III it gradually shifted to the northeastward into Canada and over New England on the 9th and 10th, and disappeared on the 11th and 12th over the Gulf of Saint Lawrence.

No. III. Succeeding low pressure No. III, it probably extended south and eastward over Montana Territory the 9th and 10th. On the morning of the latter the temperature fell to —13° at Virginia City. At 7.35 a. m. of the 11th, the cold air flowing southward had reduced the temperature at Salt Lake City to 23°, Fort Sully to —10°, Santa Fé to 5°. In connection with low pressure No. III, a severe "norther" was produced in the Southwest. At Galveston and Indianola hourly wind-velocities of 42 and 48 miles, respectively, were reported during the night of the 11th and 12th. The temperature fell in 24 hours from 82° to 30° at Fort Gibson, 82° to 36° at Denison, 86° to 44° at Fort Richardson, 80° to 38° at Corsicana, and 70° to 43° at Indianola. At 7.35 a. m. of the 12th the pressure was highest in Dakota, the barometer at Fort Sully reading 30.66. The temperature at Pembina was —14°, Yankton —4°, and Corsicana 30°, with a continued south and eastward flow of the cold air. By morning of the 13th the barometer was highest in Northeastern Minnesota, (above 30.50,) with the ridge lying throughout the Mississippi Valley. At the morning report of the 14th the highest was over Lakes Superior and Huron. In advance of low pressure No. IV it moved into Canada north of the Lower Lakes, with barometer 30.66 at Parry Sound, and thermometer —8° at 7.35 a. m., 15th. Thence it disappeared to the northeastward. Heavy frosts were produced on the 14th in the northern portions of the Gulf States, and on the 14th and 15th over the interior of the South Atlantic States.

No. IV. Rapidly-rising barometer took place in Oregon and Northern California on the morning of the 13th, and quickly extended eastward, with falling temperature, over Montana, Wyoming, and Utah to Colorado during the 13th. The slowly eastward movement of low pressure No. IV, in front of it, checked its progress on the 14th, during which time the pressure continued increasing, and the temperature, under the influence of the cold air rushing southward, falling. At 7.35 a. m. of the 15th the highest pressure reached from Montana to Western New Mexico, with temperature readings at Cheyenne of 1°, Pike's Peak 0°, Santa Fé 25°, and Dodge City 15°. On the following morning the pressure had diminished somewhat north of Kansas, but increased thence southward, especially in Texas. At Corsicana the temperature fell from 65° to 33° in sixteen hours. By 7.35 a. m. of the 17th the pressure had rapidly in-

creased in the Territories and eastward beyond the Mississippi, with cold northerly winds increasing to gales, the barometer reading 30.52 at Fort Sully. On the morning of the 18th the barometer at Breckenridge read 30.64, the temperature —27°, and a light "norther" prevailed in Texas. The ridge of highest pressure extended from Minnesota to Indian Territory, which by 4.35 p. m. covered the Mississippi Valley. The following morning the highest pressure was central in Michigan, with temperatures near and below zero, reaching thence to the South Atlantic States, while frosts, killing early vegetables and fruits, were reported as far south as the northern half of Florida. On the 19th and 20th, in advance of low pressure No. VI, it moved over the Lower Lakes, Middle States, New England, Nova Scotia, and New Brunswick, disappearing on the 21st.

No. V. On the 18th the pressure was high at Portland, Oreg., and increased, with cold northerly winds, at the stations in the Northern Territories. These conditions extended south and eastward on the 19th, so that on the next morning this area reached from Dakota to Texas, with the temperature of —24° at Breckenridge, —3° at Omaha, 27° at Corsicana, and 37° at Indianola. A very severe "norther" was produced in the Southwest, with killing frosts. At Indianola and Galveston the northerly winds reached 64 and 56 miles, respectively, per hour, which diminished at night. The area of highest pressure reached from Minnesota to Texas at 7.35 a. m. of the 21st, and destructive frosts were reported from the Gulf States. The temperature fell to freezing nearly as far south as 30° N. latitude. On the morning of the 22d the highest (30.45) was central in Tennessee, and freezing temperature reached below 30° N. latitude in Florida. In the northern half of that State, orange-trees and all early vegetables were destroyed; also all early crops in the South Atlantic States. At 7.35 a. m. of the 23d it was central over the Carolinas; 24th, over the Middle States; 25th, over Maine, Nova Scotia, and New Brunswick, and disappeared to the northeastward on the 26th.

No. VI. As low pressure No. VI passed northeastward from the Mississippi Valley on the 24th, the barometer rose, with cold northerly winds. At 4.35 p. m. of the 26th, the ridge of highest pressure (about 30.00) ran from Minnesota southward throughout the Mississippi Valley. It rapidly disappeared in advance of low pressure No. VII on the 26th and 27th, except in Minnesota and Dakota, where high pressure

No. VII apparently developed itself and extended southward over the Missouri Valley and the Territories westward on the 27th, and reached the Texas coast as a light "norther" during the night. At 7.35 a. m. of the 29th the areas of highest barometer were over Southeastern Texas and to the north of Dakota. On the morning of the 30th they were central in Florida and the Northwest, the former slowly moving eastward during the 30th and 31st, the latter increasing and covering the Northwest and Upper Lake region at 11 p. m. of the 31st, with barometric readings of 30.50 in Northern Minnesota.

Areas of low pressure.—A comparison of the charts for the same month for 1874, 1875, and 1876 discloses the following facts, viz: The number of low-pressure areas, traced upon accompanying Chart No. I, has been smaller than usual during the present month; the paths of lowest barometric depression, after they could be definitely located, have been more nearly across the central portions of the United States, and somewhat farther to the southward than heretofore; they have frequently developed into two or three separate areas within the large and general depression; the majority can be traced to the Pacific coast. Broken lines indicate that the paths cannot be accurately drawn on account of the limited number of stations. Their average movement in miles per hour will be found in a table upon Chart No. 1. It has frequently been reported that, during heavy sleet and snow storms, the anemometers have been coated with ice to such an extent as to very seriously interfere with their working, at times even causing the cups to come to a stand-still. In such cases it is impossible to obtain the true velocity, in miles per hour, with which the wind was traveling at many stations, and the figures given below are much below what they should be for stations in the Lake region and the Northwestern States.

No. I. This storm passed from the Pacific coast across the Territories during the last days of February, and is spoken of as No. XI in the review for that month. From the Lower Missouri Valley to the North Carolina coast, the center of lowest depression (a small area of 29.80) moved at the rate of 46 miles per hour. On the 1st, light rains occasionally fell in the Southern States, accompanying thunder-storms, with southerly gales along the coast of North Carolina; thence northward to Southern Minnesota, the Lakes, Middle States, and Southern New England. The rain turned into snow, which at many places was heavy, with brisk to high northerly or easterly winds as far eastward as Lake Erie. The maximum velocity (30 miles) was reported from Port Huron, Michigan. During the 2d, the light rains in the South Atlantic States, and snow in the Middle and New England States, were succeeded by partly cloudy weather and rapidly-rising barometer. Northeast and north gales prevailed along the coast from Florida to Massachusetts, which were most severe from New Jersey to North Carolina. The following wind-velocities were reported, viz: Cape Hatteras, 36;

Kittyhawk, N. C., 48; Long Branch, 48; Sandy Hook, 34; and Thatcher's Island, Mass., 36 miles per hour. The weather between Nova Scotia and the Bermudas, on the 2d and 3d, undoubtedly was stormy, as the observations at the latter show that heavy rains fell, and high southwest, veering to northwest, winds prevailed there. In both sections the barometer fell below 29.70 inches, so that, as the storm advanced eastward, the lowest pressure continued diminishing. Cautionary signals were ordered for this storm on the afternoon of the 1st from Charleston to Norfolk, the following morning from Cape May to New York and at Eastport, and in the afternoon at Jacksonville, Savannah, and again at Charleston, all of which were justified except Eastport.

No. II. Upon the 2d, heavy rains, brisk to high southerly winds, and falling barometer indicated the approach of this disturbance on the coast of Oregon and Northern California. During the 3d the rains continued, and the central depression advanced to Idaho and Western Montana, while falling barometer and warmer southerly winds prevailed to the eastward beyond the Mississippi Valley. On the 4th, clear weather extended southward from Oregon to California; snow or rain fell from Montana southward to Arizona; cloudy and threatening weather were reported thence eastward to the Mississippi Valley, and the low pressure reached Nebraska. The 5th it became very interesting, as an extensive trough of low barometer (29.70) from near Lake Superior to Texas, with violent gales, rising to 50 miles per hour at Corsicana. Upon the chart it will be observed that it developed into two distinct areas. Rain or snow fell at the Rocky Mountain stations and in the Northwest. Cloudy and rainy weather reached the Western Gulf States and Lake region. Severe thunder-storms were reported as far north as La Crosse, Wis. During the 6th, rainy weather and severe local storms prevailed from the Upper Lakes to the Western Gulf, and to the eastward, warm southerly winds, with increasing cloudiness. On the 7th, the southern depression developed into two, with rainy weather and gales from the Eastern Gulf and South Atlantic States to the lakes. At Cape Hatteras the wind-velocity was 60 miles; at Sandy Hook, 46. The heavy sea drove steamers into the harbor at the mouth of Cape Fear River. High northwesterly winds were produced in its rear along the New Jersey coast. Cautionary signals were displayed in its advance at Milwaukee and Grand Haven, from Wilmington, N. C., to New York, and at Eastport, which were justified, except the last. Several Canadian stations were also notified.

No. III was preceded by brisk southerly winds and rainy weather on the 5th and 6th along the coast of Oregon and Northern California. At Portland, Oreg., the barometer was very low during the night of the 6th and 7th. Thence eastward the conditions accompanying it were similar to the last, until it reached the Lower Missouri Valley on the morning of the 9th. Here its eastward progress was very much delayed, apparently due to a barometric depression which succeeded it, probably crossed Southern California and the more southern Territories during the 9th and 10th, and joined the general depression. At 4.35 p. m. of the last date the two were quite distinct in Eastern Iowa and Indian Territory. Threatening or rainy weather and violent storms, frequently accompanied by thunder, were reported from the Southwest to the Upper Lakes, with heavy snow-storms northwest of same. Followed by rapidly-increasing pressure, the two then became still more distinct, and tornadoes were the result in Wisconsin and Missouri. The southern branch disappeared southeastward into the Gulf on the 11th, followed by the severe "norther" already mentioned. The northern branch gradually separated into two, one moving northward over Lake Superior into Canada, the other eastward. Its path is, indeed, an extraordinary one. Heavy rains and high winds, increasing to gales, prevailed on the 11th from the Western Gulf to the Lakes, with thunder-storms as far north as La Crosse and Indianapolis. During the 12th it reached the Middle States, with rain, turning into snow from the Ohio Valley to Lake Huron and the Lower Lakes, and the 13th, New England and New Brunswick. North to west gales succeeded it, viz: At Buffalo, 35; at Cape May, 36; at New York, 48; at Sandy Hook, 50; at Thatcher's Island, Mass., 40; and at Eastport, 36 miles per hour. Cautionary signals were ordered on the 8th at Milwaukee and Grand Haven; Canadian stations warned the 10th; signals displayed on the Texas and New Jersey coasts the 11th; from New York to North Carolina the 12th; and along the New England coast the 13th. All of these were fully verified.

No. IV crossed Washington Territory on the 11th and 12th, having been preceded and accompanied by rainy weather from thence to California. Snow-storms were reported on the 12th from Nevada to Montana, unusually heavy and terrific in the Sierra Nevada Mountains, and completely blockading railroads. They extended eastward over Colorada and Dakota during the 13th. A reference to the chart will show that it progressed southward in the next twenty-four hours, and very little to eastward, having been delayed by the high pressure in its advance. Cold northerly gales, with snow, were experienced on its northern and western sides, and warmer south to east winds with threatening and rainy weather on its eastern side. By 11 p. m. of the 15th, the central depression, probably less that 29.40, moved to Missouri, with unusually severe thunder-storms, thence southward to the Gulf. At Vicksburg a wind velocity of 55 miles was recorded. The rainy weather reached the South Atlantic States and Lake

Erie. Heavy snow and sleet fell from New Mexico northeastward to Dakota, Minnesota, and Wisconsin, with northerly gales. During the 16th the barometer fell below 28.90 in Michigan. The storm became very severe from the Lakes and the Northwest to the Eastern Gulf, South Atlantic, Middle Atlantic, and Southern New England coasts, with very heavy thunder-storms as far north as Indiana. In the Lake region, New York, and New England, the rain very generally turned into snow, which blockaded railroads in Northern Michigan and westward. A secondary depression was gradually formed, which, at midnight, became quite marked in Delaware and New Jersey. Some of the highest hourly wind-velocities are—Grand Haven, 38; Marquette, 36; Alpena, 44; Erie, 52; Saint Louis, 48; Pike's Peak, 72; Lexington, Ky., 52; Knoxville, 56; Smithville, N. C., 37; Cape Hatteras, 44; and New Jersey coast, 40 miles. The Signal-Service tri-daily charts apparently indicate that the northern branch passed northeastward into Canada, leaving a secondary depression in the Lower Lake region, which, on the 17th, united with the southern branch on the New England coast. Snow, with brisk and high but diminishing north to west winds, continued in the Lake region and Ohio Valley. Northwesterly gales, with clearing weather, were reported from the Carolinas to New York, and destructive easterly gales, with rain or snow, in New England, Nova Scotia, New Brunswick, and the Saint Lawrence Valley. At Port Huron the wind blew at the rate of 42; Escanaba, 52; Sandy Hook, 55; Thatcher's Island, 40; and Eastport, 57 miles per hour. Cautionary signals were displayed on the 14th at Milwaukee and Grand Haven; 15th, from Wilmington to New York; 16th, from New York to Eastport; and warnings were sent to Canadian stations, all of which were fully justified. Reports from the Bermudas indicate that this storm was felt there on the 17th and 18th, with a northwest gale on the 19th, of 42 miles per hour.

No. V.—There are indications of this storm having advanced southeastward, over Utah and New Mexico, to the valley of the Rio Grande. However, its path has only been traced from the 19th. During its northeastward course it increased in extent and force. Many vessels caught in it were wrecked, damaged, detained, or forced to seek shelter when possible. During the 19th heavy thunder-storms and gales prevailed in the Gulf States, and heavy snows thence northward to Kansas, Missouri, and Southern Indiana, with the following velocities: Dodge City, 40; Vicksburg, 36; New Orleans, 40; Mobile, 38 miles; Pike's Peak, terrific gale, and the severe "norther" mentioned above. On the 20th it became very extensive. In the South Atlantic and Gulf States heavy rains fell—remarkably heavy on the coast of the Carolinas—accompanying thunder-storms and severe gales. For several hundred miles off the coast of the first district vessels reported having experienced heavy gales and hurricanes. From Arkansas to the lakes and the Alleghanies, heavy snows fell, with high winds and occasional gales. In the Middle States and New England snow commenced falling, turning into heavy rain along the Middle Atlantic coast, with severe easterly gales and very heavy seas as far north as the coast of Massachusetts. At 11 p. m. an isobaric curve of 29.40 was traced from Southeastern Virginia to Central Pennsylvania, while the curve of 29.70 included nearly the whole of the South Atlantic States, Middle States, lower lakes, and Lake Huron. Maximum velocities of wind occurred at Saint Mark's, Fla., 35; Smithville, N. C., 60; Cape Hatteras, 72; Kittyhawk, 64; Cape Henry, 48; Norfolk, 42; Cape May, 40; Barnegat, 50; Long Branch, Sandy Hook, and New York, 60; and Erie, 36 miles. At Cairo, steamers were obliged to cease running on account of the heavy snow, which fell to the depth of 13 inches in about 24 hours. During the 21st it continued northeastward, carrying destruction with it. Hurricanes continued to be reported off the South Atlantic coast. Light snows continued in the Lower Lake region, and heavy snow or sleet in the Saint Lawrence Valley, New England, and Nova Scotia, partly turning into rain along the coast. Many vessels were wrecked and lives lost, and others sought shelter in different harbors. Some of the highest wind-velocities are given: New Haven, 44; New London, 54; Boston, 52; Thatcher's Island, 60; Portland, 60; and Eastport, 64 miles. This storm moved northeastward over New Brunswick, beyond the limit of the stations, on the 22d. Cautionary signals were ordered to be displayed in its advance on the 19th from Texas to North Carolina, and 20th from Virginia to Maine. Canadian stations, along Lake Ontario and in the Saint Lawrence Valley, were notified of its approach on the 20th. All of these were fully justified, except those for the Texas coast, which were ordered rather late.

No. VI.—The observations indicate that this storm was felt on the 21st and 22d at the stations in the Western Territories. During the 23d rainy weather extended beyond the Lower Mississippi Valley, with increasing southeasterly winds and rising temperature. By 11 p. m. 24th, a small area was inclosed by isobaric curve 29.20 in Illinois and Indiana. From thence to the Gulf and South Atlantic coasts rainy weather had prevailed, with the southeasterly winds increasing to gales along the latter; from the northwest to the Lake region, heavy snow and north to east gales, reaching 34 miles per hour at Grand Haven. On the 25th there were developed several depressions of 29.40 and 29.50 in the Lower Lake region and on the Middle Atlantic coast, within the isobaric curve 29.70, which included Lower Michigan, the Lower Lake region, Middle States, and portions of New England and North Carolina. In the Lake region severe and heavy

snow-storms, partly turning into sleet and rain, occurred, with east to north winds; in the Middle States and New England, heavy rains or snow, mostly the former, with easterly winds, veering to southerly and increasing to gales; in the South Atlantic and Eastern Gulf States, heavy rains, followed by clearing weather, with southeasterly gales, veering to westerly and diminishing in force. The wind-velocity reached 32 miles at Saint Mark's, Fla.; 52 at Cape Hatteras; 45 at Long Branch; 36 at New York; 44 at New London; 48 at Erie; and 34 at Escanaba. During the 26th the heavy weather continued along the New England coast, and extended to Nova Scotia, New Brunswick, and down the Saint Lawrence Valley, with wind-velocities at Thatcher's Island of 39 miles; Portland, 44; Eastport, 34, and Quebec, gale. As drawn upon the chart, the two depressions apparently combined on the 27th, and disappeared over the Gulf of Saint Lawrence the 28th. The northeasterly gales, from Nova Scotia to the Lower Saint Lawrence Valley, were very severe. For this storm signals were ordered to be displayed from Florida to Maine, at Milwaukee and Grand Haven, and warnings were sent to the Canadian stations from Lake Huron to the Saint Lawrence Valley. All were fully verified by the dangerous winds which followed.

No. VII.—By an examination of the tri-daily charts it is observed that this disturbance was felt in Oregon and Western Montana on the 25th, but passed north of the stations. Westerly gales were reported from Colorado to Montana the 26th and 27th, and easterly gales, with snow, from Dakota on the 27th. At 11 p. m. of the last date, the lowest pressure (29.40) was central southwest of Cairo. Snow fell during that day from Nebraska and Kansas to Northern Indiana, with high northeasterly winds, but thence southward to the Gulf severe thunder-storms were reported. During the southeasterly gales along the coast a number of vessels wrecked, and the maximum wind-velocity (36 miles) was registered at Mobile. At Dodge City, Kans., 48 to 60 miles was reached. As the central depression (lowest about 29.00, near Buffalo) moved to the Lower Lakes on the 28th, furious north to east snow-storms prevailed in the northwest, north, and northeast of it, and heavy rains, with severe easterly, veering to southerly and westerly, gales, to the east and south of it. The anemometer recorded 50 miles at Vicksburg, 32 at Saint Mark's, 52 at Smithville, 56 at Cape Hatteras, 46 at Philadelphia, 72 at New York, 42 at New London, 40 at Toledo, 46 at Port Huron, and 52 at Evanston, Ill. Vessels experienced very rough weather along the Middle and South Atlantic coasts. During the 29th and 30th the storm disappeared into Canada. In New England and the Lake region it continued very severe on the former of these dates, the easterly winds rising to 38 miles at Portland and 34 at Boston, and the westerly gales along the lakes varying from 30 to 34 miles per hour. In advance of this storm cautionary signals were hoisted on the 27th along the Texas coast, from North Carolina to New York, at Grand Haven and Milwaukee, and the 28th, along the New England coast, and Canadian stations notified from Lake Huron to Montreal. The display was justified at all of them.

No. VIII.—At Portland, Oreg., this storm was preceded by brisk southerly winds and rainy weather on the 28th, and accompanied by a heavy hail-storm on the 29th. Snow-storms prevailed during the 30th from Utah and Colorado northward, and rapidly falling barometer, with warm, southerly winds in the southwest. By 11 p. m. of the 31st, the central area of lowest pressure had advanced southeastward into Texas. On its eastern side the rain-area reached the Lower Mississippi Valley, and on its northwestern side severe snow-storms continued, with northerly winds, from New Mexico to Wyoming. Heavy thunder-storms were reported from the Southwest. At Dodge City, Kans., the anemometer registered from 49 to 55 miles per hour during the forenoon.

TEMPERATURE OF THE AIR.

The isothermal curves, in red, upon Chart No. II illustrate the general distribution of the temperature of the air for the month. A reference to the table in lower left-hand corner upon the same chart shows that it has averaged above that for many years at the Pacific coast stations, and 2°.5 above at Salt Lake City. In the remaining sections, the average has been below the normal from 1° to 7°.5, the difference being greatest for the Northwestern States. At Virginia City, Cheyenne, Denver, and Santa Fé, it has averaged from 0°.6 to 3°.7 below. Minimum and maximum temperatures, respectively, for the month, are given for the following stations, viz: Pembina, —27°, 35°; Breckenridge, —30°, 44°; Duluth, —10°, 43°; Bismarck, —22°, 42°; Cheyenne, —3°, 60°; Virginia City, —19°, 52; Salt Lake City, —18°, 65°; Pikes' Peak, —20°, 25°; Santa Fé, 5°, 60°; Leavenworth, 2°, 68°; Marquette, —6°, 53°; Alpena, —6°, 62°; Erie, 4°, 69°; Cincinnati, 16°, 73°; Oswego, 6°, 59°; Malone, N. Y., —4°, 65°; Mount Washington, —25°, 47°; Eastport, 0°, 45°; New York, 12°, 70°; Washington, 14°, 76°; Fort Gibson, 7°, 83°; Indianola, 37°, 80°; New Orleans, 39°, 79°; Savannah, 30°, 80°; and Key West, 59°, 86°.

Ranges of temperature.—In addition to the above, some of the greatest ranges are for Saint Louis, Manhattan, Kans., and Omaha, 68°; Pittsburgh, 72°; North Platte, 74°; and Dodge City, 80°. Some of the least ranges are for Portland, Oreg., 26°; San Fran-

cisco, 29°; San Diego and Thatcher's Island, Mass., 34°; Cape May, 36°; Newport, 39°; Galveston, 40°; Tybee Island, Ga., 44°; and Mobile, 45°.

Frosts and ice, destructive to fruits and early vegetables, besides those mentioned in connection with the movement of high-pressure areas: 12th, peaches killed at Wytheville, Va.; 13th and 28th, Humboldt, Tenn., fruit and early vegetables killed; 13th to 18th, Benettsville, Ky., peaches killed; 16th to 19th, Baxter Springs, Kans., peaches killed; 18th, Dodge City, Kans., all fruit killed; 18th to 23d, McMinnville, Tenn., peaches killed; 19th, Caperville, Va., all fruits killed; 20th, Melissa, Houston, and Austin, Tex., vegetation and fruits killed; 20th, 21st, and 22d, Humboldt, Tenn., and Monticello, Ark., fruits and vegetables injured; 21st and 29th, Gilmer, Tex., fruit injured; 24th, Norfolk, Va., pears damaged; 25th, Ringgold, Ohio, fruit, &c., killed; 26th, Keokuk, Iowa, peaches injured; 31st, Alta Vista, Va., and Louisville, Ill., peaches killed; during the month, much damage at Clarkesville, Tex.; peaches killed, and pears partly, Attaway, N. C.; and fruit killed at Asheville, N. C.

PRECIPITATION.

Upon Chart No. III is represented the distribution of rain-fall and melted snow for the present month. The amount of snow caught in the gauges was frequently less than the actual fall in the northern sections, owing to loss during the prevalence of high winds and gales. Except the slight deficiency in the South Atlantic States and the average fall in Minnesota, the precipitation has largely exceeded the normal.

Snow-fall.—Reports of snow-fall vary from 18 to 35.5 inches in Maine, 17 to 39 in Vermont and New Hampshire, 3.5 to 14 in Massachusetts, Connecticut, New Jersey, Virginia, Alabama, Arkansas, and Tennessee; 9 to 31.5 in Kentucky, Ohio, Indiana, Illinois, and Iowa; 12.5 to 44 in Michigan and Wisconsin, 10 to 21 in Minnesota and Dakota, 7.5 to 38 in Kansas, Nebraska, Colorado, and Utah.

Rainy days.—The number of days during which rain or snow fell averages as follows: Middle Atlantic States and New England, 14; South Atlantic and Gulf States, 10; Ohio Valley and Tennessee, 15; Lower Lake region, 21; Upper Lake region, 15; Upper Mississippi and Lower Missouri Valleys, 13; Rocky Mountain stations, 14. At Portland, Oreg., 26 rainy days were recorded; San Francisco, 10, and San Diego, 4.

Cloudy days.—The number for New England varies from 6 to 17; Middle States, 5 to 17; South Atlantic States, 3 to 10; Gulf States, 3 to 16; Tennessee and Ohio Valley, 4 to 17; Lake region, 6 to 21; west of the Upper Mississippi Valley, 7 to 16; Territories, 9 to 17.

Hail.—The following have been reported in addition to those mentioned before: on 1st, Creswell, Kan.; 5th, Genoa, Nebr.; 10th, Cresco, Iowa; 15th, Houston, Tex.; 16th, Hudson, Cleveland, and near Cincinnati, Ohio; 17th, Sebec, Me.; 20th and 28th, New Germantown, N. J.; 25th, Astoria, Oreg., and Milford, Del.; 28th, Danville, Ky.

Droughts.—In the southern part of New Mexico, a scarcity of water is reported on the 3d.

Floods.—On the 6th, 7th, and 8th, in the vicinity of La Crosse, Wis.; 9th, at Contoocookville, N. H., mills stopped; 19th, lower part of Galveston flooded by water being driven in from the Gulf during the southeast gale; 25th and 26th, rivers in New England high and overflowing at many points; 28th, Illinois and Sangamon Rivers, Ill., out of their banks; 29th, Billerica, Mass., Concord River higher than for forty years past; 30th and 31st, Cairo, floods and break in levee.

RELATIVE HUMIDITY.

The average relative humidity for the month ranges on the New Jersey and New England coasts from 70 to 78 per cent.; Middle Atlantic States, 56 to 68; South Atlantic States, 58 to 60; Tennessee and the Gulf States, 59 to 72; Ohio and the Upper Mississippi Valleys, 64 to 74; Lake region, 69 to 82; Lower Missouri Valley, 69 to 80; Valley of the Red River of the North, 79 to 87; Pacific coast, 67 to 79. *Dry stations.*—Santa Fé and Colorado Springs, 45 per cent.; Denver, 53; Lynchburg, 56; Bismarck, 57. *Moist stations.*—Mount Washington, 88; Pembina, 87; Milwaukee and Albany, 82; Cleveland, Erie, and Evanston, 81; Omaha, 80.

WINDS.

Prevailing winds.—By an examination of Chart II, it will be seen from which direction the winds have blown most frequently. The arrows fly with the wind. Generally, they point from the high toward, inclining somewhat to the right of, the low pressure.

Total movements.—The largest total movements of the air, excluding directions, have been recorded at the following stations: Pike's Peak, (30 days only,) 19,781 miles; Sandy Hook, 15,815; Long Branch, 14,376; Thatcher's Island, 13,600; Barnegat, 12,865; Dodge City, 11,571. The smallest total movements reported are: Portland, Oreg., 3,162 miles; Virginia City, 3,590; Lynchburgh, 3,920; Burlington, Vt., 4,643; Nashville, 4,710; Augusta, Ga., 4,920.

Maximum velocities, in addition to those given above, have been recorded at Gaines-

ville, Ga., 70 miles per hour on the 19th; Freehold, N. J., over 60, Stapleton, N. Y., estimated at 70, and Flushing, N. Y., N. E., 60, 28th; Mount Washington, N. W., 96, 6th, S. E. 76, 21st, and N. W. 100, 22d.

Tornadoes are reported to have occurred at Hazel Green, Grant Co., Wis., and Hassard, Ralls Co., Mo., on the 10th; near Larned, Kans., 5th; South Hartford, Washington Co., N. Y., 21st.

VERIFICATIONS.

Probabilities, as worked up three times each day and issued to the public, of the weather for the ensuing twenty-four hours, have been carefully compared with the actual conditions following. The percentage of verifications has averaged 93.7 for New England; 95.4 for the Middle States; 91.7 for the South Atlantic States; 94 for the Eastern Gulf States; 83.7 for the Western Gulf States; 91.8 for Tennessee and the Ohio Valley; 90 for the Lower Lake region; 91.3 for the Upper Lake region; 89.4 for the Upper Mississippi Valley; 85.5 for the Lower Missouri Valley. The average percentage of verifications for the month is 90.6.

Cautionary signals.—Out of 167 displayed at stations along the Gulf and Atlantic coast, Milwaukee and Grand Haven, the only stations along the lakes warned during the month, 159 were justified, and 8 not justified, by succeeding wind-velocities of 25 miles per hour. It may be stated here that, during cold weather, especially while snow is falling and the wind blowing on the coast, navigation becomes dangerous with even less than 25 miles of hourly velocities. A few cases have been reported in which the signals have been ordered late; and 40 from scattered stations, with hourly velocities ranging from 25 to 54 miles, where signals were not ordered to be displayed.

NAVIGATION.

Muscatine, Iowa, first boat of season arrived 7th; Achusnet River, at Fairfield, Mass., was clear of ice 7th, frozen over 20th, clear 23d; Plattsmouth, Nebr., heavy ice in Missouri River 28th; ice on the Hudson River remained firm at Newburgh, 2d, moved out the 4th, river open to Poughkeepsie and navigation resumed the 6th; navigation not suspended on Seneca Lake, N. Y., during the winter; Buffalo, N. Y., ice in lake six inches thick 1st, ice went out of river 8th; Middletown, Conn., river free of ice 9th, New York steamer arrived the 17th; Mississippi opened at Dubuque, Iowa, 13th; river clear at Davenport 4th and 24th, first boat arrived 7th; ice went out of harbor at Cleveland, Ohio, 6th; Rochester, N. Y., ice went out of river 7th; Omaha, Nebr., ice went out of river below bridge 31st; Grand Haven, Mich., navigation resumed 11th; forty miles south of Sable Island, Nova Scotia, navigation obstructed by ice-fields.

Ice.—At Green Spring, Ala., ice formed half inch thick mornings of 21st and 22d; Gainesville, Ga., ice three-sixteenths inch thick on fruit-trees, &c., 19th; Point Pleasant, La., ice half inch thick 21st; Brookhaven, Miss., ice formed 21st and 22d; Spartanburg, S. C., ice formed 29th and 30th; Terrell, Texas, ground frozen half inch 29th; Belmont Farm, Tex., ice sufficiently thick to bear a man's weight 21st; Corsicana, Tex., ice formed 21st; North Palermo, N. Y., mill-pond ice fifteen inches thick the 6th; Malone, N. Y., pond-ice twenty inches thick 7th.

Height of rivers.—Upon Chart No. III is printed a table giving the highest and lowest marks and the dates upon which they occurred. The Red River fell quite steadily from the 1st to the 11th, and rose almost continuously after that date. The Missouri, at Leavenworth, fell slowly until the 5th, after which it rose and fell through intervals of three or four days. The Mississippi, at Vicksburg, on the 31st, was within three inches of the highest given for the 1st and 4th; at Cairo, the "danger-point" was reached on the 22d, and continued above afterward; at Memphis, "danger-point" reached on 30th; at Vicksburg, above "danger-point" from 1st to 13th, below from 14th to 26th, and above from 27th to close of month. At Nashville, the Cumberland fell 2 feet 2 inches from 1st to 9th, rose 20 feet 2 inches by 21st, fell 8 feet 8 inches by 24th, reached highest 30th, and fell 3 feet next day. The Lower Ohio rose quite steadily after the dates of the lowest water-marks.

WATER TEMPERATURES.

The maximum and minimum temperatures only are given in the table on Chart No. II, for stations along the lakes, rivers, and coasts. The least range, 1°, was recorded at Duluth, Detroit, and Milwaukee; the greatest range, 24°, at Shreveport.

ATMOSPHERIC ELECTRICITY.

Auroras.—Those of the 24th, 25th, and 26th were very extensively observed. Displays were reported as seen on the 1st at Albany, N. Y., Davenport, Iowa; 12th, Monticello, Iowa, Rocky Run, Wis.; 13th, Florida, Mass., Stapleton, N. Y.; 14th, Frankford, Mo.; 24th, Portland, Me., Waltham, Mass., North Argyle and Malone, N. Y., Woodstock, Vt., Mount Washington, N. H.; 25th, Afton, Cresco, Noro Springs, and Monticello, Iowa, Duluth and Minneapolis, Minn., Rocky Run, Utica, LeRoy and La Crosse, Wis.; 26th, Acton, Me., Lyndon, Evanston, and Somonauk, Ill., Duluth, Minn., Afton,

Cresco, and Monticello, Iowa, Grand Haven and Adrian, Mich., Frankfort, Mo., Utica, Rocky Run, Embarrass, Milwaukee, La Crosse, and LeRoy, Wis., Virginia City, Nev.; 27th, Stapleton, N. Y., Duluth, Minn.; 29th, Hutchinson and Breckenridge, Minn.; 30th, Stapleton and Malone, N. Y., Milwaukee, Wis., Breckenridge, Minn.; 31st, Stapleton, N. Y., Hillsboro', Ohio, Duluth, Minn.

Thunder-storms.—At two or more stations in Alabama, on the 12th, 15th, and 19th; Arkansas, 11th and 15th; Connecticut, 13th and 29th; Georgia, 16th and 20th; Illinois, 5th and 10th; Indiana, 10th and 11th; Iowa, 5th and 10th; Kansas, 5th, 10th, and 31st; Louisiana, 11th, 15th, and 19th; Maryland, 15th and 28th; Massachusetts, 17th and 28th; Michigan, 10th; Mississippi, 10th; Nebraska, 5th and 10th; New Jersey, 13th, 16th, and 28th; New York, 12th, 13th, 26th, and 28th; North Carolina, 12th; Ohio, 10th, 11th, and 16th; Pennsylvania, 12th, 13th, 16th, and 28th; South Carolina, 11th and 12th; Tennessee, 11th; Texas, 5th, 14th, 15th and 19th; Virginia, 25th and 28th; Wisconsin, 10th.

OPTICAL PHENOMENA.

Mirage, recorded as follows: At Ellinwood, Kans., 7th; Moorhead, Minn., 1st, 12th, 13th, 18th, 20th, 22d, 28th, 29th, and 31st; Fort Lyon, Colo., 18th; New London, Conn., 1st, 3d, 4th, and 28th; Breckenridge, Minn., 18th, 30th, and 31st; Mount Washington, N. H., 11th.

Solar halos.—1st, California, Iowa, Kansas, Nevada; 2d, Connecticut, Dakota, Iowa, Kansas, Michigan, Minnesota, Wisconsin; 3d, Iowa, Kansas, Maine, Minnesota, New Mexico, Wisconsin; 4th, Connecticut, Delaware, Georgia, Illinois, Indiana, Kentucky, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Wisconsin, Virginia; 5th, Iowa, Maine, Massachusetts, New Hampshire, New York, Ohio; 6th, Maine, Minnesota, Pennsylvania, Ohio, New Jersey; 7th, Iowa, Maine, North Carolina; 8th, Nebraska, Ohio, Michigan; 9th, Michigan, New York, Ohio, Wisconsin; 10th, Mississippi, Nebraska, Ohio; 11th, California, Dakota, Georgia, Iowa, Michigan, Minnesota, Nevada, New York, Virginia; 12th, Kansas, Nebraska; 13th, Illinois, Iowa, Kansas, Texas, Wisconsin; 14th, Indiana, Kentucky, Montana Territory, Ohio, Tennessee, Virginia; 15th, Maine, Vermont; 16th, Maine, Massachusetts, Nevada, New Hampshire, New York, North Carolina, Vermont; 17th, Minnesota, Rhode Island; 18th, Dakota, Iowa, Kansas, Louisiana, Minnesota, Mississippi, New Hampshire; 19th, Dakota, Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Nebraska, Nevada, New York, North Carolina, Ohio, Wisconsin, West Virginia, Virginia; 20th, Connecticut, Iowa, Kansas, Maine, Massachusetts, Missouri, Nebraska, New Hampshire, New York, Vermont; 21st, Indiana, Kansas, New York, Oregon; 22d, Illinois, Indiana, Iowa, Kentucky, Ohio; 23d, Connecticut, Massachusetts, Michigan, Nevada, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Wisconsin; 24th, Kansas, Michigan, New York; 25th, Maine, Nevada, Wisconsin; 26th, California; 27th, Illinois, Indiana, Iowa, Michigan, Minnesota, Nevada, Ohio, Pennsylvania, Wisconsin, West Virginia, Virginia; 28th, Connecticut, Iowa, Kansas, Wisconsin; 29th, Illinois, Wisconsin; 30th, Delaware, Iowa, Maine, Nebraska, New Hampshire, Ohio, Vermont; 31st, Nebraska.

Lunar halos.—1st, Dakota, Maine, New York, Utah; 2d, Colorado, Illinois, Iowa, Kansas, Missouri, Michigan, Nebraska, New Hampshire, New Mexico; 3d, Georgia, Illinois, Iowa, Kansas, Maine, Massachusetts, Michigan, New Jersey, New Mexico, North Carolina, Oregon, Wisconsin; 4th, Connecticut, Colorado, Illinois, Georgia, Kentucky, Maine, Massachusetts, Michigan, Nebraska, New Jersey, New York, North Carolina, Pennsylvania, South Carolina, Tennessee, Virginia, Wisconsin; 5th, Alabama, Connecticut, Georgia, Illinois, Maine, Massachusetts, Michigan, Nebraska, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island; 6th, Alabama, Colorado, Dakota, Delaware, Illinois, Georgia, Indiana, Kentucky, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Virginia; 7th, Colorado, Indiana, Iowa, Kansas, Minnesota, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Rhode Island, Tennessee, Virginia; 8th, Alabama, Dakota, Illinois, Indiana, Iowa, Maine, Massachusetts, Nebraska, Ohio, Tennessee, Wisconsin, West Virginia; 9th, Alabama, Illinois, Indiana, Louisiana, Massachusetts, Michigan, Mississippi, New Jersey, New York, North Carolina, Ohio, Pennsylvania; 10th, Dakota, Indiana, Nebraska, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia; 11th, Alabama, Georgia, Iowa, New York, North Carolina; 12th, Minnesota, North Carolina; 15th, New Jersey; 20th, Maine; 21st, Oregon; 27th, Wisconsin, Maine; 29th, Nebraska, Wisconsin, Kentucky; 30th, Maine, Nebraska, Vermont, Virginia, North Carolina; 31st, California, Dakota, Illinois, Indiana, Iowa, Kentucky, Michigan, Nebraska, Ohio, Oregon, Rhode Island, North Carolina, Maine.

MISCELLANEOUS PHENOMENA.

Polar bands were observed at Guttenberg, Iowa, on the 9th and 28th; Carthagena, Ohio, 9th, 19th, and 29th; Hanover, Pa., 14th; Wytheville, Va., 3d, 4th, 8th, 9th, 14th

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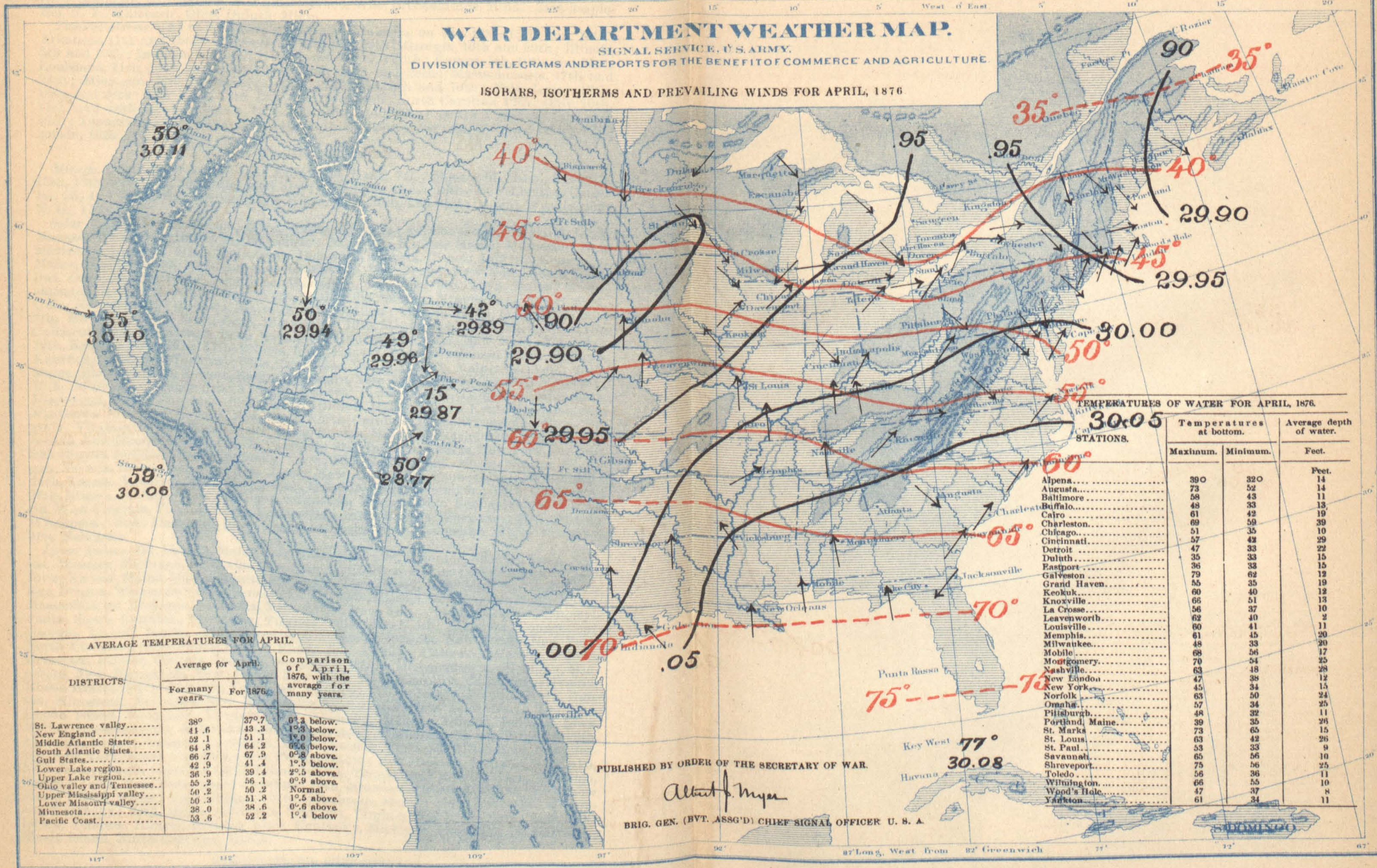

AVERAGE TEMPERATURES FOR APRIL.

DISTRICTS.	Average for April.		Comparison of April, 1876, with the average for many years.
	For many years.	For 1876.	
St. Lawrence valley	38°	37°.7	0°.3 below.
New England	41 .6	43 .3	1°.3 below.
Middle Atlantic States	52 .1	51 .1	1°.0 below.
South Atlantic States	64 .8	64 .2	0°.6 below.
Gulf States	66 .7	67 .9	0°.8 above.
Lower Lake region	42 .9	41 .4	1°.5 below.
Upper Lake region	36 .9	39 .4	2°.5 above.
Ohio valley and Tennessee	55 .2	56 .1	0°.9 above.
Upper Mississippi valley	50 .2	50 .2	Normal.
Lower Missouri valley	50 .3	51 .8	1°.5 above.
Minnesota	38 .0	38 .6	0°.6 above.
Pacific Coast	53 .6	52 .2	1°.4 below

TEMPERATURES OF WATER FOR APRIL, 1876.

STATIONS.	Temperatures at bottom.		Average depth of water.
	Maximum.	Minimum.	Feet.
			Feet.
Alpena	39°	32°	14
Augusta	73	52	14
Baltimore	58	43	11
Buffalo	48	33	13
Cairo	61	42	19
Charleston	69	59	39
Chicago	51	35	10
Cincinnati	57	42	29
Detroit	47	33	22
Duluth	35	33	15
Eastport	36	33	15
Galveston	79	62	12
Grand Haven	55	35	19
Keokuk	60	40	12
Knoxville	66	51	13
La Crosse	56	37	10
Leavenworth	62	40	2
Louisville	60	41	11
Memphis	61	45	20
Milwaukee	48	33	20
Mobile	68	56	17
Montgomery	70	54	25
Nashville	63	48	28
New London	47	38	12
New York	45	34	15
Norfolk	63	50	24
Omaha	57	34	25
Pittsburgh	48	32	11
Portland, Maine	39	35	26
St. Marks	73	65	15
St. Louis	63	42	26
St. Paul	53	33	9
Savannah	65	56	10
Shreveport	75	56	25
Toledo	56	36	11
Wilmington	66	55	10
Wood's Hole	47	37	8
Yankton	61	34	11

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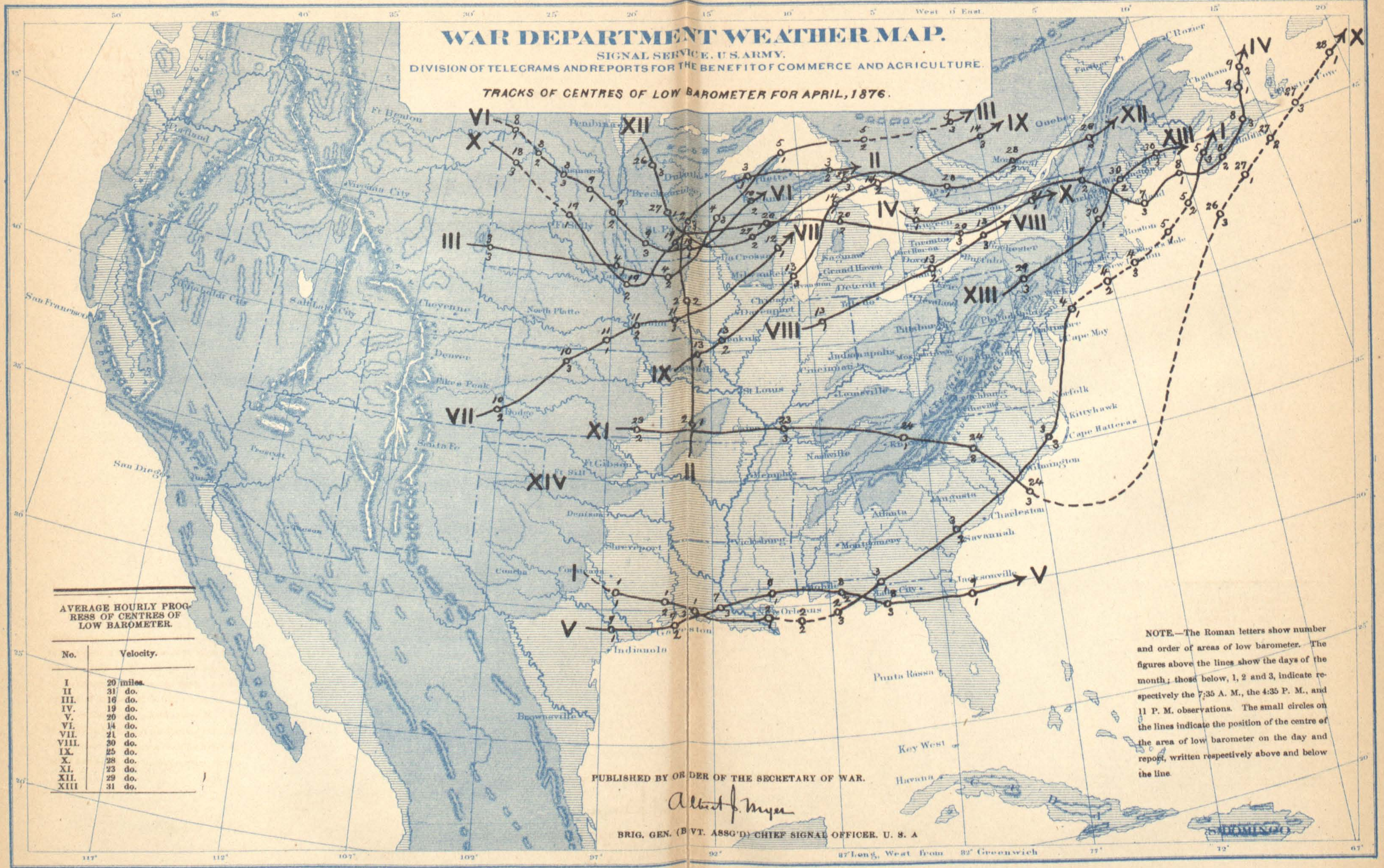

AVERAGE HOURLY PROGRESS OF CENTRES OF LOW BAROMETER.

No.	Velocity.
I.	20 miles.
II.	31 do.
III.	16 do.
IV.	19 do.
V.	20 do.
VI.	14 do.
VII.	21 do.
VIII.	30 do.
IX.	25 do.
X.	28 do.
XI.	23 do.
XII.	29 do.
XIII.	31 do.

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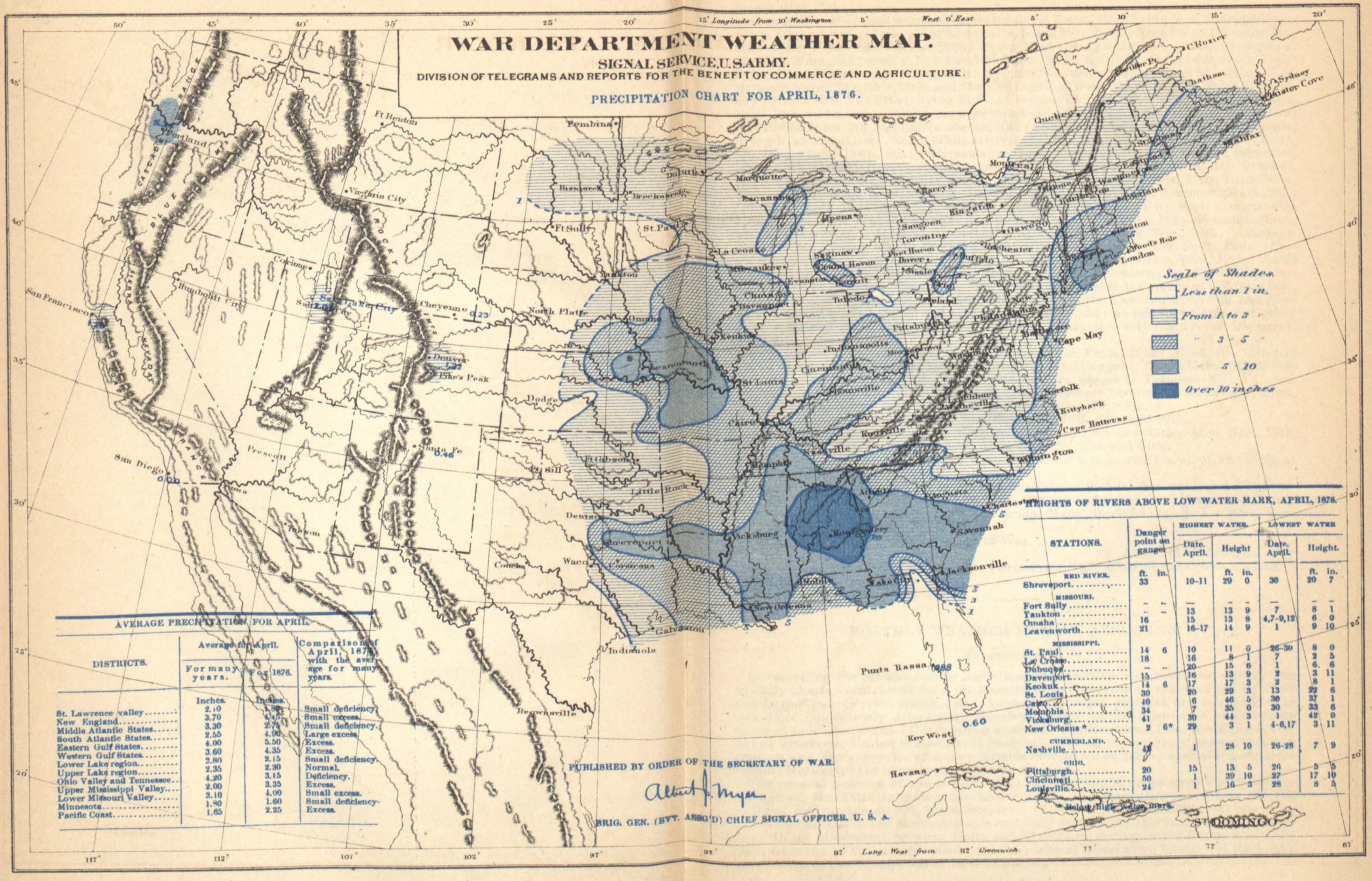
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR APRIL, 1876.



AVERAGE PRECIPITATION FOR APRIL.

DISTRICTS.	Average for April. For many years.	Average for April. For 1876.	Comparison of April, 1876, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	2.10	1.85	Small deficiency.
New England	3.70	4.45	Small excess.
Middle Atlantic States	3.30	2.75	Small deficiency.
South Atlantic States	2.55	4.90	Large excess.
Eastern Gulf States	4.00	5.50	Excess.
Western Gulf States	3.60	4.35	Excess.
Lower Lake region	2.80	2.15	Small deficiency.
Upper Lake region	2.35	2.30	Normal.
Ohio Valley and Tennessee	4.20	3.15	Deficiency.
Upper Mississippi Valley	2.00	3.35	Excess.
Lower Missouri Valley	3.10	4.00	Small excess.
Minnesota	1.80	1.60	Small deficiency.
Pacific Coast	1.65	2.25	Excess.

HEIGHTS OF RIVERS ABOVE LOW WATER MARK, APRIL, 1876.

STATIONS.	Danger point on gauge		Highest water. Date. April.	Highest water. Height		Lowest water. Date. April.	Lowest water. Height.	
	ft.	in.		ft.	in.		ft.	in.
RED RIVER.								
Shreveport	33		10-11	29	0	30	20	7
MISSOURI.								
Fort Sully	—	—	—	—	—	—	—	—
Yankton	—	—	13	13	9	7	8	1
Omaha	16		15	13	8	4,7-9,12	6	0
Leavenworth	21		16-17	14	9	1	9	10
MISSISSIPPI.								
St. Paul	14	6	10	11	0	26-30	8	0
La Crosse	18		16	8	1	7	2	5
Dubuque	—	—	20	15	6	1	6.	6
Davenport	15		16	13	9	2	3	11
Keokuk	14	6	17	17	3	2	8	1
St. Louis	30		20	29	3	13	22	6
Cairo	40		6	46	5	30	37	1
Memphis	34		7	35	0	30	33	6
Vicksburg	41		30	44	3	1	42	0
New Orleans *	2	6*	29	3	1	4-6,17	3	11
CUMBERLAND.								
Nashville	40		1	28	10	26-28	7	9
OHIO.								
Pittsburgh	20		15	13	5	26	5	5
Cincinnati	50		1	39	10	27	17	10
Louisville	24		1	16	3	28	8	5

* Below high water mark.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN. (BVT. ASSC'D) CHIEF SIGNAL OFFICER, U. S. A.

and 19th; Plattsmouth, Nebr., 2d; Dubuque, 29th; Smithville, N. C., 14th and 22d; Bismarck, Dak., 7th.

Zoological.—*Wild geese* were seen at Guttenberg, Iowa., 8th; flying N. at Independence, Iowa, 8th and 10th; flying N. at Monticello, Iowa, 9th; flying N. at Point Pleasant, La., 8th; flying N. at Standish, Me., 29th; flying N. at Owing's Mills, Mo., 11th; flying E. at Mendon, Mass., 6th; seen at New Bedford, Mass., 28th; flying W. at Hudson, Mich., 19th; flying N. at Clear Creek, Nebr., 24th; flying N. at Jacksonsburg, Ohio, 3d; flying N. at Belmont Farm, Tex., 9th, 14th, and 31st; flying N. at West Charlotte, Vt., 30th; flying N. at Prospect Hill, Va., 27th; flying N. W. at Wytheville, Va., 9th; flying N. at Rock Run, Wis., 10th, and S. 9th. *Wild ducks* were seen flying N. at Golden, Colo., 28th; flying N. at Monticello, Iowa, 9th, and Independence, 10th; at Hudson, Mich., observed during month; flying N. at Clear Creek, Nebr., 30th; arrived at Utica, Wis., 6th. *Robins* arrived at Riley, Ill., 7th; Afton, Iowa, 8th; Independence, Iowa, 5th; Gardiner, Me., 30th; Somerset, Mass., 16th; Dumbarton, N. H., 9th; Auburn, N. H., 26th; Ardenia, N. Y., 7th; Starkey, N. Y., 6th; Woodstock, Vt., 9th; Coalville, Utah, 17th; Wautoma, Wis., 19th; Utica, Wis., 10th. *Bluebirds* appeared at Riley, Ill., 8th; Standish, Me., 29th; Somerset, Mass., 7th; Dumbarton, N. H., 7th; Auburn, N. H., 12th; Starkey, N. Y., 7th; West Chester, Pa., 11th; Utica, Wis., 10th. *Blackbirds* first seen at Estes Park, Colo., 7th; Somerset, Mass., 18th; Dumbarton, N. H., 9th; Chambersburg, Pa., 9th; Utica, Wis., 10th. *Mocking-birds* arrived (during a snow-storm) at Louisville, Ill., 12th; Norfolk, Nebr., 12th. *Purple martin* appeared at Laconia, Ind., 28th. *Killdeer* seen at Utica, Wis., 10th. *Larks* appeared at Riley, Ill., 8th; Emerson, Nebr., 30th: Chambersburg, Pa., 9th. *Song sparrow* arrived at Somerset, Mass., 5th. *Trout* were observed in the creeks at Golden, Colo., 9th. At Somerset, Mass., *Herring* were first caught in the Taunton River 7th, and *Shad* 30th. *Grasshoppers* hatched out at Estes Park, Colo., 3d; at Belmont Farm, Tex., they have remained alive all winter, and were on wheat the 25th; active at Bismarck, Dak., 4th.

Botanical.—*Peach-trees* in full bloom at Knoxville, Tenn., 10th; Anna, Ill., 11th; in bloom at Bennettsville, Ky., 7th; budding out at Ringgold, Ohio, 11th. *Apple-trees* budding out at Ringgold, Ohio, 11th. *Plum-trees* in bloom at Prospect Hill, Va., 8th. *Willow-buds* opened at Springfield, Mass., 5th. *Elm-trees* budding at Monticello, Iowa, 31st. *Maple* and *elder trees* budding at Owing's Mills, Md., 18th.

Prairie fires occurred near Fort Lyon, Colo., 7th, 18th, 21st, and 29th.

Zodiacal light was observed at Ellinwood, Kans., 12th and 17th; Atco, N. J., 19th, 22d, and 23d; Waterburg, N. Y., 14th, 15th, 19th, 22d, 23d, and 24th.

Earthquakes.—Two slight shocks were felt about 6 a. m. and 1 p. m. of the 25th, at Oakland, Cal.

Meteors were seen on the 1st at Nora Springs, Iowa, Beloit, Wis.; 6th and 9th, Freehold, N. J.; 10th, Florida, Mass.; 13th, Nora Springs and Davenport, Iowa; 14th, Pennville, Pa.; 19th, Flushing, N. Y.; 23d, Florida, Mass., Brookhaven, N. Y.; 26th, Bennettsville, Ky., Smithville, N. C.

Published by order of the Secretary of War.

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Brig. Gen., (Brevet Assigned,) Chief Signal-Officer, U. S. A.

MONTHLY WEATHER REVIEW, APRIL, 1876.

INTRODUCTION.

In compiling the present review the following data have been made use of, viz: The tri-daily charts, constructed from the simultaneous observations taken at one hundred and forty Signal-Service stations and fourteen Canadian stations, and telegraphed to this office immediately afterward; monthly meteorological records of observations taken at four hundred and thirty-seven stations, including those from the civilian voluntary observers, United States naval hospitals, United States Army posts, Canadian stations, and Signal-Service stations; reliable newspaper extracts; special reports from various sections of the country, and marine records.

The general features of the month were: (1) The slight deficiency of temperature throughout the Atlantic States, the Lower Lakes, and Canadian provinces; (2) the rarity of destructive storms, tornadoes, &c.; (3) the rarity of auroras; (4) the large excess of rain-fall in the South Atlantic and Gulf States; (5) the long-continued high water in the Mississippi between Cairo and Vicksburg, ending in the formation on the 26th of the cut-off at the latter place; (6) the rarity of destructive frosts; (7) the heavy snow-storm of the 4th and 5th in New England.

BAROMETRIC PRESSURE.

The general distribution of atmospheric pressure for April is shown by the isobars upon Chart No. II, which exhibit characteristic differences as compared with the charts

for April, 1874 and 1875. A comparatively low pressure is shown for April, 1876, in the Northwest, but about the same pressure in the South Atlantic and Eastern Gulf States, the Pacific coast, and Nova Scotia, as compared with the two preceding years.

Barometric range.—The barometric ranges, reduced to sea-level, have been as follows: Large ranges—Alpena, 1.45 in.; Bismarck, 1.20; Buffalo, 1.24; Breckenridge, 1.23; Detroit, 1.15; Escanaba, 1.43; Grand Haven, 1.15; Marquette, 1.58; North Platte, Oswego, and Pembina, 1.20; Malone, 1.26; Port Huron, 1.22; Rochester, 1.27. Small ranges—Jacksonville, 0.52; New Orleans, 0.46; Punta Rassa, 0.37; San Diego, 0.40; San Francisco, 0.41.

Areas of low barometer.—In general the tracks of the paths of the areas of low pressure have lain decidedly to the northward of those of 1874 and 1875. Three have passed eastward over the Atlantic States to the Gulf Stream. Ten have passed east-northeastward over the Lake region. Of these four moved southeastward to the southern boundary of Minnesota and then turned to the east-northeast. But one of these has been attended by winds attaining the force of a gale on the Atlantic coast.

No. I. This depression is (as No. VIII of the Review for March) traced back to the Pacific coast. It was on the 1st of April central in Texas, but appears as an insignificant depression until the 4th, when it had increased to a storm off the Middle Atlantic coast, which subsequently moved slowly northeastward over Nova Scotia. Northeasterly winds of from twenty-five to fifty miles were reported on the 4th and 5th on the Middle and East Atlantic coasts, and a heavy snow-fall occurred in New England.

No. II. This may be considered as a branch of No. I, which was definitely formed on the morning of the 2d in Missouri. It moved thence northward into Minnesota, and then eastward over Lake Superior. Light rains, but no high winds were reported. Nos. I and II afford an excellent illustration of the fact that a slight deficiency of pressure over a large extent of territory, as, for instance, from the Gulf of Mexico to California or Manitoba, is followed by a general slow southward movement of cool, dry air from British America, on the southern borders of which cloud and rain are formed, and which latter may, under favorable circumstances, give rise to several local barometric depressions, which subsequently increase into well-marked storms. The region to which the beginnings of these storms may be traced extends from the northwestern portion of the Gulf of Mexico up to Central Mississippi, Central Kansas, and Western Texas.

No. III. Is located, first, at midnight of the 3d in Western Kansas; it had been preceded for two days by high, cold north and west winds on Pike's Peak and high barometer in Oregon. The area of low barometer rapidly extended northward and southward, but at midnight of the 4th had closed up to an oval area central in Wisconsin. South and west winds of from 20 to 42 miles were reported from the Upper Lakes on the 5th, and from 30 to 35 miles on Lakes Ontario and Huron on the 6th, when the central depression was already beyond the limits of our stations and apparently in the valley of the Upper Saguenay River.

No. IV. This low barometer was apparently central on the morning of the 7th between Lakes Huron and Ontario, and might be considered as a branch of No. III. It evidently owed its origin to the combination of the moist southwest winds over the Lower Lakes in the rear of No. III, with the cold northwest winds also following that area. It passed rapidly eastward over New England and to the Atlantic, and was a well-marked depression on the morning of the 8th, central near the Bay of Fundy, whence it moved slowly northeastward, but does not appear to have been accompanied by any high winds up to the time of being lost sight of on the 9th.

No. V. The barometer fell slowly on the 5th and 6th in Southwestern Texas, with cloudy weather and occasionally brisk north and east winds. On the morning of the 7th a slight local depression was probably central between Galveston and Corsicana, whence it moved slowly eastward, increasing its dimensions, and, accompanied by heavy rains and occasional brisk winds, it passed over the Florida peninsula, 11 p. m. of the 8th, and disappeared on the 9th east of Florida, while light rains prevailed during a part of the day on the South Atlantic coast.

Nos. VI and VII. Depression No. VI, which is first located on the morning of the 8th in Northern Dakota, may possibly have originated in that neighborhood under the influence of easterly winds then prevailing, while an area of high pressure was central on Lake Superior; but more probable is it that this depression was the southern end of an extended area in British America parallel to the base of the Rocky Mountains, to which we may attribute both the low pressure in Oregon on the 9th and the high barometer over British America and Canada on the 8th. On the morning of the 9th the lowest barometer was in Eastern Dakota, and a northerly gale prevailed at Bismarck, but high southerly winds in Minnesota. The barometer fell very generally southward to Texas, and the main depression seems to have passed eastward and disappeared in Wisconsin, while a second depression, No. VII, formed on the 10th in Kansas, as usual under the influence of prevailing warm, southeasterly winds ascending the plains east of the Rocky Mountains. The barometric depression attending the formation of this storm extended south to Texas and west to California. Southeast to southwest winds

with rain or snow, prevailed in Arizona on the 11th. The barometer rose rapidly, with northerly winds and snow in Nevada, Wyoming, Colorado, and Nebraska. The storm-center was well marked at 11 p. m. of the 11th in Iowa, after which it rapidly developed into a trough extending northeastward and southwestward, and ceased to exist as a well-defined storm-center after the morning of the 12th.

Nos. VIII and IX. The southwestern extremity of the belt of low pressure that followed No. VII was attended during the night of the 12th-13th by southerly winds, cloud, and rain from Texas to Illinois. On the morning of the 13th rain prevailed, with northerly winds in the Upper Mississippi Valley, but with southerly winds in the Ohio Valley, and during the day the two depressions, Nos. VIII and IX, moved respectively from Indiana and Illinois northeastward. No. VIII had broken up by midnight into several small depressions over the Lower Lakes. No. IX moved more nearly northward over Lake Michigan, accompanied by heavy rains and occasional brisk winds, and disappeared on the 14th in Northern Canada, whence it probably moved eastward to the Gulf of Saint Lawrence. The barometer rose but little over the Lakes on the 15th, but on the 16th a moderate depression, extending, however, over a large area, seems to have moved eastward into Northern New England and to have disappeared over the Gulf of Saint Lawrence.

No. X. A slight depression existed in Oregon on the 18th, while the barometer fell steadily in Manitoba and Dakota. At 11 p. m. the pressure had risen decidedly, with clear, cold weather in Oregon, and the depression, which had very possibly all the time been developing in British America on the eastern slope of the Rocky Mountains, and had at no time been central on the western side, had extended rapidly southward into Kansas, whence it stretched as a very elongated oval northward into Manitoba. The pressure was lowest at Bismarck, at 11 p. m. of the 18th, with a southeast gale; had risen slightly, with calm, at 7.35 a. m., 19th, after which a brisk northwest wind sprang up and the barometer rose rapidly. On the 19th, 4.35 p. m., the lowest isobar was an ellipse, whose axis nearly coincided with the western boundary of Iowa. The movement southwestward of this depression now ceased and its northeastward movement began, (similar turning-points in the progress of the low barometers, Nos. III, VI, and XII, are all located in the same neighborhood.) No. X moved northeastward and eastward over the Upper Lakes into New York, where it disappeared on the morning of the 21st. The brisk and high winds that attended the first part of its course diminished decidedly in the latter part.

No. XI. The barometer fell quite low in California and Oregon on the 21st, and after 7.35 a. m., 22d, rose rapidly. The pressure was high, but slowly falling, on the 21st west of Montana, with indications that a depression was then forming in Wyoming or Montana. At midnight of the 22d the barometer had risen over the Lake region and had fallen from Texas to Nebraska. The depression may be considered to have been central in Kansas on the morning of the 23d, whence it stretched eastward, as a trough of low barometer, over Tennessee, while high barometer and cool northerly winds continued over the Lake region, Northwest, and Ohio Valley. During the 24th, the western end of the trough of low pressure closed up under the influence of the steady flow of northerly winds, which reached into Texas by midnight, and the lowest barometer was confined to the South Atlantic coast. Although it was now beyond the limits of our charts, yet the brisk and high northeast winds at the New Jersey coast stations, the ocean-swell, and the threatening weather justify the conclusion that a severe storm passed up the Gulf Stream on that day, which may have had an independent origin near the West Indies, but was at least joined on the morning of the 25th by our No. XI. The path of the combined storms from 26th to 28th is represented on Chart No. I as passing along the coast of Nova Scotia, and is estimated from the indications afforded by the isobars and winds reported from neighboring stations.

Nos. XII, XIII, and XIV. The depression, which is first definitely located at 11 p. m., 26th, in Northern Minnesota, was preceded by a slight fall of the barometer in Oregon, followed by a rise on the 25th and 26th, attaining its maximum on the morning of 27th. Southerly winds, rarely attaining to brisk, and falling barometer prevailed on the 26th over the Northwest, the Upper Lakes, and the Ohio Valley. Brisk northwest winds prevailed on the 27th from the Upper Mississippi westward, but rapidly diminished and were rarely reported on the Upper Lakes after the depression had moved eastward. In its passage over the St. Lawrence Valley this disturbance gave rise to smaller depressions in the Middle States and New England on the 29th, some of which were, however, not of sufficient importance to be presented upon Chart No. I. One of them, which was central at 11 p. m., 29th, in Pennsylvania, may be considered at the eastern extremity of the belt of low pressure extending from Indian Territory to the Middle States. The southwest end of this belt is represented by No. XIV as stationary on the 30th. It developed into a severe storm, whose subsequent history belongs to the month of May. The eastern extremity, constituting low barometer No. XIII, moved northeastward, and was, at 11 p. m., 30th, off the New England coast, with a rapidly-falling central low barometer. Its subsequent history also belongs to May.

Areas of high barometer.—In general, these have not been so well marked as in April,

1875, and, in consequence, areas of extended frosts have been rare, and reports of very severe frosts have not reached us. The general progress of the areas of high barometer has been, as usual, from British America southward over the lakes. Several minor areas have, however, pushed northward from the Gulf, and these, together with the rises in the barometer that have occurred east of the Alleghanies and west of the Rocky Mountains, show that when an area of low pressure is forming anywhere in the region east of the Rocky Mountains, its influence is felt in a very short time on both the Pacific and Atlantic coasts, and on the shores of the Gulf of Mexico and Hudson's Bay, as shown by the inflow of air and the rising pressure.

No. I. This area extended, on the morning of April 1, from the Middle and South Atlantic coasts northwestward over the Lake region. The pressure was highest on Lake Superior, with light winds and calms north of Wisconsin and Minnesota. The central high pressure moved eastward, and was, on the morning of the 2d, north of New York. The barometer had risen decidedly over New England and the Gulf of St. Lawrence, and the southward flow of air extended along the Atlantic coast into Georgia, while to the west of the Alleghanies warmer, cloudy weather prevailed, and low barometer No. II originated. The pressure diminished rapidly during the 2d at the northern stations, and to a less extent on the Atlantic coast. On the morning of the 3d, the pressure was highest east of the Middle Atlantic States, preceding the passage of low barometer No. I.

No. II. On the 3d and 4th, while the pressure was low at northern stations, southerly winds and rising barometer prevailed at the southern stations, and, simultaneously, high barometer also prevailed on the coasts of Oregon and California. On the morning of the 5th, while low barometer No. III was central over Lake Superior, cold northerly winds and rising barometer extended southward along a portion of the eastern slope of the Rocky Mountains into the Gulf States. The highest pressure was, on the morning of the 6th, central in Southern Missouri, and, on the morning of the 7th, central in Tennessee, after which it passed eastward to the Atlantic.

No. III. At 11 p. m., 7th, an area of rising barometer and clear, cold weather was rapidly extending southward over the Upper Lake region. At 11 p. m. of the 8th, was apparently central in Northern Michigan, while low barometer No. VI was central in Dakota, and low barometer No. IV was central in Nova Scotia, and low barometer No. V central in Northern Florida. The central area of highest pressure moved slowly southeastward, being, at 11 p. m. of the 9th, between Lakes Huron and Ontario, and but little east of that place at 11 p. m. of the 10th. Meanwhile a considerable extension of the area of rising barometer and northerly winds had taken place over the Middle Atlantic coast, and, reaching into the South Atlantic States, formed a ridge of maximum pressure from the Upper St. Lawrence to Florida. The pressure remained stationary in the South Atlantic States, but fell in the Middle States and Canada, and the area of highest barometer remained off the South Atlantic coast until 11 p. m. of the 13th.

No. IV. The northerly winds and rising barometer in the rear of low pressures Nos. VIII and IX covered Texas on the 14th at 7.35 a. m., and extended thence slowly eastward over the Southern States, remaining, however, highest on the Texas coast until the 16th, 7.35 a. m. Meanwhile a continuous southward flow of colder air was taking place, with rising barometer, over Manitoba and the Northwest, reaching Indian Territory and Missouri at 7.35 a. m. of the 16th, and forming at 7.35 a. m. of the 17th a ridge of high pressure from Manitoba to the Western Gulf. The pressure now began to fall in Manitoba, and the area of highest barometer, at 7.35 a. m. of the 18th, extended from Louisiana to Illinois, whence it moved slowly eastward, and was, at 7.35 a. m. of the 19th, central in the interior of North Carolina, and, at 7.35 a. m. of the 20th, off the South Carolina coast.

No. V. In the rear of low barometer No. X northerly winds extended southward only as far as Kansas and Missouri, while southerly winds and rising barometer prevailed in the Gulf States, which movement may apparently be described as an extension westward of the high pressure No. IV, or of the general area of high pressure prevailing under the tropic of Capricorn. The rising barometer in the Northwest extended eastward over the Ohio Valley and Lake region, reaching the Middle Atlantic States on the morning of the 22d, after which this ill-defined area of high pressure can be no longer traced.

No. VI. While low barometer No. XI was developing in Kansas, and the pressure was falling in the Southern States, the barometer began to rise, with northerly winds and clear weather, over the Lake region. At 7.35 a. m. of the 23d the barometer was highest, with northeast winds, over Manitoba and Lake Superior, and continued to rise in that region, where it was also highest, but with calms, at 7.35 a. m. of the 24th. It had fallen slightly by 7.35 a. m. of the 25th, by which time the highest pressure had passed to Illinois and Missouri, whence it moved eastward, and, at 7.35 of the 26th, extended from Eastern Tennessee to Western Pennsylvania, and was at 11 p. m. of the 26th off the South Carolina coast, where the highest barometer remained until the morning of the 28th.

TEMPERATURE OF THE AIR.

In general.—The isothermal lines upon Chart No. II show the general distribution of temperature for the month, from which it appears that, in comparison with the average of many years, the month has been slightly cooler in the St. Lawrence Valley and Atlantic States, and decidedly cooler in the Lower Lake region. It has been slightly warmer in the Gulf States, Ohio and Missouri Valleys, and decidedly warmer in the Upper Lake region. The average temperature at the summit of Mount Washington has been 19°.5, the maximum being 43° and the minimum 0°.

Maximum temperatures.—The maximum temperatures for the month have been: Denver, 82°; Augusta, Cape Henry, North Platte, Vicksburg, Indianola, Leavenworth, and Memphis, 85°; Denison, Saint Mark's, and Savannah, 86°; San Diego and Tybee Island, 87°; Jacksonville, 88°; Montgomery and Shreveport, 89°; Corsicana and Dodge City, 90°.

Minimum temperatures.—The minimum temperatures for April have been as follows: Cheyenne, Denver, and Pembina, 4°; Breckenridge, 5°; Colorado Springs and Duluth, 8°; Escanaba, 9.

Ranges of temperature.—The greatest ranges of temperature have been: 57° at Duluth; 59° at Yankton; 60° at Bismarck; 65° at Santa Fé; 66° at Dodge City; 69° at Breckenridge and North Platte; 71° at Cheyenne and Colorado Springs; 73° at Pembina; 78° at Denver. The least ranges have been 37° at Charleston, Portland, Me., Tybee Island, and Smithville; 36° at Long Branch, New Orleans, and Newport; 35° at Thatcher's Island; 34° at Indianola and Mobile; 33° at Cape May and Wood's Hole; 31° at San Francisco; 30° at Eastport; 29° at Galveston.

Frosts, or temperatures low enough to form ice, have been reported at various stations in the following States, on the respective dates: 2d, New Jersey; 4th, Tennessee; 5th, North Carolina, West Virginia; 6th, Ohio, Tennessee, West Virginia; 7th, Kansas, Maryland, South Carolina, North Carolina, West Virginia; 8th, North Carolina, South Carolina, West Virginia; 9th, New Jersey, North Carolina, South Carolina, West Virginia; 10th, New Jersey, South Carolina, West Virginia; 11th, Virginia; 12th, California, Illinois; 13th, California; 14th, Kansas; 15th, Mississippi; 17th, Illinois, Iowa, Tennessee, Michigan, North Carolina, New Jersey; 18th, Illinois, Iowa, Kansas, Kentucky, North Carolina, Maryland, New Jersey, New York, Pennsylvania, Tennessee; 19th, Georgia, Maryland, New Jersey, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee; 20th, New Jersey; 21st, Wisconsin; 22d, Iowa, Wisconsin; 24th, Wisconsin; 25th, Illinois, Ohio, Michigan, Tennessee; 26th, Maryland, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia; 27th, Massachusetts, New Jersey, New York, Ohio; 28th, Minnesota, Nebraska; 29th, Minnesota, Michigan, Ohio, Tennessee, West Virginia; 30th, Illinois, Indiana, Iowa, Michigan, New Jersey, New York, Ohio. Most of these frosts were to a slight extent only injurious to vegetation.

PRECIPITATION.

In general.—The precipitation of rain and melted snow is shown by Chart No. III. The comparison, with the average for many years, shows a large excess in the South Atlantic States and Portland, Oreg., and a decided excess in the Eastern Gulf States and Upper Mississippi Valley. A deficiency is apparent in the Ohio Valley and Tennessee.

Snow-fall.—The following snow-falls (in inches) are reported from the volunteer stations: Colorado, Golden City, 11.4, Estes Park, 5½; Connecticut, Southington, 3½, Colebrook, 10; Dakota, Firesteel, 1½; Iowa, Monticello, 1, Council Bluffs, 5½ and 6.3, Rockford, 6½, Nora Springs, 7½; Kansas, LeRoy, 5, Ellinwood, 6½; Maine, West Waterville, 12½, Orono, 9; Massachusetts, Somerset, 3½, Springfield, 4, Andover, 8, Lawrence, 13, Worcester, 13, (fell on 4th,) Westboro, 13, Waltham, 14, Florida, 15, (at close of month the snow was 1 foot deep in the forests;) Missouri, Corning, 3; Nebraska, Norfolk, 5, Genoa, 12½; New Hampshire, Plaistow and Shelburn, 11½, Auburn, 29; New York, Jacksonville, 1, South Hartford, 2, South Trenton, 3½; Vermont, Newport, 5, Woodstock, 12, Strafford, 16; Virginia, Snowville, 1; Wisconsin, LeRoy, 2½, Neillsville, 6–8. The snow-storm of the 1st was, at Denver, Colo., considered to be the severest experienced in eight years. The melting of the snow in the Great Salt Lake Valley gave rise to great floods there on the 26th, and on 30th, creeks were steadily rising in Colorado.

Heavy rains.—1st to 3d, Carlowville, Ala., in 40 hours 8.75 inches rain; also at Montgomery, Ala., over 8 inches; at Troy, Ala., on 1st and 2d, 4.8 inches; Guttenburg, 12th to 13th, 3.3 inches rain, causing floods in creeks; Oregon, Mo., heavy rain-storm 11th, raising the creek 6 feet higher than ever known.

Hail.—Hail-storms, sometimes of considerable severity, were reported as follows: 1st, Brookhaven, Miss.; 12th, Mattoon, Decatur, Ill., Atchison, Kans., Woodmere Cemetery, Mich.; 14th, Fort Wayne, Ind.; 15th, Wabash, Ind.; 19th, Stanley, Kans.; 22d, Topeka and Manhattan, Kans., (stones 2 inches in diameter fell, and to a depth of 10 inches;) 23d, Howard, Nebr.; 26th, Ellinwood, Kans.; 27th, Rock Island, Erie, Ill.; 29th, Ellinwood, Kans.

Droughts.—But few droughts have been reported. At Newport, Fla., at the close of the month the potatoes were suffering from drought. At Wellborn, Fla., the month was dry, and cotton and corn were dying. At Wilsonville, Ala., crops were suffering at the close of the month.

Rainy days.—The number of rainy days, as recorded by the Signal-Service observers, is greatest in the Lower Lake region, where it amounts from 13 to 19; in the Upper Lake region, it ranges from 7 to 9. On the Middle Atlantic coast, the range is from 11 to 17. In New England, from 10 to 15. In the South Atlantic and Eastern Gulf States, the range is from 6 to 10. In the Northwest, the numbers range from 8 to 15; Mount Washington, 13. The greatest number of rainy days reported is 22 at Portland, Oregon, and 20 at Pittsburgh.

Cloudy days.—The number of cloudy days, as reported by the volunteer observers, is about as follows: In the South Atlantic States, 3 to 9; Eastern Gulf, 7 to 10; Middle and Eastern States, 5 to 14; for the Lake region and Northwest, 6 to 12; for the Southwest, 3 to 6.

RELATIVE HUMIDITY.

The average relative humidity for the month is from 70 to 75 per cent. at stations on the immediate Gulf coast; about 65 per cent. for stations on the South Atlantic coast; about 70 per cent. for the Middle Atlantic coast stations. It diminishes as we proceed toward the Ohio Valley, where it ranges from 52 to 57 per cent.; but again increases as we proceed northward and westward, and amounts to 60 per cent. for the Northwest and 65 per cent. for the Lake region. The average, uncorrected for elevation, is: Mount Washington, 92 per cent.; Santa Fé, Denver, Colorado Springs, and Cheyenne, about 41 per cent.; San Francisco and San Diego, 70 per cent.

WINDS.

Prevailing winds.—The prevailing directions of the wind for the month are shown by the arrows upon Chart No. II. They are from the northwest in New England and the Middle States; from the south in the Gulf States; from the southwest at the Rocky Mountain stations.

Total movements.—The largest total movements of the air have, when above 10,000 miles, been as follows: Manhattan, Kans., 11,522; Kittyhawk, 11,438; Long Branch, 11,158; Sandy Hook, 11,075; Thatcher's Island, 11,065; Cape Hatteras, 11,043; Indianola, 10,928; Dodge City, 10,923; Barnegat, 10,417; Breckenridge, 10,209; Cheyenne, 10,043. The smallest total movements of the air, when below 4,000 miles, have been as follows: Lynchburg, 3,036; Augusta, 3,179; Nashville, 3,307; Wytheville, 3,354.

High winds or severe storms have been reported from Carbondale, Ill., on the 20th; Cresco, Iowa, on the 4th and 21st; Genoa, Nebr., 4th and 9th. A velocity of 50 miles per hour was reported from Flushing on the 7th and 29th, and of 52 miles per hour on the evening of the 4th. High wind, 29th, at Belmont Farm, Texas. Violent gale, 3d, Coalville, Utah.

Tornadoes.—One began in Iowa, in the evening of the 11th, in Wright County, traversing Franklin County, and last heard of in Clayton County, 150 miles to the east of its origin; a second occurred near Louisville, Ky., on the 14th. Water-spout at Fountain, Minn., 13th. Tornado near Barnegat, N. J., 16th, and near Dodge City, Kans., 26th.

Highest winds.—Among the maximum velocities of winds, reported at the Signal-Service stations, are the following: Bismarck, 56 miles; Breckenridge, on the 9th, 63; Cheyenne, on the 15th, N.W., 56; Eastport, on the 5th, N.E., 58; Long Branch, 21st, N.W., 60; Milwaukee, on the 5th, W., 52; Mount Washington, 70; New York, on the 7th, S.W., 58; Manhattan, on the 19th, 50; Saint Paul, on the 9th, S.E., 52; Sandy Hook, on the 7th, N.W., 60; Thatcher's Island, on the 4th, N.E., 73; Boston, on the 5th, N.E., 54; Port Huron on the 14th, S.W., 50 miles.

VERIFICATIONS.

Cautionary signals.—154 cautionary signals have been displayed at the United States signal-stations, of which 29 were not justified and 5 were too late, and 120, or 78 per cent., justified, by high winds known to have occurred within 100 miles of the stations.

Probabilities.—The comparison of the published tri-daily probabilities with the weather of the succeeding 24 hours gives a general average of the percentage of verifications of 83.6 The averages for the sections are as follows: New England, 80; Middle States, 83: South Atlantic States, 79; East Gulf States, 86; West Gulf States, 88; Tennessee and Ohio Valley, 85; Lower Missouri Valley, 80; Upper Mississippi Valley, 86; Upper Lake region, 85; Lower Lake region, 84.

NAVIGATION.

Stage of water.—From the table on Chart No. III, showing the highest and lowest waters, it will be seen that the Red River fell from 29 to 20 feet, and the Missouri varied irregularly between 6 and 13 feet at stations above Leavenworth; between that point and St. Louis, it was above the "danger-line" during a considerable portion of the

month. In the Ohio, a moderate flood wave descended the river during the first half of the month, after which the river fell steadily. The principal feature in regard to the Upper Mississippi was the slow rise during the first half of the month. At Keokuk, the river was above the "danger-line" for several days; at St. Louis, the river was 9 inches below the "danger-line" on the 20th; between Cairo and Vicksburg the river remained above the "danger-line," with slight intermissions throughout the greater part of the month. An important change in the river-channel has been made at Vicksburg by the completion of the cut-off, and a formation of a new chan nel about 3 miles west of Vicksburg, by which the distances on the river-channel are shortened by about 8 miles. This cut-off, which has been anticipated since the year 1828, and whose progress has been carefully observed, was finally accomplished on the 26th of April, and was accompanied by a decided rise of about 9 inches on the Signal-Service gauge at Vicksburg.

Freshets in rivers.—The volunteer observer at Havana, Ill., reports that the maximum height of the Illinois River was 16 feet above low-water mark, and Guttenberg, Iowa, reports on the 12th and 13th, in consequence of the heavy rains elsewhere mentioned, destructive freshets in the neighboring rivers. At Moorhead, Minn., the Red River of the North began to rise on the 8th, reached maximum, 14 feet above low water, on the 19th; Oregon, Mo., on the 11th, creeks higher than ever known before in consequence of sudden rains; Pennville, Pa., high water in the west branch of the Susquehanna on the 14th; Rochester, N. Y., highest water, 35 feet, on the 7th; lowest, 33 feet 6 inches, 30th; Keokuk, Iowa, the Des Moines River rising and destructive floods, 13th to 18th; Shreveport, La., low places overflowed, 8th to 12th. The combination of east wind and high tide produced an unusually high water on the New Jersey coast on the 25th.

Ice in rivers and harbors is reported as follows: Fort Niagara, on the 5th, no ice in river for several days; quantities of floating ice on the 14th, 29th, and 30th; Madison Barracks, N. Y., ice in bay, and teams crossing, 1st; Firesteel, Dak., ice moving out of James River on the 7th; Nora Springs, Iowa, river clear of ice on the 8th; Standish, Maine, ice left Sebago Lake on the 30th; Mount Desert, Maine, ice left the harbor on the 5th; a thin skim of ice on river and harbor on the 28th; Traverse City, Mich., ice cleared out of Grand Traverse Bay on the night of the 19th; Shelburne, N. H., Androscoggin River opened on the 17th; Auburn, N. H., lake free from ice on the 16th; Cazenovia, N. Y., the lake fully open on 21st; Cooperstown, N. Y., ice left Otsego Lake, 26th; West Charlotte, Vt., Lake Champlain opened 21st; Lunenburg, Vt., ice cleared out of Connecticut River on the 22d; Bloomfield, Wis., Geneva Lake opened on the 6th; Madison, Wis., Lake Monoma clear of ice, 8th, and Lake Mendota clear of ice, 11th; Buffalo, N. Y., harbor ice-bound during month; Milford, Pa., Delaware River cleared of ice on the 6th; Escanaba, Mich., ice left Green Bay on 24th; still firm in Escanaba harbor, 26th; left the harbor on the 30th; Breckenridge, Minn., river rising and ice breaking away on the 11th; river fell and ice breaking, 15th; La Crosse, Wis., ice moving, 6th, and river clear, 7th; Saint Paul, Minn., ice gorge broke, 8th; river clear, 10th; drift, 11th, 12th, and 16th; Bangor, Me., harbor clear of ice, 11th; Albany, N. Y., river clear, 1st; Port Huron, Mich., harbor free on the 6th; floating ice, 7th; large ice-field, 11th; Alpena, Mich., bay clear of ice, 20th; Pembina, Minn., river ice moving, 19th; free, excepting floating ice, 22d.

Opening of navigation.—Fort Ontario, first vessel arrived, 6th; Madison Barracks, navigation open and vessels leave, 24th; Gardiner, Me., the Kennebec River opened on the 7th. West Charlotte, Vt., regular steamers resume trips, 26th; Neillsville, Wis., a good stage of water in Black River, and logs running out on the 9th; Detroit, Mich., first boat left on the 4th, and the first boat for Lake Huron on the 8th; Rochester, N. Y., first vessel out on the 4th; Northport, Mich., first schooner arrived, 13th, first steamer arrived, 24th; Moorhead, Minn., first steamer arrived, 24th, left on the 24th; Plattsmouth, Nebr., first steamer went up the river, 8th; Toledo, Ohio, first steamer from Canada on the 4th; Escanaba, Mich., steamers crossed channel through the ice, 27th; Saint Paul, Minn., navigation opened, 22d; Bangor, Me., navigation opened, 12th; Chicago, Ill., opened, 28th; Bismarck, Dak., first boat up river, 24th; Erie, Pa., first departure, 12th, arrival, 14th; Cleveland, Ohio, first arrival, 4th; Port Huron, Mich., first boat passed up, 9th; Alpena, Mich., first steamer arrived, 9th; Pembina, Minn., first boat arrived, 26th.

WATER TEMPERATURES.

The maximum and minimum temperatures, as observed at the bottom of waters in rivers and harbors, are given in the table on Chart No. II. Minima of 32° or 33° are recorded at Alpena, Buffalo, Detroit, Duluth, Eastport, Milwaukee, Pittsburgh, and Saint Paul. Maxima are reported, from Key West, 83°; Augusta, 73°; Galveston, 79°; Montgomery, 70°; Saint Mark's, 73°; Shreveport, 75°. Ranges of 20° or more are reported from Grand Haven, Keokuk, Saint Paul, and Toledo, 20°; Augusta and Saint Louis, 21°; Leavenworth, 22°; Omaha, 23°; Yankton, 27°. At Golden City, Colo., the temperature of Clear Creek was 52°, and of well-water 43°, on the 30th.

ATMOSPHERIC ELECTRICITY.

Thunder and lightning have been observed in the following States on the given dates 1st, Alabama, Georgia, Louisiana, Mississippi, Tennessee, Texas; 2d, Alabama, Florida, Illinois, Indiana, Kentucky, Ohio; 3d, Alabama, Georgia, Florida, Indiana, South Carolina; 4th, Indiana, Louisiana, Missouri; 5th, Illinois, Ohio, Pennsylvania, Texas; 6th, New Mexico, Texas; 7th, Alabama, Connecticut, Louisiana, Mississippi, New York, Rhode Island, Texas; 8th, Dakota; 9th, Dakota, Iowa, Kansas, Missouri, Nebraska, Wisconsin; 10th, Dakota, Illinois, Iowa, Kansas, Nebraska, Pennsylvania, Texas; 11th, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Mississippi, Michigan, Missouri, Nebraska, Ohio, Tennessee, Texas, Virginia, Wisconsin; 12th, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Michigan, Mississippi, Missouri, New Jersey, Pennsylvania, Tennessee, Texas, Wisconsin; 13th, Illinois, Indiana, Iowa, Kentucky, Louisiana, Mississippi, Maryland, Michigan, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Wisconsin, West Virginia; 14th, Alabama, Georgia, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Virginia, Wisconsin; 15th, Illinois, Indiana, Ohio; 16th, Connecticut, Massachusetts, Ohio, Pennsylvania, Tennessee, West Virginia; 17th, Virginia; 18th, Iowa, North Carolina; 19th, Iowa, Kansas, Minnesota, Nebraska; 20th, Illinois, Indiana, Kansas, Kentucky, Michigan, Missouri, New Jersey, New York, Ohio, Pennsylvania, Wisconsin, West Virginia; 21st, Georgia, Illinois, Iowa, Kansas, Kentucky, Missouri, Nebraska, New Jersey, New York, North Carolina, Pennsylvania, Tennessee; 22d, Dakota, Kansas, Michigan, Missouri, Nebraska, Tennessee, Utah; 23d, Indiana, Kansas, Kentucky, Massachusetts, Missouri, Nebraska, North Carolina, Ohio, Tennessee; 24th, Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee; 25th, Dakota, Florida, Indiana, Iowa, Kansas, Louisiana, Minnesota, Nebraska, North Carolina, Texas, Virginia; 26th, Dakota, Illinois, Iowa, Kansas, Louisiana, Missouri, Nebraska, Texas; 27th, Arkansas, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Ohio, Tennessee, Wisconsin; 28th, Alabama, Delaware, Georgia, Louisiana, New Jersey, New York, North Carolina, Pennsylvania, South Carolina, Tennessee, Texas, Virginia; 29th, Illinois, Indiana, Kansas, Missouri, New York, Ohio, Utah; 30th, Alabama, Illinois, Kansas, Minnesota, Nebraska, Tennessee.

Auroras have been feeble, except that of the 19th. They have been reported as follows: 6th, Guttenburg, Iowa; 12th, Havana, Ill.; 14th, Malone, N. Y.; 16th, Waltham, Mass.; 17th, Decatur, Ill.; 18th, Escanaba, Alpena, and Marquette, Mich.; 19th, Buffalo, N. Y., Springfield, Mass., Malone, N. Y., Boston, Mass., Cornish, Eastport, West Waterville, Gardiner, Standish, Orona, and Acton, Me., Hinsdale and Florida, Mass., Shelburne and Contoocookville, N. H., Ardenia, Waterburg, North Argyle, Wappinger's Falls, and Canton, N. Y., Woodstock, West Charlotte, and Lunenburg, Vt.; 22d, Escanaba, Mich., and Indianapolis, Ind.; 23d, Escanaba, Mich., and Woodstock, Vt.; 24th, Breckenridge, Minn., and Malone, N. Y.; 27th, Malone, N. Y.

Telegraphic ground-currents.—Electrical disturbances reported on telegraph-lines at Milwaukee, 11th and 20th; at Santa Fé, N. Mex., 5th; at Philadelphia, 28th; and at Pike's Peak, 24th.

OPTICAL PHENOMENA.

Mirage was observed at Evanston, Ill., on the following dates: 8th, 9th, 21st, 22d, and 24th; New London, 2d, 8th, 11th, 13th, 22d, and 27th; Breckenridge, 6th, 10th, 17th, 19th, and 30th; Fort Ontario, N. Y., 16th, 26th; Atlanta, Kans., 3d, 9th, 12th, 13th, 17th, 18th, 19th, 22d, 24th, 25th, 26th, 27th; Ellinwood, Kans., 7th; Moorhead, Minn., 1st.

Solar halos.—1st, Illinois, Indiana, Kentucky, Ohio, Virginia, West Virginia, Wisconsin, Georgia; 2d, Maryland, North Carolina, Ohio, New York, Kansas, Pennsylvania, Maine; 3d, Maine, Nebraska, Ohio, Wisconsin; 4th, Illinois, Iowa, Minnesota, Ohio, Wisconsin, New York; 5th, Kansas, New Jersey, New York, Vermont, Illinois, Wisconsin, Colorado; 6th, Michigan, Wisconsin, Georgia, Illinois, Minnesota, Dakota; 7th, Connecticut, Maine, Massachusetts, New Hampshire, New York, Ohio, Tennessee, Vermont, Georgia, Virginia; 8th, Maine, Tennessee; 9th, Illinois, Indiana, Michigan, Ohio, Tennessee, Wisconsin, Kansas, Florida; 10th, Maryland, Michigan, Nebraska, New York, Ohio, Pennsylvania; 11th, Connecticut, Massachusetts, Michigan, North Carolina, New Hampshire, New Jersey, New York, Pennsylvania; 12th, Connecticut, Maine, Massachusetts, Michigan, New York; 13th, Maine, New Hampshire, New York, Ohio, Vermont, Georgia, Minnesota, Nebraska; 14th, New Hampshire, New York, Georgia; 15th, Iowa, Nebraska, Tennessee; 16th, Michigan, Maine, New Hampshire, New York, Tennessee; 17th, Nebraska; 18th, Dakota; 19th, Illinois, Ohio, Tennessee, Michigan; 20th, Delaware, Illinois, Maine, Nebraska, Ohio, Pennsylvania, Tennessee, Virginia, North Carolina; 21st, Connecticut, Delaware, Illinois, Indiana, Kentucky, Massachusetts, Minnesota, Michigan, New York, Nebraska, New Jersey, Ohio, Tennessee, Wisconsin; 22d, Illinois, Maine, Michigan, North Carolina, New York, New Jersey, Ohio, Kansas, Connecticut; 23d, Maryland, Pennsylvania, New York, New Jersey; 24th, Massachusetts, Maine, New Hampshire, New York; 25th, Connecticut, Illinois, Iowa, Maine, New York, Vermont, Wisconsin; 26th, Maine, New Hampshire, New York, Ohio, Vermont; 27th, Maine, New Hampshire, New York, Vermont, Wisconsin; 28th, Maine, Ohio; 29th, Iowa, New York, Tennessee, Illinois; 30th, Iowa, Virginia.

Lunar halos.—1st, Iowa, Massachusetts, Minnesota, New Jersey, North Carolina, Ohio, Virginia, West Virginia, Wisconsin, Rhode Island, Kentucky, Florida; 2d, Nebraska, Pennsylvania, Connecticut, Virginia; 3d, Nebraska, Alabama, Minnesota, Colorado, Kansas; 4th, Illinois, Michigan, Minnesota, Ohio, North Carolina, California, New York, New Mexico; 5th, Colorado, Iowa, Kentucky, New York, North Carolina, Ohio, Illinois, Wisconsin; 6th, Arkansas, Michigan, Dakota, Wisconsin, Illinois, New York, Pennsylvania, Ohio, Kansas, Rhode Island, Minnesota, Florida, New Mexico; 7th, New York, Tennessee, Utah, Virginia, North Carolina, Pennsylvania, Michigan, Kentucky, South Carolina, Georgia; 8th, California, Indiana, Maine, Tennessee, Nebraska; 9th, Michigan, Ohio, Tennessee, North Carolina, Dakota; 10th, Tennessee, North Carolina, Alabama, New Jersey, Pennsylvania, New York, Dakota; 11th, New York, North Carolina, New Jersey; 13th, North Carolina; 15th, Kansas; 16th, New York, Kansas; 26th, Utah, Wisconsin; 27th, Pennsylvania, Georgia, South Carolina, Kentucky, Kansas, North Carolina; 28th, New Jersey, Tennessee, Kansas, Colorado, New Mexico, North Carolina; 29th, Illinois, California, Georgia, Colorado, Minnesota, Louisiana, Texas, Kansas, North Carolina; 30th, Indiana, Virginia, Minnesota, Alabama, Georgia, Dakota, Wisconsin, Louisiana, Kentucky, North Carolina.

MISCELLANEOUS PHENOMENA.

Climate of the cotton-belt.—In the cotton interests, the following information is furnished: Chart No. II shows that the cotton-belt is mostly included between the monthly isotherms for April of 70° and 60°, and the table on the same chart shows that these temperatures vary less than one degree from the mean for a long series of years, being slightly above the mean in the Gulf States, and slightly below in the South Atlantic States.

Chart No. III shows that the monthly rain-fall for the cotton-belt has been largely above the mean, particularly in Alabama. A very large portion of this rain fell during the first three days of the month, leaving the latter part of the month very dry; in consequence the crops must have suffered, before the close of the month, in many localities. But abundant rains fell in all of the cotton States, except Southern Texas, during the second week of May. The number of days on which rain fell during April, in the cotton district, varied from 2 at Indianola to 10 at Shreveport, Vicksburgh, and Mobile, and the mean relative humidity in the same section ranges between 54 per cent. at Memphis and Nashville to 77 at Galveston.

Polar bands were observed at Milwaukee on the 18th; Freehold, N. J., 2d and 13th; Carthagena, Ohio, 1st, 6th, 7th, and 21st.

Zoological phenomena.—Birds.—Bluebirds seen at Madison Barracks, N. Y., 6th; Afton, Iowa, 3d; Cornish, Me., 13th; Salem, W. Va., 2d; Embarrass, Wis., 7th; Newport, R. I., 12th. *Blackbirds* seen at Estes Park, Colo., 16th; Independence, Iowa, 7th; Muscatine, Iowa, 6th; Nora Springs, Iowa, 9th; Northport, Mich., 12th; Auburn, N. H., 8th; Palermo, N. Y., 1st; Flushing, N. Y., 2d; West Charlotte, Vt., 7th; Woodstock, Vt., 27th. *Cat-birds* seen at Oregon, Mo., 23d; Plattsmouth, Nebr., 26th; Urbana, Ohio, 29th; Bethel, Ohio, 29th; Jacksonburg, Ohio, 11th; Clarksville, Tenn., 24th. *Ducks* seen at Morgantown, W. Va., flying east on the 1st, and west on the 2d; Milwaukee, Wis., flying north on the 1st; Pembina, Dak., north, 10th and 12th; Saint Paul, Minn., north, 9th. *Geese* seen at Madison Barracks, N. Y., 11th; Mount Sterling, Ill., 16th, moving north; Hatton, Kans., 1st and 3d, north; Cornish, Me., 6th, north; North Port, Mich., 19th, north; Brookhaven, Miss., 23d, north; Emerson, Nebr., 3d, north; Palermo, N. Y., 2d and 12th, north; Morgantown, W. Va., 4th, north; Milwaukee, Wis., 1st, north; Cairo, Ill., 20th, north; Davenport, Iowa, 5th, north; Breckenridge, Minn., 21st and 28th, north; Saint Paul, Minn., 8th, north; Atlantic City, N. J., 5th, 7th, 11th, 12th, and 14th, north; Newport, R. I., 24th, southeast; Pembina, Dak., 8th, 10th, and 12th, north; Portland, Oreg., south, 2d and 19th. *Kildeer, Plover,* and *Snipe* seen at Louisville, Ill., 20th. *Martens* seen at Decatur, Ill., 21st; Afton, Iowa, 3d; Independence, Iowa, 10th; Monticello, Iowa, 4th; Holton, Kans., 5th; Burlingame, Kans., 3d; Bennettsville, Ky., 6th; Corning, Mo., 3d; North Hammond, N. Y., 19th; Weldon, N. C., 3d; Urbana, Ohio, 7th; Bellefontaine, Ohio, 10th; Kenton, Ohio, 6th; Bethel, Ohio, 10th; Jacksonsborough, Ohio, 6th; Ringgold, Ohio, 16th; Westchester, Pa., 11th; Clarksville, Tenn., 2d; Clarksville, Tex., 2d; Newport, Vt., 22d; Bloomfield, Wis., 14th; Embarrass, Wis., 26th; Utica, Wis., 9th; Morgantown, W. Va., 13th; Grand Haven, 21st; Malone, 21st. *Meadow larks:* Estes Park, Colo., 16th; Golden City, Colo., 20th, nesting; Somerset, Mass., 2d; Contoocookville, N. H., 16th; Bismarck, 10th. *Mocking-birds* first seen at Fort Madison, Iowa, 13th. *Pelicans:* Cairo on the 21st, moving north. *Pigeons:* Morgantown, W. Va., 3d and 4th, moving west. *Prairie-chickens* seen at Independence, Iowa, 4th, and at Monticello, Iowa, 5th. *Prairie-owls:* Golden City, Colo., 29th. *Robins* seen at Fort Ontario, N. Y., 2d; Madison Barracks, N. Y., 6th; Estes Park, Colo., 9th; West Waterville, Me., 10th; Standish, Me., 2d; Mount Desert, Me., 8th; Florida, Mass., 12th; Lunenburg, Vt., 12th; West Charlotte, Vt., 1st; Strafford, Vt., 3d; Newport, Vt., 11th; Salem, W. Va., 2d; Grand Haven, 10th; Malone, 10th; Newport, 12th; Eastport, Me., 19th. *Sand hill cranes* seen at Independence, Iowa, 7th; Holton, Kans., 3d; Emerson, Nebr., 3d. *Swallows*

seen at Independence, Iowa, 7th; Standish, Me., 20th; Fall River, Mass., 8th; Litchfield, Mich., 21st; Hudson, Mich., 12th; Contoocookville, N. H., 12th; Wappinger's Falls, N. Y., 28th; Weldon, N. C., 29th; Carthagena, Ohio, 29th; Margaretta, Ohio, 27th; Jacksonborough, Ohio, 13th; Ringgold, Ohio, 16th; West Charlotte, Vt., 12th; Prospect Hill, Va., 12th; Embarrass, Wis., 30th; Morgantown, W. Va., 14th. Sparrows seen at Contoocookville, N. H., 12th; Jacksonborough, Ohio, 10th; Ringgold, Ohio, 12th; Woodstock, Vt., 6th; West Charlotte, Vt., 3d; Embarrass, Wis., 11th. *Thrush* seen at Baxter Springs, Kans., 6th; Litchfield, Mich., 15th; Urbana, Ohio, 18th; Little Mountain, Ohio, 11th; Woodstock, Vt., 23d. *Whippoorwills* seen at Monticello, Ark., 6th; Laconia, Ind., 14th; Fort Madison, Iowa, 22d; Nora Spring, Iowa, 26th; Bennettsville, Ky., 9th; Kensico, N. Y., 23d; Weldon, N. C., 29th; Murphy, N. C., 6th; Little Mountain, Ohio, 4th; Hacienda Saluda, S. C., 6th; Purdy, Tenn., 2d; Alta Vista, Va., 2d. *Woodpeckers* seen at Cornish, Me., 15th; Salem, W. Va., 22d; Utica, Wis., 29th. *Insects.*—Grasshoppers' eggs laid August 24, 1875, hatched out April 21, 1876, at Golden City, Colo.; destroying tobacco-plants at Bennettsville, Ky., 22d; seen at Stanley, Kans., 28th; seen at Dodge City, Kans., 30th, near which town the ground was thickly covered with the young; seen at Nashville, 13th, numerous in the country roads and city streets. *Colorado beetle* turned up in digging at Wappinger's Falls, N. Y., 28th. *House-flies* appeared on 26th at Burlingame, Kans., unusually early, they generally come June 1. *Trout-flies* in creek at Golden City, Colo., 20th. *Fire-flies* at Purdy, Tenn., 9th. *Mosquitoes* at Emerson, Neb., 9th. *Fish, &c.*—Shad began to run the 12th at Ardenia, N. Y.; caught in the Hudson on the 15th, at Wappinger's Falls, N. Y. *Frogs* at Grand Haven, Mich., 23d; West Waterville, Me., 22d; Shelburne, N. H., 29th; Hightstown, N. J., 2d; North Hammond, N. Y., 12th; North Volney, N. Y., 11th; Flushing, N. Y., 2d; Tioga, Pa., 12th; Pennville, Pa., 13th; Coalville, Utah, 20th; Salem, W. Va., 1st.

Botanical phenomena.—Budding.—Gooseberry-bushes, at Riley, Ill., 19th; *Maple trees* at Philadelphia, Pa., 12th. *Leafing.—Currant-bushes*, at Southington, Conn., 24th. *Leafing and flowering.—Choke-cherries, plum, willow, elder, melon, cactus, yellow violet, mountain blue-grass, bearberry* and *water-cress*, at Golden City, Colo., on the 29th. *Blooming.*—Dogwood, at Hot Springs, Ark., 11th.; cactus, at Estes Park, Colo.; Breckenridge, Minn., 28th; *red maple*, at Southington, Conn., 24th; *peach-trees*, at Louisville, Ill., 8th; Decatur, Ill., 13th; Muscatine, Iowa, 25th; Fort Madison, 19th; New Market, Md., 17th; Plattsmouth, Nebr., 27th; Vineland, N. J., 10th; Marion, Ohio, 21st; Westerville, Ohio, 19th; Ruggles, Ohio, 30th; Margaretta, Ohio, 27th; Cleveland, Ohio, 24th; Wooster, Ohio, 24th; Santa Fé, N. M., 10th; Philadelphia, 22d; plum-trees, at Havana, Ill., 18th; Fort Madison, 29th; Holton, Kans., 23d; Morgantown, 14th; *pear-trees*, at Havana, Ill., 18th; Vineland, N. J., 13th; *cherry-trees*, at Fort Madison, Iowa, 24th; Holton, Kans., 23d; Baxter Springs, Kans., 24th; Newark, N. J., 28th; Morgantown, 14th; *apple-trees*, at Fort Madison, Iowa, 26th; Holton, Kans., 23d; Baxter Springs, Kans., 24th; Hillsboro', Ohio, 27th; Morgantown, 26th; *cowslips*, at Riley, Ill., 24th; *roses*, at Clarksville, Texas, 30th, very late, usually done blooming by May 1st; *dandelions*, at Salem, W. Va., 22d. *Ripening.—Early Rose potatoes*, nearly ripe at Newport, Fla., 30th; *cucumbers*, nearly ripe at Newport, Fla., 30th; *dew-berries*, ripe at Welborn, Fla., 29th; *green peas* and *potatoes*, abundant at Welborn, Fla., 17th.

Prairie-fires occurred in the vicinity of Dodge City, Kans., on the 19th; Breckenridge, Minn., 18th, 19th, 20th, 21st, 25th, 30th; La Crosse, Wis., 19th, 22d, 24th; Saint Paul, Minn., 17th, 18th, 29th; Monticello, Iowa, 8th, 24th, 25th; De Soto, Nebr., 11th, 12th, 30th; Oregon, Mo., 15th, 20th, 21st. Forest-fires, occurred near Brookhaven, N. Y., 8th, 27th; Wappinger's Falls, N. Y., 26th; Atco, N. J., 21st.

Zodiacal light was observed at Auburn, N. H., on the 18th; Atco, N. J., 18th; Waterburg, N. Y., 11th.

Earthquakes.—The only earthquake reported occurred in Saint Mary's County, Md., on the 10th.

Meteors were seen on the 7th at Council Bluffs, Iowa; 8th, Crawfordsville, Ind.; 9th, Crawfordsville, Ind., Ellinwood, Kans.; 11th, Mount Auburn, Ohio; 14th, Monticello, Iowa; 18th, Corning, Mo.; 19th, Buffalo, N. Y., Smithville, N. C.; 20th, Logansport, Ind., Milton, Fla.; 21st, Smithville, N. C., Green Spring, Ala.; 22d, Montgomery, Ala., Milton, Fla.; 24th, Belmont Farm, Texas; 27th, Davenport, Iowa, North Platte, Nebr.; Rock Island, Ill.; 28th, Smithville, N. C.

NOTE.—Reports of inspectors of the Signal Service during the present month comment on the especial value to the cotton-producing interests of the Signal Service reports, and instance that a single severe storm in the cotton-belt has been known to cause fluctuation in total value of the annual crop amounting to $20,000,000. The usual damages by rain, in the case of hay-crops, are believed to have been greatly reduced in Indiana and Illinois, during the past year, by the prevailing custom of consulting the farmers' bulletin before cutting the hay.

Published by order of the Secretary of War.

ALBERT J. MYER,
Brig. Gen., (Brevet Assigned,) Chief Signal-Officer, U. S. A.

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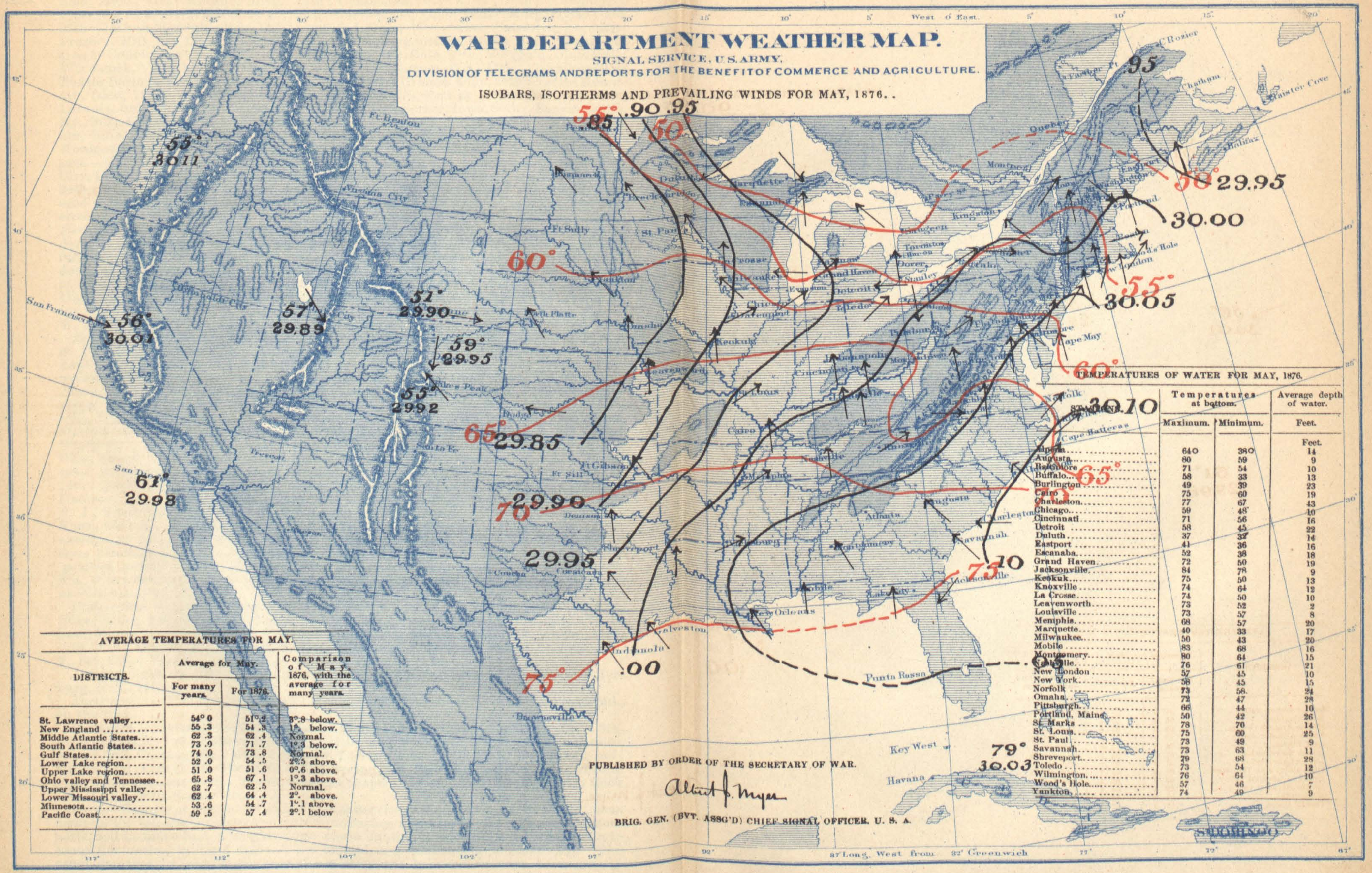

AVERAGE TEMPERATURES FOR MAY.

DISTRICTS.	Average for May. For many years.	Average for May. For 1876.	Comparison of May, 1876, with the average for many years.
St. Lawrence valley	54° 0	51°.2	3°.8 below.
New England	55 .3	54 .3	1°. below.
Middle Atlantic States	62 .3	62 .4	Normal.
South Atlantic States	73 .9	71 .7	1°.3 below.
Gulf States	74 .0	73 .8	Normal.
Lower Lake region	52 .0	54 .5	2°.5 above.
Upper Lake region	51 .0	51 .6	0°.6 above.
Ohio valley and Tennessee	65 .8	67 .1	1°.3 above.
Upper Mississippi valley	62 .7	62 .5	Normal.
Lower Missouri valley	62 .4	64 .4	2°. above.
Minnesota	53 .6	54 .7	1°.1 above.
Pacific Coast	59 .5	57 .4	2°.1 below

TEMPERATURES OF WATER FOR MAY, 1876.

STATIONS.	Temperatures at bottom. Maximum.	Temperatures at bottom. Minimum.	Average depth of water. Feet.
Alpena	64°	38°	14
Augusta	80	59	9
Baltimore	71	54	10
Buffalo	58	33	13
Burlington	49	39	23
Cairo	75	60	19
Charleston	77	67	43
Chicago	59	48	10
Cincinnati	71	56	16
Detroit	58	45	22
Duluth	37	32	14
Eastport	41	36	16
Escanaba	52	38	18
Grand Haven	72	50	19
Jacksonville	84	78	9
Keokuk	75	50	13
Knoxville	74	64	12
La Crosse	74	50	10
Leavenworth	73	52	2
Louisville	73	57	8
Memphis	68	57	20
Marquette	40	33	17
Milwaukee	50	43	20
Mobile	83	68	16
Montgomery	80	64	15
Nashville	76	61	21
New London	57	45	10
New York	58	45	15
Norfolk	73	58.	24
Omaha	72	47	28
Pittsburgh	66	44	10
Portland, Maine	50	42	26
St. Marks	78	70	14
St. Louis	75	60	25
St. Paul	73	49	9
Savannah	73	63	11
Shreveport	79	68	28
Toledo	73	54	12
Wilmington	76	64	10
Wood's Hole	57	46	7
Yankton	74	49	9

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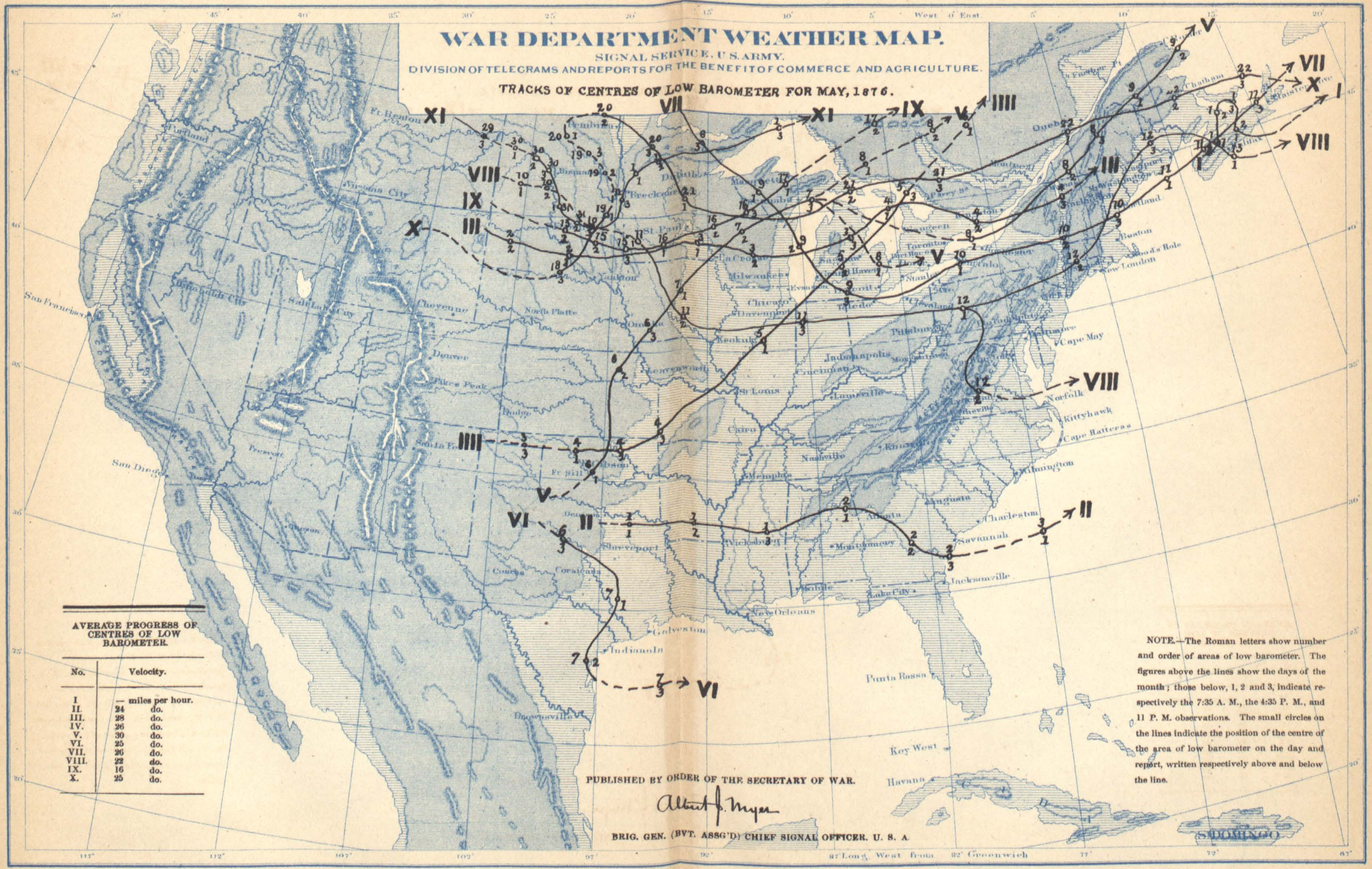
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF LOW BAROMETER FOR MAY, 1876.



AVERAGE PROGRESS OF CENTRES OF LOW BAROMETER.

No.	Velocity.
I	— miles per hour.
II.	24 do.
III.	28 do.
IV.	26 do.
V.	30 do.
VI.	25 do.
VII.	26 do.
VIII.	22 do.
IX.	16 do.
X.	25 do.

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN. (BVT. ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.

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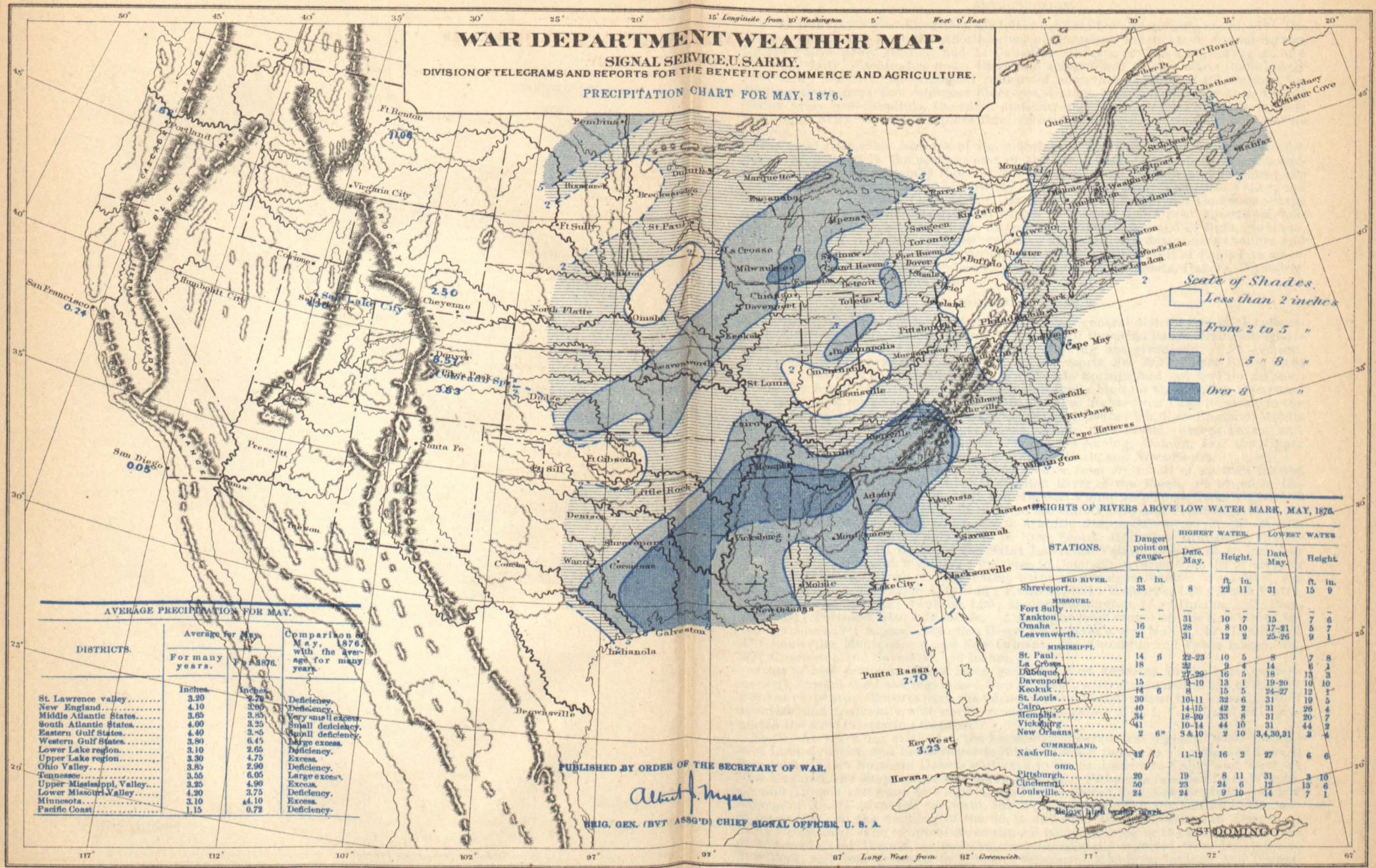
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR MAY, 1876.



AVERAGE PRECIPITATION FOR MAY.

DISTRICTS.	Average for May. For many years.	For 1876.	Comparison of May, 1876, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	3.20	2.72	Deficiency.
New England	4.10	3.90	Deficiency.
Middle Atlantic States	3.65	3.85	Very small excess.
South Atlantic States	4.00	3.25	Small deficiency.
Eastern Gulf States	4.40	3.85	Small deficiency.
Western Gulf States	3.80	6.45	Large excess.
Lower Lake region	3.10	2.65	Deficiency.
Upper Lake region	3.30	4.75	Excess.
Ohio Valley	3.85	2.90	Deficiency.
Tennessee	3.55	6.05	Large excess.
Upper Mississippi Valley	3.25	4.90	Excess.
Lower Missouri Valley	4.20	3.75	Deficiency.
Minnesota	3.10	4.10	Excess.
Pacific Coast	1.15	0.72	Deficiency.

HEIGHTS OF RIVERS ABOVE LOW WATER MARK, MAY, 1876.

STATIONS.	Danger point on gauge.		Highest water. Date. May.		Highest water. Height.		Lowest water. Date. May.		Lowest water. Height.	
	ft.	in.			ft.	in.			ft.	in.
RED RIVER.										
Shreveport	33		8		22	11	31		15	9
MISSOURI.										
Fort Sully	–	–	—		–	–	—		–	–
Yankton	–	–	31		10	7	15		7	6
Omaha	16		28		8	10	17–21		5	7
Leavenworth	21		31		12	2	25–26		9	1
MISSISSIPPI.										
St. Paul	14	6	22–23		10	5	8		7	8
La Crosse	18		32		9	4	14		6	1
Dubuque	–	–	27–29		16	5	18		13	3
Davenport	15		9–10		13	1	19–20		10	10
Keokuk	14	6	8		15	5	24–27		12	1
St. Louis	30		10–11		32	6	31		19	5
Cairo	40		14–15		42	2	31		26	4
Memphis	34		18–20		33	8	31		20	7
Vicksburg	41		10–14		44	10	31		44	2
New Orleans*	2	6*	5 & 10		2	10	3,4,30,31		2	4
CUMBERLAND.										
Nashville	42		11–12		16	2	27		6	6
OHIO.										
Pittsburgh	20		19		8	11	31		3	10
Cincinnati	50		23		24	6	12		13	6
Louisville	24		24		9	10	14		7	1

* Below high water mark.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN. (BVT ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.

MONTHLY WEATHER REVIEW, MAY, 1876.

INTRODUCTION.

In compiling the present review, the following data have been made use of, viz: The charts constructed from the simultaneous observations taken at 88 Signal-Service United States Army stations and 14 Canadian stations, at 7.35 a. m., 4.35 p. m., and 11 p. m., daily, Washington mean time, and telegraphed to this office immediately afterward; monthly meteorological records of observations taken at 465 stations, including those from the volunteer observers, United States naval hospitals, United States Army post-hospitals, Canadian stations, and Signal-Service stations, reliable newspaper extracts, special reports from various sections of the country, and marine records.

The most noticeable features of the month are: The barometric pressure averages higher than usual in the sections east of the Rocky Mountains; the frequent occurrence of tornadoes, especially those of the 6th in Kansas, Illinois, and Indiana; the temperature averages nearly 4° below the normal in the Saint Lawrence Valley, and 2°.5 above in the Lower Lake region; late frosts in Mississippi and Tennessee; large excess of rain-fall in the Western Gulf States, Tennessee, and Upper Mississippi Valley: severe snow-storms along Lake Superior, on Pike's Peak, and in Utah, Montana, and Wyoming Territories; very few reports of droughts; the destructive thunder and hail storms; ice-fields in Lake Superior, Straits of Mackinac, Gulf of Saint Lawrence, and near Saint John's, Newfoundland; grasshoppers in Minnesota, Dakota, Wyoming, and Montana; aurora of the 25th.

BAROMERTRIC PRESSURE.

In general.—Upon chart No. II is represented the general distribution of the atmospheric pressure by the isobaric curves, in black. Of the mean barometric readings received after the printing of the chart, the following are given, viz: Fort Benton, 29.92; Virginia City, 29.66; Pike's Peak, 29.97; Santa Fé, 29.78; Fort Sully, 29.84 inches. (The data on the chart refer to Colorado Springs and not to Pike's Peak.) Along the South Atlantic coast it averages unusually high for the month. Compared with May, 1874, the pressure for May, 1876, averages higher from Lake Superior to the Lower Lakes, in the Saint Lawrence Valley, New Brunswick, New England, Middle States, Ohio Valley, Tennessee, South Atlantic States, Gulf States, (except Texas,) and Oregon; slightly lower from Texas to Colorado, Wyoming, Dakota, and the Upper Mississippi Valley; about the same in California, Utah, and Nova Scotia.

The same, compared with May, 1875, is greater from .01 to .03 of an inch for the Pacific coast, .01 to .05 in the valley of the Red River of the North, .01 to .06 in the Upper Mississippi Valley, .01 to .10 in the Missouri Valley and Upper Lake region, .03 to .10 in the Lower Lake region, .02 to .07 in the Ohio Valley and Tennessee, .01 to .06 in the Gulf States, .06 to .08 in the South Atlantic States, .05 to .09 in the Middle States, .01 to .07 in New England, .10 in Nova Scotia, .02 in New Brunswick and Indian Territory, and .06 to .09 in the Saint Lawrence Valley; it is .01 of an inch less for stations in Utah and Wyoming; for those in Colorado it varies from .02 of an inch above to .02 below. Some of the greatest barometric ranges, reduced to sea-level, are for Fort Sully, 1.46; Dodge City, 1.37; Eastport, 1.31; Bismarck, 1.30; North Platte, 1.25; Breckenridge, 1.22; Yankton, 1.20; Mount Washington, 1.15; Omaha, 1.06; Pembina, 1.04; Portland, Me., 1.02 inches. Among the least ranges are for Key West, .34; San Francisco, .38; Augusta, .44; San Diego, Saint Mark's, and Mobile, .45; Lexington, .47; Louisville, Montgomery, and New Orleans, .48; Knoxville and Tybee Island, Ga., .49; Charleston and Savannah, .50 inches.

Areas of high pressure.—These have, generally, first appeared in the northwestern sections, crossed the Lake region and New England, and disappeared to the southeastward or eastward. Reports from the island of Bermuda show that they extend in that direction, and frequently with north or northeast gales. Nos. I, V, VII and VIII presented the most interesting features.

No. I.—At 7.35 a. m., of the 1st, the barometric pressure was highest, (30.30 inches,) over Lake Superior, and the barometric ridge extended thence to Virginia and toward Manitoba. From Northern Dakota eastward to the St. Lawrence Valley and Northern New England, the temperature was below freezing. Frost was reported from Wisconsin and Illinois eastward to Virginia, the Middle States, and New England. As low barometer No. II advanced eastward, this high pressure gradually shifted to the rear of it, so that, on the morning of the 2d, it extended from Southeastern Dakota to Indian Territory. The temperature continued below freezing in the northern portions of Minnesota and Dakota, while frosts were occasionally reported from Delaware to New York, and from Arkansas to Missouri, Wisconsin, Michigan, Indiana, and Tennessee. By 7.35 a. m., of the 3d, it was central in Northern Louisiana, and frosts occurred from Northern Texas, Arkansas, Mississippi, and Tennessee to Iowa, the Upper Lake region, and Ohio. In advance of low barometers Nos. III and IV, it moved to the east-

ward, and was central off the North Carolina coast on the morning of the 4th, producing frost at places in Delaware, New Jersey, Massachusetts, and Tennessee. During the 4th it united with No. II, which, on the 3d, had extended southward over the Lower St. Lawrence Valley and New England, and on the following morning the highest pressure (above 30.30) reached from the Gulf of St. Lawrence to about latitude 35° N. and longitude 8° E. At 7.35 a. m., of the 6th, it was central to the southeast of Nova Scotia, with barometric readings of about 30.40 inches along that coast, after which it gradually disappeared to the eastward.

No. III appeared during the night of the 3d in Minnesota, but was of little interest. Frosts were reported on the morning of the 4th from Michigan to Wisconsin and Minnesota.

No. IV followed low barometers Nos. V and VI in the Southwest on the 7th, producing a severe "norther" on the Texas coast during the afternoon and night. On the 8th and 9th it moved south and eastward, and on the morning of the 10th reached from Texas to Northern Florida, with frosts as far south as Northern Mississippi, and with a barometric ridge extending from Louisiana to Minnesota. As low barometer No. VII passed to the eastward, the pressure rapidly increased from the Gulf to Lower Michigan. On the morning of the 11th frosts were reported from Delaware, Western North Carolina, Ohio, and Wisconsin. By 7.35 a. m., of the 12th, it covered the Gulf and South Atlantic States, and then gradually lost its distinctive features.

No. V was first observed in Oregon on the 9th, in Montana on the 10th, and in Dakota on the 11th, succeeding low barometer No. VII. At 7.35 a. m., of the 12th, the ridge of highest pressure extended from Dakota to Iowa, with temperatures near freezing in Northwestern Minnesota. As it moved eastward over the Lake region the pressure increased, with barometric readings of 30.36 inches along Lake Superior on the morning of the 13th, and with frosts from Ohio and Indiana to Wisconsin. By 7.35 a. m., of the 14th, it was central over the Virginias, and frosts were reported from Delaware, Pennsylvania, and Ohio northeastward to Maine. As low barometer No. IX advanced eastward, this high pressure area developed into two. On the morning of the 15th they were central off the South Atlantic coast and north of Lake Ontario, and frosts occurred from northern New York to Maine. During the 15th and 16th the former continued nearly stationary, and the latter extended south and eastward, with increasing pressure, over the Middle States, New England, and eastern British Provinces, producing frosts and frequently ice in New York and New England. At 7.35 a. m., of the 17th, the highest (above 30.40) reached from New Jersey beyond Nova Scotia, with frosts in Vermont and Maine. During the 17th and 18th the pressure diminished in the Middle and Eastern States, and slowly in the Southern States.

No. VI, which was of little interest, made its appearance over Lake Superior during the night of the 17th, passed eastward toward New England and the St. Lawrence Valley on the 18th and 19th, and disappeared apparently to the southeastward.

No. VII.—After low barometer No. X began its eastward course, this high-pressure area appeared in Dakota and Minnesota on the 21st, and rapidly extended over the Lake region during the 22d. Along its southeastern front high winds and gales occurred, and frosts in Wisconsin. On the morning of the 23d the highest barometric reading (30.43) was reported from Milwaukee, Wis., with frosts as far south as Iowa, Illinois, Indiana, Ohio, and Virginia. At 7.35 a. m., of the 24th, a narrow area, inclosed by the isobaric curve 30.30 inches, was traced from Southeastern Wisconsin to Pennsylvania, and from latter to northeastern North Carolina, while reports of frosts came from Ohio to Virginia and thence northeastward to New England. During the 24th and 25th it lost its identity by breaking up into several minor areas. On the morning of the 26th frosts were produced from New York to Maine.

No. VIII was first observed during the night of the 28th as approaching Manitoba and Lake Superior from the northwestward, and was central north of the latter on the following morning. It delayed the eastward progression of low barometer No. XI, and northeasterly gales were produced over western Lake Superior. By morning of the 30th, the highest (above 30.20) was central north of Lake Ontario, with reports of frosts from New York, Vermont, and Massachusetts. Thence it moved southeastward over New England. At 7.35 a. m., of the 31st, the isobaric curve 30.30 inches was traced from New Jersey to Nova Scotia, with the highest pressure lying to the eastward, and with frosts from northern New York and Massachusetts northeastward. During the 31st the pressure continued without change along the New England coast, and increased thence to Florida, but the highest remained central southeast of New England.

Areas of low pressure.—A comparison of the charts for the same month in 1873, 1874, and 1875, discloses the following facts, viz: the number of low-pressure areas, traced upon accompanying chart No. I, has averaged about the same during the present month; the paths of lowest barometric depression, after they could be definitely located, have generally been, as heretofore, across the northern sections of the country; they have frequently developed into two or more minor depressions; in some cases they could be traced to the north Pacific coast. Broken lines indicate that the paths cannot be accurately drawn on account of the limited number of stations in the Territories, and the

impossibility of making use of the barometric readings, taken at the high stations, for drawing isobaric curves, as reduced to the sea-level by the method at present in use. Their average movement, in miles per hour, will be found in a table upon chart No. 1.

No. I.—This storm is described in the Review for April as No. XIV. On the 1st instant it continued nearly stationary, and heavy snow fell in New Brunswick and the mouth of the St. Lawrence, accompanied by northeasterly gales, but rain or sleet from Nova Scotia to northern Maine. It disappeared on the 2d, with northerly winds and cold, clearing weather in those sections. Cautionary signals were ordered April 30th from Cape Hatteras to Thatcher's Island, Mass., which were justified by high northwest, north, or northeast winds. During the morning of the 1st a wind velocity of 48 miles per hour was recorded at Father Point, Canada, and increased to a hurricane from the northwest on Mount Washington.

No. II.—On the 30th of April this disturbance was felt in Kansas and Indian Territory. During the 1st instant it moved to Mississippi. Thunder-storms occurred from New Mexico and Kansas to Arkansas, Mississippi, and Tennessee, with frequently heavy rains, and in Kansas gales. Cautionary signals had been ordered at Galveston and Indianola, where southeasterly gales, reaching 40 miles per hour at latter, were succeeded on the morning of the 2d by a severe "norther," attaining 46 miles. During the 2d thunder-storms, occasionally accompanied by hail, were reported from Louisiana to North Carolina. Cautionary signals were displayed in the morning along the North Carolina coast, which were succeeded by high northeasterly winds and a heavy sea. During the 3d and 4th it passed northeastward between Nova Scotia and the island of Bermuda.

No. III.—Apparently advanced southeastward over Eastern Montana on the 2d to Southern Dakota, accompanied by a severe S. E. gale at Fort Sully, which, at 8 p. m., reached 60 miles per hour, and on the 3d by a heavy snow-storm over Lake Superior. As it passed to the eastward, generally light rains fell in the Lower Lake region, New York, and New England. The main disturbance crossed Lake Huron into Canada, while a secondary depression was developed along the Lower Lakes and disappeared in New England. Cautionary signals were ordered on the morning of the 3d at Marquette, Escanaba, Milwaukee, Grand Haven, and Alpena, and on the following morning from Cleveland to Oswego, and were justified by dangerous winds at or in the vicinity of the stations.

No. IV.—Probably developed during the 2d and 3d from No. III, and passed southward over Colorado toward Northern Texas, under the influence of high pressure No. III. Generally light rains and snow fell from Montana to Utah and Colorado. During the 4th brisk and high southerly winds were reported from the Texas coast, with threatening or rainy weather, frequent thunder-storms, and occasional hail; thence northeastward to Indiana, Illinois, Iowa, and Nebraska. On the 5th it moved quite rapidly to Lake Huron, with threatening and rainy weather extending over the Lake region and New England. Thunder-storms were occasionally reported from Texas, Louisiana, Mississippi, and Alabama to Ohio. Like the previous disturbance, it sent a minor depression eastward over New England and Nova Scotia. Cautionary signals were ordered at midnight of the 4th and morning of the 5th from Lake Michigan to Lake Ontario. Dangerous winds were reported as having occurred at Milwaukee and Rochester only.

No. V.—The southern edge of this storm was felt in Oregon, where light rains fell on the 3d and 4th. As it passed southeastward over Montana, Nevada, Utah, Wyoming, and Colorado toward Indian Territory, light rains or snow accompanied it, which continued until the 6th. Upon the last date it moved almost due northward. Threatening and rainy weather reached east and southward to Nebraska, Southern Minnesota, Upper Lake region, Ohio Valley, and West Gulf States, with frequent and severe thunder-storms. Tornadoes are reported to have occurred at a number of places, viz, at Leavenworth, Kans., 6th, 3.15 a. m., (local time,) severe whirlwind passed over city from the southwest, destroying three buildings and unroofing ten others; from 10 p. m. of the 5th up to time of whirlwind a terrific thunder-storm raged, attended by very heavy and incessant rain. In Indiana, on the 6th, about 5 p. m., (local time,) a tornado passed through the southern part of Hamilton County. It formed at White River, about two miles from the north line of Marion County, moved 20° north of east, passed through Delaware, Fall Creek, and Wayne Townships in Hamilton, and stopped in Strong Creek Township, Madison County. It traveled about twenty miles, and was about one hour in passing that distance. Farm-houses, barns, &c., were destroyed. Cattle, sheep, and timber were taken up and whirled through the pipe. Its shape was that of an hour-glass, which, at times, would separate, and its color dark black. Chicago 6th, 5.10 p. m., (local time,) was visited by a tornado, accompanied by rain, thunder, and lightning, from southwest to northeast, having a swift rotary motion from right to left, bounding along like a ball; apparently reached the ground but two or three times; was last seen near the "crib," at which point it demolished the fog-bell tower. Estimated that about a quarter of a million dollars' damage was done to property in and about the city. Carbondale, Ill., 6th, at 9.30 p. m., (local time,) a tornado

struck the city on the northwest, and passed through to the southeast; trees were uprooted, houses unroofed, and the Illinois Central Railroad depot demolished. A few miles to the north a locomotive and train of cars on the Illinois Central Railroad were blown from the track near Neoga, Cumberland County. It was accompanied with vivid lightning, and storm terminated at 11 p. m. Anna, Ill., 6th, at 9.30 p. m., (local time,) during a heavy thunder and rain storm, a tornado, covering a track about five hundred yards wide, and lasting about five minutes, passed near the town toward the northeast, uprooting and breaking off trees 12 and 15 inches in diameter, and damaging buildings. At 11 p. m. the isobaric curve 29.40 inches was central in the southwestern corner of Iowa, with barometric troughs extending thence toward Ohio and Arkansas, where the conditions were favorable for the formation of tornadoes and severe local storms. In the morning signals had been displayed at Chicago, Milwaukee, and Grand Haven, and in the evening and night at the remaining stations along the Lakes. Nearly all were justified by dangerous winds succeeding. At Buffalo and Evanston, Ill., the highest wind-velocity, 36 miles per hour, was recorded. During the 7th the isobaric curves separated quite rapidly, or, in other words, the barometric gradients became less steep and the disturbance lost very much of its force. By midnight isobar 29.70 included nearly the whole of the Upper Lake region, while minor depressions had developed, and were central over Lake Champlain and southeast of Maine. Thunder-storms, with occasional hail, occurred from Tennessee to Kansas, the Lake region, and New England. Upon the 8th it passed into Canada, but sent over the Lower Lakes and Saint Lawrence Valley another secondary depression. Brisk to high westerly winds followed it over Lakes Huron and Erie, and a southwest gale off Cape Hatteras. Thunder-storms continued from North Carolina to Ohio, New York, and Connecticut. On the 9th cautionary signals were ordered from North Carolina to Massachusetts, but only those along the coast of the former were verified. At Smithville, N. C., an hourly wind-velocity of 47 miles from the southwest was recorded, and at Cape Lookout 41 from the south.

No. VI may be considered as a branch of the previous one. During the night of the 6th, 7th, and 8th, as they progressed eastward, a barometric trough connected them. Severe thunder and heavy rain storms resulted in the Gulf States. As the wind shifted to the north it increased to gales at many places, reaching 48 miles per hour at Indianola, 35 at Galveston and Mobile, and 28 at New Orleans. On the 9th it crossed Florida, with thunder-storms thence to Virginia. At Key West the anemometer registered 48 miles per hour from the southwest at 8.20 p. m.

No. VII advanced southeastward over Manitoba on the 8th. During the 9th light rains fell in the Lake region, with thunder-storms in Illinois and Indiana. At 4.35 p. m. a narrow area, inclosed by isobar 29.60, extended along the western shore of Lake Michigan. In connection with minor depressions left by the two previous low barometers, it produced thunder-storms from Indiana to South Carolina and eastward to New England, with occasional hail in Pennsylvania and Delaware, on the 10th. After the winds had shifted to westerly along the New Jersey coast they increased in force, reaching 36 miles per hour at Cape May, 52 at Long Branch, and 70 at Sandy Hook. During the 11th it passed northeastward to the Gulf of Saint Lawrence, accompanied by rainy weather in New England and thunder-storms in Maine. On Mount Washington the wind blew a northwest gale, 36 miles per hour at Newport, 40 at Boston, and 41 at Thatcher's Island, from the west.

No. VIII. During the 10th cloudy and rainy weather prevailed in Montana, but the central depression passed to the northward. By 11 p. m. it had reached Southeastern Dakota, and was inclosed by isobar 29.60 inches. In Dakota and Minnesota severe thunder-storms occurred. During the 11th the northern portion progressed eastward more rapidly than the southern, due to high pressure No. V advancing southeastward in its rear, so that, by 11 p. m., it was central near the southern end of Lake Michigan, with a barometric trough extending southwestward over Indian Territory. Thunder-storms were reported from Colorado to Minnesota, Michigan, and Indiana. Cautionary signals were displayed on the 10th at Duluth, and on the 11th at the remaining stations along the Lakes, the majority of which were justified. At Milwaukee and Grand Haven the northeast wind reached 28 miles per hour, and at Cleveland, N. W., 43. As shown upon Chart No. I, it divided into two on the 12th, one disappearing southeastward over Virginia, the other moving to Maine. Thunder-storms were frequent and severe, accompanied by occasional hail, from North Carolina, Kentucky, and Indiana northeastward to New England. Cautionary signals, were ordered from North Carolina to Maine, but the majority was reported as not justified. At Kittyhawk, N. C., 36 miles of wind from the S. W., were recorded, and at Vineland, N. J., 40. During the 13th the northern branch passed eastward beyond the stations, with thunder-storms in Maine.

No. IX succeeded high pressure No. V. During the 13th the barometer continued falling from Montana southeastward to the Upper Mississippi Valley, with thunder-storms. On Pike's Peak a severe snow-storm prevailed, and several hundred miles east of Dodge City, a tornado, accompanied by unusually heavy rains. At Fort

Sully, the south wind reached 37, and at Breckenridge, S. E., 45 miles per hour. On the 14th the storm-center advanced into Southern Dakota, with severe thunder-storms as far southward as New Mexico and Northern Missouri. At Du Luth a severe northeast gale prevailed; at Dodge City, S. E., 42, Fort Sully, N., 40, and at Saint Paul, S. E., 44 miles per hour were registered. By 4.35 p. m. of the 15th an area, inclosed by isobaric curve 29.40, was central in Southeastern Dakota, with barometric troughs extending southward toward Indian Territory and eastward over Ohio to the New Jersey coast. Frequent and severe thunder-storms prevailed during the day from Dakota and the Lakes southward to Indian Territory, Kentucky, and North Carolina, with occasional hail. The highest hourly wind-velocities recorded were at Toledo, E., 35, Alpena, E., 30, and Milwaukee, S. E., 38 miles. A violent northwest gale, lasting about eight minutes, swept over the vicinity of Fallston, Md., at 7.05 p. m., overturning buildings, prostrating the largest forest-trees, &c. On the 16th it diminished very much in force. High northeast winds were reported from New Jersey coast and Du Luth; frequent, and, at places, destructive thunder-storms from Dakota, Iowa, and Kansas eastward to the Middle States. During the 17th it passed into Canada. Occasional thunder-storms occurred from North Carolina to Ohio, Michigan, and New York; at Cleveland a southwest wind of 42 miles. On the 18th the central depression passed eastward near the mouth of the Saint Lawrence, producing thunder-storms from North Carolina to New York and New England. Cautionary signals were displayed on the 13th along Lakes Superior and Michigan, on the 14th along Lakes Huron and Erie, and on the 15th along Lake Ontario and the New Jersey and North Carolina coasts, all of which were justified except those along Lake Ontario and the North Carolina coast.

No. X. After low barometer No. IX moved eastward over the Northwest, the pressure continued quite low at the stations in Montana. Generally light rains fell on the 16th and 17th from Oregon to Utah and Montana, partly turning into snow. Upon the latter date the central depression passed over Montana and Wyoming, with rapidly-falling barometer west of the Upper Mississippi Valley. Thunder-storms were occasionally reported from Utah and Dakota, and 18 inches of snow from Camp Douglas, Utah. During the 18th it advanced to Dakota and Nebraska, accompanied by rain or snow from Montana and Idaho eastward to Minnesota. Frequent thunder-storms occurred from that section south and eastward to Northern Texas, Missouri, Tennessee, Ohio, and Wisconsin. At Dodge City, an hourly wind-velocity of 36 miles from the east, and at Breckenridge and Davenport, S. E., 36 miles were registered. A water-spout was observed 7 miles northwest of Dubuque. At Fort Benton, nearly 5 inches of rain fell on the 17th and 18th. At 7.35 a. m. of the 19th an area, inclosed by isobaric curve 29.50, covered the eastern portion of Dakota, and a barometric trough extended thence to Ohio. Thunder-storms were frequently reported from Dakota south and eastward to Kansas, Iowa, Illinois, Indiana, Virginias, and Western Pennsylvania, with hail in first and last sections. During the 20th it continued nearly stationary in Northeastern Dakota, but with falling barometer in the Lake region. Destructive hail-storms were reported from Yankton, and Cedar County, Nebr., and frequent thunder-storms from Dakota south and eastward to Northern Texas, Illinois, Michigan, and Western Pennsylvania. Southerly winds reached at Saint Paul 38 and at Denison 60 miles per hour. At 11.50 a. m. a heavy gale of wind or tornado, accompanied with hail one inch in diameter, passed below Yankton, crossed the Missouri River into Nebraska, then curving, crossed its former track near Gayville, 14 miles below Yankton, at noon, and at 3 p. m. had reached Worthington, Minn. Considerable damage was done to buildings and crops. During the 21st it crossed the Upper Lake region quite rapidly, and was followed by high pressure No. VII. Frequent and severe thunder-storms, with hail in many places, resulted from Wisconsin to Northern Texas and eastward to the Atlantic States. Some of the highest hourly wind-velocities are: For Port Huron, N., 30, Toledo, S. W., 27, Indianola, S., 36, Sandy Hook, N. W., 40, and Cape May, N. W., 44 miles. At 4.35 p. m. of the 22d the pressure was lowest over New Brunswick and the New England coast, with a barometric trough extending southwestward toward Florida, and rapidly-increasing pressure in the Lake region. In the Middle States, New England, and North Carolina frequent and severe thunder-storms occurred, with occasional hail, and a tornado at Rondout, N. Y. Some of the highest wind-velocities reported are for Milwaukee, N. E., 34, Port Huron, N., 48, Oswego, N., 36, Sandy Hook, N., 40, Long Branch, N.W., 48 miles per hour, and on Mount Washington a gale. On the 23d it disappeared eastward over Nova Scotia, followed by clearing weather in the Atlantic States. Cautionary signals were displayed on the 18th at Duluth, and 19th at Escanaba and Marquette, but not justified; on the 22d, along the Lower Lakes and Atlantic coast from Georgia to Maine, the majority of which were succeeded by dangerous winds. This disturbance left a secondary depression, which, on the 22d, in connection with low pressure No. VII, caused thunder-storms from Nebraska and Colorado to Indian Territory, with occasional hail. On Pike's Peak a severe snow-storm prevailed. At Dodge City a northeast wind of 51 and Denver 40 miles per hour were recorded. During the 22d and 23d, 6.70 inches of rain fell at Denver. Thunder-storms continued on the 23d from Ne-

braska to Mississippi, Louisiana, and Northern Texas, and on the 24th, 25th, 26th, and 27th from Texas to Alabama.

No. XI. On the 28th, falling barometer in the Upper Missouri Valley indicated the approach of this storm, and very light rains were reported from Utah to Nebraska, with a hail-storm below Fort Randall, Dak. At 7.35 a. m. of the 29th it was probably central over the eastern portions of Wyoming and Montana, with a barometric trough extending eastward over the Lake region. Frequent thunder-storms were reported during the day from Dakota and Montana south and eastward to Texas, Alabama, Illinois, and Michigan, with hail in Nebraska, Montana, Dakota, Iowa, and Michigan. At Detroit, Mich., severe thunder-storm at 2.45 p. m.; during morning barometer fell steadily; 2 p. m., temperature 82° Fahrenheit, and heat overpowering, notwithstanding a steady west wind of 12 miles per hour; 2.45 p. m., wind suddenly veered from west to north, and in a few moments to northeast, increasing to 20 miles per hour; rain in torrents, flooding streets and basements, and washing away pavements, trees, curbing, &c.; 3.30 p. m., during a period of five minutes, the wind blew at the rate of 35 miles per hour, and some hail fell at the same time. The following hourly wind-velocities were reported: At Duluth, N. E., 36, Breckenridge, S. E., 29, and Toledo, N. E., 42 miles. During the 30th the pressure continued diminishing over the Northwest and Lakes, and, at 11 p. m., an area, inclosed by isobaric curve 29 inches, was central in Dakota. Thunder-storms were occasionally reported from thence to Michigan and the Gulf States, with snow and hail in Montana and Utah. The following are some of the highest hourly wind-velocities: Indianola, S., 30, North Platte, S. E., 40, Dodge City, E., 43, and Pike's Peak, W., 76 miles. On the 31st the central depression advanced to Eastern Dakota, with a barometric trough extending southward over Indian Territory. Frequent and severe thunder-storms prevailed from Dakota, Minnesota, and the Upper Lakes to the Gulf States, with hail in Wyoming. At Saint Louis, S., 34, Breckenridge, S. E., 41, and North Platte, 42 miles per hour were recorded. Cautionary signals were ordered on the 29th at Du Luth, Milwaukee, Chicago, and Grand Haven, on the 30th at Escanaba and Marquette, and on the 31st as far east as Buffalo, the majority of which were justified. As this storm moved to the eastward it diminished very much in force.

TEMPERATURE OF THE AIR.

The isothermal curves, (in red,) upon Chart No. II, illustrate the general distribution of the temperature of the air for the month. Mean temperatures received late and not given on the chart are: For Fort Benton, 57°; Virginia City, 46°.4; Pike's Peak, 21°.4; Fort Sully, 61°.7; North Platte, 59°.6; Santa Fé, 55°.9; Mount Washington, 33°.1. By referring to the table in the lower left-hand corner of the same chart it will be seen that the average is below that for many years in New England, the South Atlantic States, along the Pacific coast, and in the Saint Lawrence Valley; nearly the same in the Middle Atlantic States, Gulf States, and Upper Mississippi Valley; above in the Lake region, Ohio Valley, Tennessee, and Missouri Valley. Minimum and maximum temperatures, respectively, for the month are given for the following stations, viz: Portland, Oreg., 36°, 82°; San Francisco, 45°, 81°; San Diego, 50°, 76°; Salt Lake City, 33°, 88°; Cheyenne, 27°, 81°; Denver, 32°, 85°; Pike's Peak, 2°, 39°; Santa Fé, 28°, 78°; Virginia City, 24°, 81°; Bismarck, 23°, 87°; Pembina, 22°, 57°; Fort Sully, 27°, 96°; Saint Paul, 31°, 89°; Leavenworth, 37°, 87°; Du Luth, 26°, 87°; Marquette, 23°, 86°; Chicago, 35°, 87°; Detroit, 30°, 85°; Oswego, 31°, 91°; Pittsburgh, 27°, 91°; Memphis, 48°, 88°; New Orleans, 57°, 86°; Indianola, 58°, 87°; Eagle Pass, Tex., 72°, 102°; Key West, 70°, 91°; Savannah, 50°, 94°; Norfolk, 38°, 89°; Knoxville, 40°, 89°; Washington, 34°, 90°; New York, 34°, 83°; Boston, 34°, 86°; Eastport, 33°, 65°; Mount Washington, 7°, 55°.

Ranges in temperature.—The greatest ranges, from 61° to 69° Fahrenheit, are reported from Western Pennsylvania to Minnesota and Dakota; the least ranges, 21° to 30°, from Southern Florida to Texas, 26° at San Diego, and 32° at Eastport and Wood's Hole.

Frosts and ice, destructive to fruits and early vegetables, are reported as follows, viz: On the 1st, ice formed ¼ inch thick at Elmira, Ill., Atco, N. J., and West Chester, Pa.; at Ringgold, Ohio, cherry, plum, and apple trees, and at Morgantown, cherry, peach, and plum trees were injured by freezing; 2d, 6th, and 19th, at Santa Fé, tender vegetables damaged; 3d, at La Grange, Tenn., (latest frost known,) fruit all killed, except cherries and grapes, at Corsicana vegetation slightly damaged, and at Muscatine, Iowa, sweet potatoes and tomatoes killed; 15th, ice formed at Salt Lake City; 16th, asparagus frozen at Gardiner, Me.; 16th and 17th, at San José, Cal., grapes injured; 17th, a frost, damaging vegetation, at Carson City, Nev., and at New London ice formed ⅜ inch thick; 18th, at Kanab, Utah, peaches, apples, grapes, &c., killed—ice ¼ inch thick; 21st, potato-vines killed at Viejas, Cal.; 23d, Malone, N. Y., vegetables killed; 31st, squash-vines killed at Plaistow, N. H. At Fayette, Miss., first May frosts for years on 3d and 9th.

PRECIPITATION.

Upon Chart No. III is represented the distribution of rain-fall and melted snow. The following figures were received after the printing of the chart, viz: Virginia City, 5.58; Pike's Peak, 4.73; Santa Fé, 0.83; Mount Washington, 7.83; Rio Grande City, Tex., 0.56; Eagle Pass, Tex., 1.27 inches. A table upon same gives the average of the month for this and many years. There has been a deficiency of .43 inch for the Pacific coast, .45 for the Lower Lake region and Missouri Valley, .50 for the Saint Lawrence Valley, .55 for the Eastern Gulf States, .75 for the South Atlantic States, .95 for the Ohio Valley, 1.05 for New England. An excess of .20 inch has been recorded for the Middle Atlantic States, .45 for the Upper Lake region, 1.00 for Minnesota, 1.65 for the Upper Mississippi Valley, 2.55 for Tennessee, 2.65 for the Western Gulf States.

Snow-fall.—At Colebrook, Conn., 4 inches on morning of 1st; Southington, Conn., 2 inches on 1st; Middletown, Conn., 1 inch on 1st; Vail, Iowa, ground white on 1st and 4th; Florida, Mass., 2 inches on 1st; Fall River, Mass., ⅜ inch on 1st; Shelburne, N. H., snow-storm 1st; Kensico, N. Y., 8-10 inch on 1st; Wappinger's Falls, N. Y., ¾ inch on 1st; Du Luth, Minn., on 3d, heaviest fall at one time during season; Escanaba, Mich., heavy snow-storm 3d; Salt Lake City, heavy snow 31st.

Rainy days.—The number of days on which rain fell during the month averages as follows: In New England, 16; Middle Atlantic States, 12; Southern States and Ohio Valley, 10; Lake region, 15; Upper Mississippi Valley, 12; Missouri Valley, 9; Rocky Mountain stations, 13. Only one light shower occurred at San Diego, and two at San Francisco, during the month, while sixteen days, on which more or less rain fell, are reported for Portland, Oreg. At Campo, Cal., and Stanwix, Ariz., not any rain fell.

Cloudy days.—The number varies, in New England from 4 to 13; Middle States, 3 to 13; South Atlantic States, 2 to 9; Gulf States, 0 to 11; Tennessee and the Ohio Valley, 2 to 12; Lake region, 4 to 13; Northwest, 0 to 13; Territories, 3 to 21.

Droughts.—At Litchfield, Mich., season backward and dry, but vegetation looks promising; Kanab, Utah, at close of month streams much lower than usual at this season, although much snow fell during the winter in the mountains, and crops will suffer unless rain falls to increase the streams.

Freshets.—Shreveport, La., rain-fall on 6th and 7th, 7.33 inches, flooding the lower part of the city and causing, the greatest rise (3 feet 10 inches in 24 hours) ever known in the Red River in the same space of time; 8th, Keokuk, Mississippi River 11 inches above "danger-line," but not doing much damage; 9th, Ottawa River overflowed at Ottawa, Canada; 10th, dangerous freshet at Lancaster, N. H., in Connecticut River; 12th, dangerous freshets in New Hampshire and Maine—Connecticut River higher than for 25 years; 17th, at Shelburne, N. H., highest freshet in Androscoggin River in years; 20th, at Fort Benton, since 17th river has risen 29 inches; 21st, at Lyndon, Ill., Rock River 2 or 3 feet above usual stage for May; at Fort Sully, river rose 21 inches, beginning of June rise; 22d, freshets near Denver, and Golden, Colo., severe rain-storm, damaging railroad, bridges, &c.; 25th, freshet in South Platte River, Nebraska; 30th, Portland, Oreg., the Willamette River said to be within 3 feet of high water of 1862, (the highest on record,) all the cellars in lower part of town flooded; considerable damage also reported on the Lower Columbia River; 31st, at Lunenburg, Vt. month wet and streams higher than usual.

RELATIVE HUMIDITY.

The average relative humidity for the month ranges at the Atlantic sea-coast stations from 71 to 81 per cent.; at the cities on the Atlantic coast and in the interior of the Atlantic States, 61 to 75; Gulf States, 69 to 76; Tennessee, Arkansas, and Indian Territory, 61 to 69; Missouri, Upper Mississippi and Ohio Valleys, 54 to 65; Lake region, 63 to 73; Minnesota, Dakota, and plains of Nebraska and Kansas, 52 to 62; Rocky Mountain stations, 42 to 66; Pacific coast, 65 to 76; *Dry stations.*—Santa Fé, 42 per cent.; Denver, 43; Colorado Springs, 45; Salt Lake City, 48; Bismarck, 52; Fort Sully, 53; Cincinnati, 54; Louisville and Breckenridge, 55. *Moist stations.*—Mount Washington, 86; Atlantic City, 81; Barnegat, 78; Tybee Island, Kitty Hawk, and Long Branch, 77; Indianola, Cape Hatteras, Thatcher's Island, and San Diego, 76

WINDS.

Prevailing winds.—By an examination of Chart No. II it will be seen from which direction the winds have blown most frequently, the arrows flying with the wind. The following are some of those not on the chart, viz: At Key West, from the E.; Rio Grande City, Texas, S. E.; Pike's Peak, W.; Santa Fé, S. W.; Fort Sully, S. E.; Virginia City, S. W.; San Diego, S.; Portland, Oreg., N.; Campo, Cal., W.; Stanwix, Ariz., S. W.

The *maximum velocities* and *tornadoes* are generally given in connection with the movement of low barometers. On Mount Washington, during the evening of the 1st, the hourly wind-velocity reached 102 miles. A gale was experienced on the 30th south of Bermuda, with the force 8 on the scale 0 to 10.

Total movements.—The largest total movements of the air during the month, independent of direction, have been recorded at the following stations: Pike's Peak, 15,720 miles; Dodge City, 12,010; Indianola, 11,757; Cape Lookout, 11,061; Cape Hatteras, 10,487; Breckenridge, 10,318. The smallest total movements reported are: Wytheville, Va., 2,745 miles; Lynchburg, 2,911; Augusta, 2,961; Portland, Oreg., 3,057; Vicksburg, 3,123; Nashville, 3,170.

VERIFICATIONS.

The *Probabilities*, as worked up three times daily and issued to the public, have been carefully compared with the actual conditions following. The percentage of verifications has averaged 83.9 for New England; 88.7 for the Middle States; 90.1 for South Atlantic States; 92.0 for Eastern Gulf States; 89.4 for Western Gulf States; 88.3 for Tennessee, Ohio Valley, and Lower Lake region; 87.6 for Upper Lake region; 90.1 for Upper Mississippi Valley; 87.9 for Lower Mississippi Valley. The average for the whole country is 89 per cent. For the weather, 92.3; wind direction, 90.3: temperature, 88.6; barometric changes, 85.4 per cent. have been obtained.

Cautionary signals.—Out of 184 displayed along the lakes and coast, 102 were succeeded by wind-velocities of over 24 miles per hour within a radius of 100 miles. So far as known, 82 were not justified. There have been reported 60 cases where the wind attained a velocity of over 24 miles per hour without the display of signals. All of these came from scattered stations, except on the 7th from the Western Gulf coast; 10th, New Jersey coast; 11th, New England coast; 21st and 22d, Lakes.

NAVIGATION.

Duluth, ice began to move out of harbor on 8th; first boat of season out 9th, and first arrived 13th; harbor closed by ice driven in by northeast gale 15th to 24th. Albany, canal navigation "officially" opened 4th. Buffalo, navigation opened 5th; harbor full of floating ice 11th, partly clear 12th, and clear 14th. Marquette, navigation opened 11th. Milwaukee, first steamer of season from Lower Lakes arrived 2d; ice in Straits of Mackinaw for 30 miles and unusually strong, some of it being 4 feet thick. Fort Niagara, N. Y., river free of ice 13th. Near Cape Rozier, (Gulf of Saint Lawrence,) heavy ice-fields seriously obstructed navigation 1st; four steamers and about sixty sails detained in the ice. Ice-field 20 miles southeast of Anticosti Island 27th. St. Johns, Newfoundland, 10th, for the last fortnight coast has been so beset with ice as to render it impossible for vessels to go to or come from the north, and with much difficulty can get south; harbor now full of field-ice, and two large icebergs; 15th, ice outside; 18th, string of, ice across harbor; 19th and 20th, ice in harbor.

Height of rivers.—Upon Chart No. III is printed a table giving the highest and lowest water-marks, with the dates upon which they occurred. The Red River fell nearly 3 feet from 1st to 6th, rose over 5 feet by 8th, and then fell steadily to close of month. The Mississippi was above the "danger-line" at Cairo from the 10th to the 18th, continued above at Vicksburg throughout the month, and was very near it at New Orleans from the 7th to 10th.

WATER TEMPERATURES.

The maximum and minimum temperatures alone, with the average depth of water, are given in a table on Chart No. II, for stations along the lakes, rivers, and coasts. The least range, 5°, was recorded at Duluth and Eastport; the greatest ranges, 26°, at Alpena, and 25°, at Buffalo, Keokuk, Omaha, and Yankton.

ATMOSPHERIC ELECTRICITY.

Auroras.—That of the 25th was most extensively observed. Displays were reported as having been seen on the 4th and 11th at Monticello, Iowa; 12th, North Shippen, Pa.; 17th, Duluth, and Florida, Mass.; 18th, Buffalo and Eastport; 23d, Malone, N. Y.; 24th, Escanaba and Eastport; 25th, Duluth, Saint Paul, Pembina, Dak., Alpena, Escanaba, Eastport, Gardiner, Me., and Malone, N. Y.

Ground-currents were reported from Pike's Peak, 11th and 13th; Santa Fé, 25th; Milwaukee, 19th, electric storm on telegraph-line.

Thunder-storms have been very generally mentioned, whenever they have occurred, in giving the details under the head of low-pressure areas.

OPTICAL PHENOMENA.

Solar halos.—1st, California, Michigan, Nevada, Ohio, Utah, Wisconsin, Virginia; 2d, New York, Pennsylvania, Connecticut, New Jersey, Michigan, Nebraska; 3d, Illinois, Iowa, Kansas, New York, Ohio, West Virginia; 4th, Illinois, Maryland, Massachusetts, Michigan, Delaware, Mississippi, New York, New Jersey, Wisconsin; 5th, New York, Florida; 6th, Mississippi, New York, New Jersey, Minnesota; 7th, Nebraska; 8th, Kentucky, Ohio; 9th, Oregon; 11th, Michigan, Ohio, Illinois, Florida, New York; 12th, Mississippi, Nebraska, Tennessee; 13th, Kansas, Dakota; 14th, Massachusetts, New Hampshire, Michigan, Connecticut, New York, Ohio, Pennsylvania, Tennessee, Kansas;

15th, Ohio, Tennessee, New York; 16th, Massachusetts, Mississippi, New Hampshire, New York, Wisconsin, South Carolina, Kansas; 17th, Iowa, Mississippi, Nebraska, New York, Ohio, Kansas, Minnesota; 18th, Michigan, Mississippi, Ohio, Wisconsin, South Carolina; 19th, Mississippi, Nebraska, Tennessee, Oregon; 20th, Illinois, Iowa, Michigan, New Hampshire, New York, Louisiana; 21st, Georgia, California, Illinois, Iowa, Maine, New York, Oregon, Kansas, Nebraska, Washington Ter.; 22d, Iowa, Mississippi, Nebraska, New York, Oregon, West Virginia, North Carolina, Washington Ter.; 23d, Illinois, Indiana, Iowa, Mississippi, Georgia, Nebraska, Ohio, Tennessee, Florida, Washington Ter.; 24th, Illinois, Indiana, Ohio, Tennessee, Maine, Iowa, Dakota; 25th, Indiana, Mississippi, Nevada, New Jersey, Iowa, Florida; 26th, Illinois, New York, Wisconsin; 28th, Iowa; 29th, Louisiana, Iowa; 30th, Indiana; 31st, Florida, California, Illinois, Indiana, Georgia.

Lunar halos.—1st, Michigan, New York, Ohio, Pennsylvania, West Virginia, Virginia, Utah, Oregon; 2d, Maine, Michigan, New York, Colorado, Rhode Island, Connecticut; 3d, Colorado, Dakota Territory, Georgia, Illinois, Iowa, Kansas, New York, North Carolina, Ohio, Tennessee, Virginia, West Virginia, Pennsylvania, Maine, Rhode Island; 4th, Florida, California, Iowa, Georgia, Louisiana, Massachusetts, Nebraska, New Jersey, New York, Ohio, Virginia, Pennsylvania, North Carolina; 5th, North Carolina, Minnesota, Florida, Georgia; 6th, Alabama, Mississippi, New Jersey, New York, Ohio, Virginia, Tennessee, North Carolina; 7th, New Jersey, Pennsylvania, South Carolina, Illinois, Virginia, New York, North Carolina, Georgia; 8th, New York, Illinois, North Carolina, Georgia, Oregon; 10th, Texas, North Carolina; 11th, North Carolina; 24th, California, Iowa; 25th, Louisiana, North Carolina; 27th, North Carolina, Louisiana, Georgia; 28th, Dakota Territory, Illinois, Massachusetts, Iowa, Nebraska, Louisiana, Ohio, Mississippi; 29th, Alabama, Illinois, New Jersey, Utah, Texas, Rhode Island, Minnesota, North Carolina, Dakota Territory; 30th, Illinois, Tennessee, Florida, Nebraska; 31st, Illinois, Indiana, Tennessee, Virginia, South Carolina, Florida, Nebraska, Minnesota, North Carolina.

Mirage.—10th, Ellinwood, Kans., and Evanston, Ill.; 17th, Duluth; 21st, Alpena; 2d, 15th, 17th, 19th, 23d, 24th, 28th, New London; 3d, 4th, 10th, Tybee Island, Ga.

MISCELLANEOUS PHENOMENA.

Zoological.—Birds.—Wild geese were seen flying north at Duluth, and Hennepin, Ill., 10th; Northport, Mich., 2d and 4th. *Martens* first seen at Breckinridge, 22d; Eastport, 15th; Hennepin, Ill., 29th. *Swallows*, (barn and chimney,) appeared at Southington, Conn., 6th; Cornish, Me., 7th; Mt. Desert, Me., 17th; Dunbarton, N. H., 6th; Auburn, N. H., 1st; Waterburgh, N. Y., 12th; Palermo and North Hammond, N. Y., 6th; Flushing, N. Y., 3d; Coalville, Utah, 8th; Woodstock and Strafford, Vt., 8th; Utica, Wis., 9th; Breckinridge, 22d; Eastport, 18th. *Oriole* appeared at Southington, Conn., 9th; Cornish, Me., 17th; Somerset, Mass., 7th; Dunbarton, N. H., 9th; Palermo, N. Y., 7th; Chambersburg, Pa., 3d; Woodstock, Vt., 4th; West Charlotte, Vt., 9th; Strafford, Vt., 18th; Utica, Wis., 12th. *Sparrow* appeared at Eastport, 18th. *King-bird* appeared at Southington, Conn., 10th; Cornish, Me., 9th; Somerset, Mass., 5th; Florida, Mass., 19th; Plattsmouth, Nebr., 8th. *Plover* returned to West Charlotte, Vt., 7th. *Humming-bird* appeared at Louisville, Ill., 9th; Auburn, N. H., 18th. *House-wrens* appeared at Dunbarton, N. H., 9th; Palermo, N. Y., 8th; Eastport, 12th. *Bobolink* appeared at Louisville, Ill., 10th; Cornish, Me., 8th; Mount Desert, Me., 16th; Somerset, Mass., 13th; Waterburgh, N. Y., 10th; Palermo, N. Y., 15th; North Hammond, N. Y., 7th; Woodstock and West Charlotte, Vt., 9th; Strafford, Vt., 15th. *Whip-poor-will* appeared at Holton, Kans., 10th; Cornish, Me., 12th; Oregon, Mo., 2d; Auburn, N. H., 9th; Tioga, Pa., 5th; North Shippen, Pa., 8th; Salem, W. Va., 3d; Embarrass, Wis., 10th. *Robins* appeared at Mount Desert, Me., 25th. *Blue-bird* appeared at Waterburgh, N. Y., 18th; Palermo, N. Y., 8th. *Cat-bird* appeared at Mount Desert, Me., 25th; Somerset, Mass., 1st; Auburn, N. H., 12th. *Yellow-birds* appeared at Somerset, Mass., 3d. *Brown thrush* appeared at Dunbarton, N. H., 9th; Auburn, N. H., 12th. *Mocking-bird* appeared at Northport, Mich., 18th; Embarrass, Wis., 7th. *Insects.—Colorado beetle* or *potato-bug* about Rocky Run, Wis., 21st; Morgantown, W. Va., 8th; destroying potatoes and tomatoes at Stapleton, N. Y., and Trenton, N. J.; appeared at Southington, Conn., 28th. *Chintz-bug* on wheat at Guttenberg, Iowa. At Lynchburgh, tobacco suffering from ravages of bugs. *Fire-flies* were seen at Bennettsville, Ky., 3d; Saint Meinrad, Ind., and Stanley, Kans., 20th; Southington, Conn., 27th. *Winged ants* numerous at Bennettsville, Ky, 7th. *Grasshoppers* hatched out at Breckinridge, 23d; were alive at Cheyenne, 14th; reported to have appeared in prairies near Pembina, and hatching out by millions in valleys about Virginia City, 28th. Young *katydids* crawling about at Brookhaven, Miss., 30th.

Botanical.—String-beans ripe at Wellborn, Fla., 1st. *Strawberries* ripe at Vineland, N. J., 30th. *Cucumbers* ripe at Wellborn, Fla., 3d. *Blackberries* ripe, Wellborn, Fla., 10th; Brookhaven, Miss., 20th. *Oleander* in bloom at Welborn, Fla., 15th. *Magnolias* in bloom at New Bedford, Mass., 2d. *Jessamine* in bloom at Wellborn, Fla., 17th. *Currants* bloomed at Riley, Ill., 6th; Fort Madison, Iowa, 11th. *Cherries* in bloom at Riley, Ill., 15th; West Waterville, Me., 22d; New Bedford, Mass., 10th; Fall River, Mass.,

6th; Westborough, Mass., 8th; Northport, Mich., 30th; Hudson, Mich., 6th; Auburn, N. H., 24th; Waterburgh, N. Y., 21st; Kensico, N. Y., 7th; Cleveland, 2d; Egypt, Pa., 8th; Tioga, Pa., 18th; Utica, Wis., 20th; Cathlamet, Wash., during 1st week. *Apples* in bloom at Riley, Ill., 17th; Nora Springs, Iowa, 12th; Cornish and West Waterville, Me., 30th; Williamstown, Mass., 23d; New Bedford, Mass., 21st; Westboro', Mass., 20th; Fall River, Mass, 12th; Auburn, N. H., 24th; Palermo, N. Y., 27th; Nichols, N. Y., 20th; Kensico, N. Y., 20th; Starkey, N. Y., 28th; Urbana and Carthagena, Ohio, 7th; Egypt, Pa., 9th; Tioga, Pa., 25th; Rocky Run, Wis., 21st; Neillsville, Wis., 24th; Cathlamet, Wash., during first week. *Quince-trees* in bloom at Vevay, Ind., 7th. *Plum-trees* in bloom at Independence, Iowa, 16th; Williamstown, Mass., 15th; Fall River, Mass, 2d; Waterburgh, N. Y., 21st; Nichols and Starkey, N. Y., 14th; Tiffin, Ohio, 5th; Egypt, Pa., 7th; Tioga, Pa., 15th; Woodstock, Vt., 21st; Strafford, Vt., 27th; Rocky Run, Wis., 21st; Cathlamet, Wash., during first week. *Gooseberries* in bloom at Fort Madison, Iowa, 11th. *Pear-trees* in bloom at Cornish, Me., 30th; Williamstown, Mass., 15th; New Bedford, Mass., 17th; Westboro', Mass., 13th; Fall River, Mass., 7th; Newark, N. J., 3d; Waterburgh, N. Y., 21st; Palermo, N. Y., 26th; Nichols, N. Y., 18th; Starkey, N. Y., 14th; Tiffin, Ohio, 5th; Rocky Run, Wis., 21st; Cathlamet, Wash., during first week. *Peach-trees* in bloom at Williamstown, Mass., 9th; Fall River, Mass., 2d and 3d; Egypt, Pa., 5th; Hudson, Mich., 6th; Waterburgh, N. Y., 21st; Nichols, N. Y., 14th; Starkey, N. Y., 12th.

Prairie-fires occurred near Lower Brule Indian agency, D. T., 9th; Oregon, Mo., 12th; Breckinridge, 6th and 12th. At last, also, *forest-fires* on the 9th and 12th; at Brookhaven, N. Y., 1st; woods on fire near Freehold, N. J., 26th.

Meteors were seen on the 2d and 23d at Dubuque; 8th, 9th, 10th, 15th, and 18th, Dodge City; 9th, 15th, and 18th, Richmond, Nebr.; 12th, Fall River, Mass.; 13th, 16th, 20th, and 25th, Evanston, Ill.; 13th, 21st, and 27th, Smithville, N. C.; 14th and 25th, Freehold, N. J.; 16th, Westboro', Mass.; 16th and 24th, Abington, Ill.; 18th, Buffalo; 24th, La Crosse; 25th, Newport; 29th, Indianola and Belmont Farm, Texas.

Zodiacal light was observed at Nashville on the 10th.

Earthquake at Santa Barbara, Cal., 10th.

Polar bands.—2d, Jacksonville, Fla.; 3d, Tybee Island, Ga.; 10th, Guttenberg, Iowa; 17th, 21st, 23d, 24th, 26th, Iowa City, Iowa; 21st, Bennettsville, Ky.; 16th, Somerset, Mass.; 1st, Carthagena, Ohio; 1st, 11th, 15th, Wytheville, Va.

Wheat suffering from rust and smut at Lynchburgh; rust on wheat at Creswell, Kans., 27th.

Published by order of the Secretary of War.

ALBERT J. MYER,
Brig. Gen., (Brevet Assg'd,) Chief Signal-Officer, U. S. A.

MONTHLY WEATHER REVIEW, JUNE, 1876.

INTRODUCTION.

In compiling the review for June, the following data have been made use of, viz: the weather-charts constructed three times per day from the simultaneous observations taken at 88 Signal-Service and 14 Canadian stations; monthly weather reports from 445 stations, classified as voluntary observers, Army posts, naval hospitals, Canadian, and Signal-Service stations, special reports, reliable newspaper extracts, and marine records.

The principal meteorological features of the month have been: first, the absence of any extensive storm, and the small number of severe winds; second, the unusually heavy rains in the South Atlantic States; third, the unprecedented high water in the Upper Missouri River and the rivers of Oregon; fourth, the extensive occurrence of thunder-storms and the feeble auroral displays; fifth, the numerous local tornadoes.

BAROMETRIC PRESSURE.

In general.—The general distribution of barometric pressure during the month is shown by the isobars upon Chart No. I, from which it will be seen that the highest monthly mean is reported from Oregon, while the pressure was comparatively low in California. On the eastern side of the Rocky Mountains the pressure has averaged highest (30.03 to 30.06) on the South Atlantic coast, whence it has diminished regularly in all directions, to 29.99 on the Texas coast; to 29.91 in the Saint Lawrence Valley, and 29.77 in Western Dakota. As compared with June, 1875, the pressures have been lower, and especially over the Lake region and Minnesota. As compared with June, 1874, the pressures have been about the same, except decidedly higher in the Saint Lawrence Valley and Canadian provinces. The history of changes in pressure during the month is simply a record of a succession of high pressures in Oregon and on the South Atlantic coast, with continued attempts at the formation of areas of low press-

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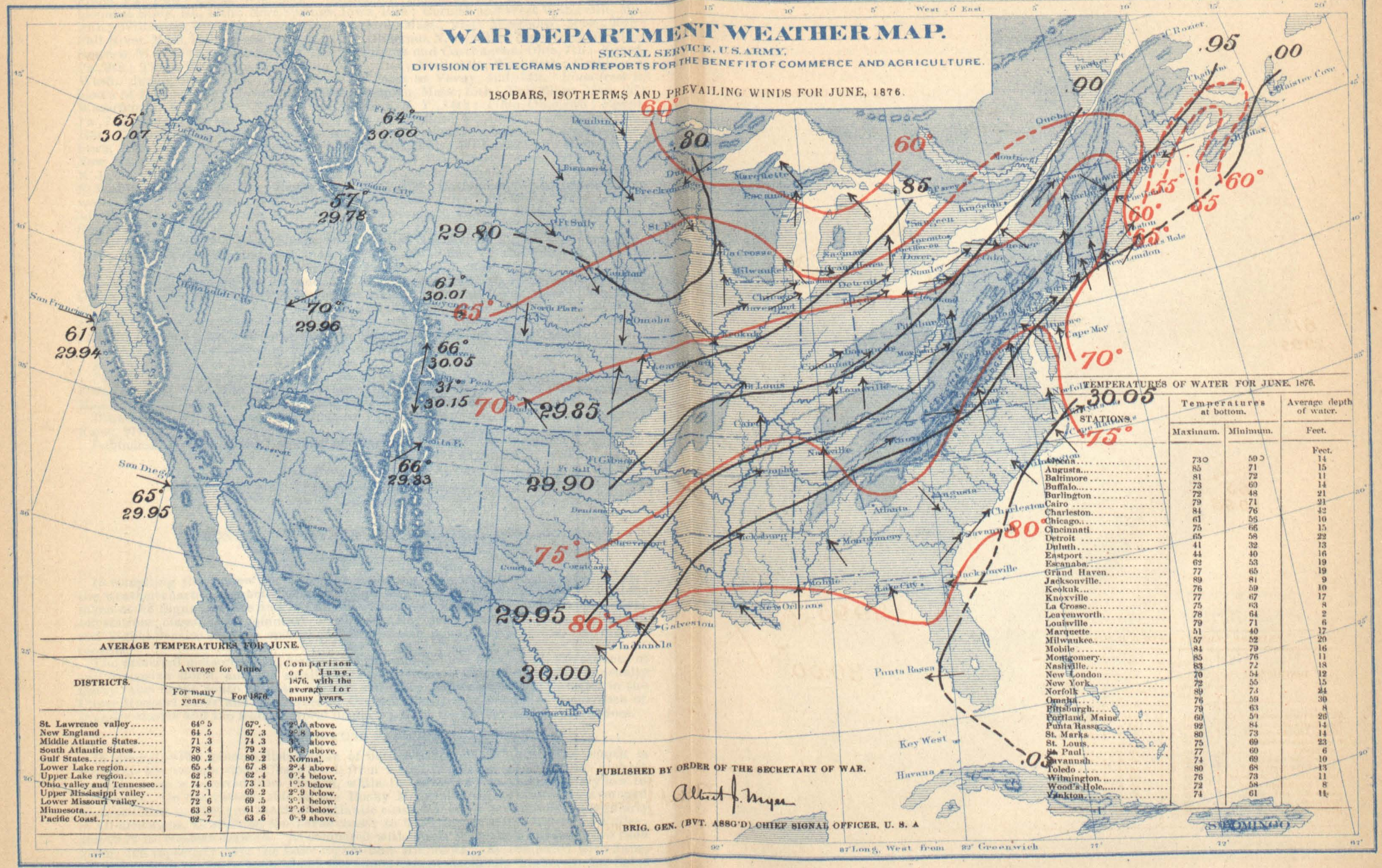

AVERAGE TEMPERATURES FOR JUNE.

DISTRICTS.	Average for June. For many years.	Average for June. For 1876.	Comparison of June, 1876, with the average for many years.
St. Lawrence valley	64° 5	67°.	2°.5 above.
New England	64 .5	67 .3	2°.8 above.
Middle Atlantic States	71 .3	74 .3	3°. above.
South Atlantic States	78 .4	79 .2	0°.8 above.
Gulf States	80 .2	80 .2	Normal.
Lower Lake region	65 .4	67 .8	2°.4 above.
Upper Lake region	62 .8	62 .4	0°.4 below.
Ohio valley and Tennessee	74 .6	73 .1	1°.5 below
Upper Mississippi valley	72 .1	69 .2	2°.9 below.
Lower Missouri valley	72 6	69 .5	3°.1 below.
Minnesota	63 .8	61 .2	2°.6 below.
Pacific Coast	62 .7	63 .6	0°.9 above.

TEMPERATURES OF WATER FOR JUNE, 1876.

STATIONS.	Temperatures at bottom. Maximum.	Temperatures at bottom. Minimum.	Average depth of water. Feet.
			Feet.
Alpena	73°	59°	14
Augusta	85	71	15
Baltimore	81	72	11
Buffalo	73	60	14
Burlington	72	48	21
Cairo	79	71	21
Charleston	84	76	42
Chicago	61	56	10
Cincinnati	75	66	15
Detroit	65	58	22
Duluth	41	32	13
Eastport	44	40	16
Escanaba	62	53	19
Grand Haven	77	65	19
Jacksonville	89	81	9
Keokuk	76	59	10
Knoxville	77	67	17
La Crosse	75	63	8
Leavenworth	78	64	2
Louisville	79	71	6
Marquette	51	40	17
Milwaukee	57	52	20
Mobile	84	79	16
Montgomery	85	76	11
Nashville	83	72	18
New London	70	54	12
New York	72	55	15
Norfolk	89	73	24
Omaha	76	59	30
Pittsburgh	79	63	8
Portland, Maine	60	59	26
Punta Rassa	92	84	14
St. Marks	80	73	14
St. Louis	75	69	23
St. Paul	77	60	6
Savannah	74	69	10
Toledo	80	68	13
Wilmington	76	73	11
Wood's Hole	72	58	8
Yankton	74	61	11

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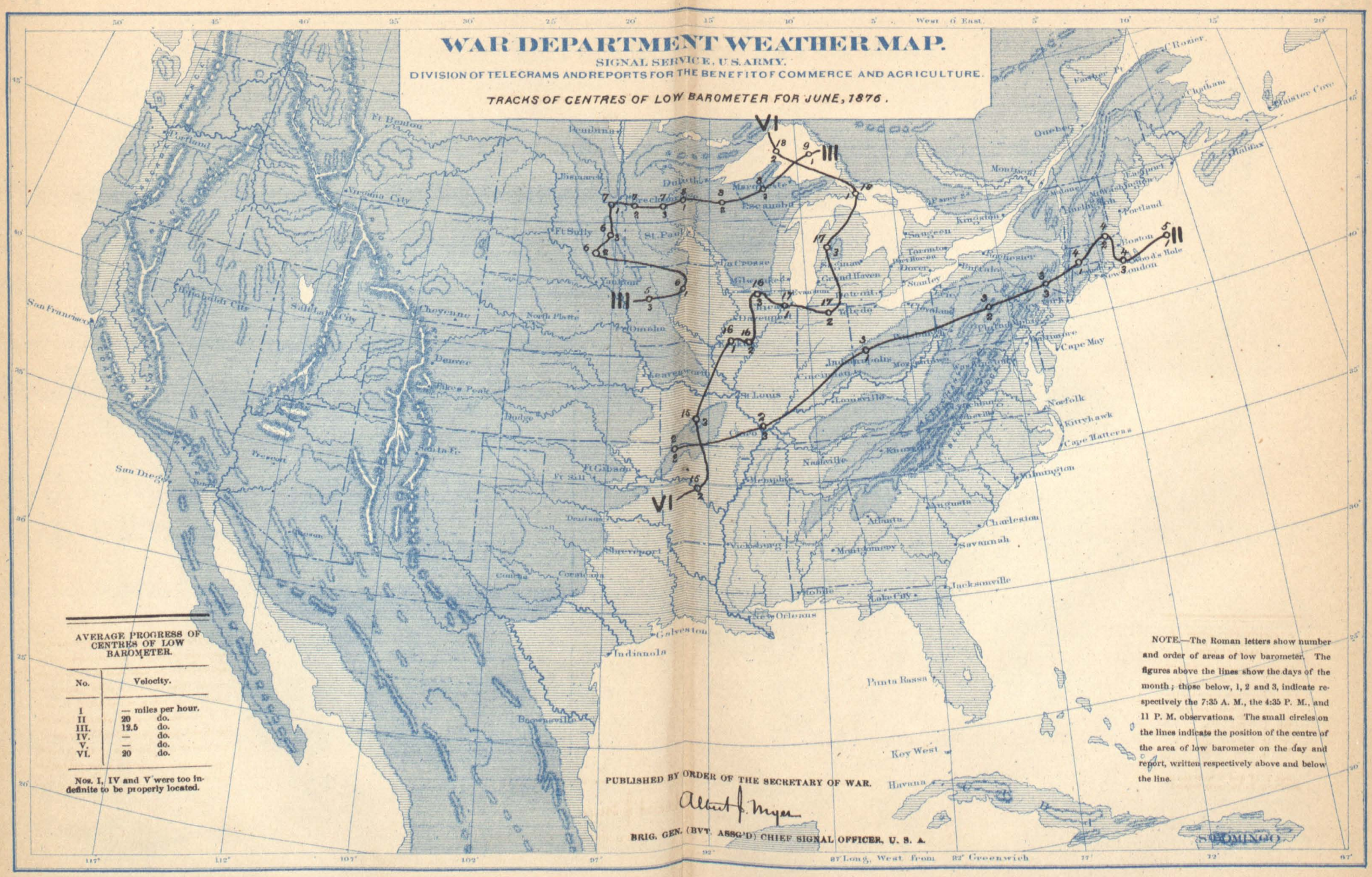
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TRACKS OF CENTRES OF LOW BAROMETER FOR JUNE, 1876.



AVERAGE PROGRESS OF CENTRES OF LOW BAROMETER.

No.	Velocity.
I	— miles per hour.
II	20 do.
III.	12.5 do.
IV.	— do.
V.	— do.
VI.	20 do.

Nos. I, IV and V were too indefinite to be properly located.

NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

BRIG. GEN. (BVT. ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.

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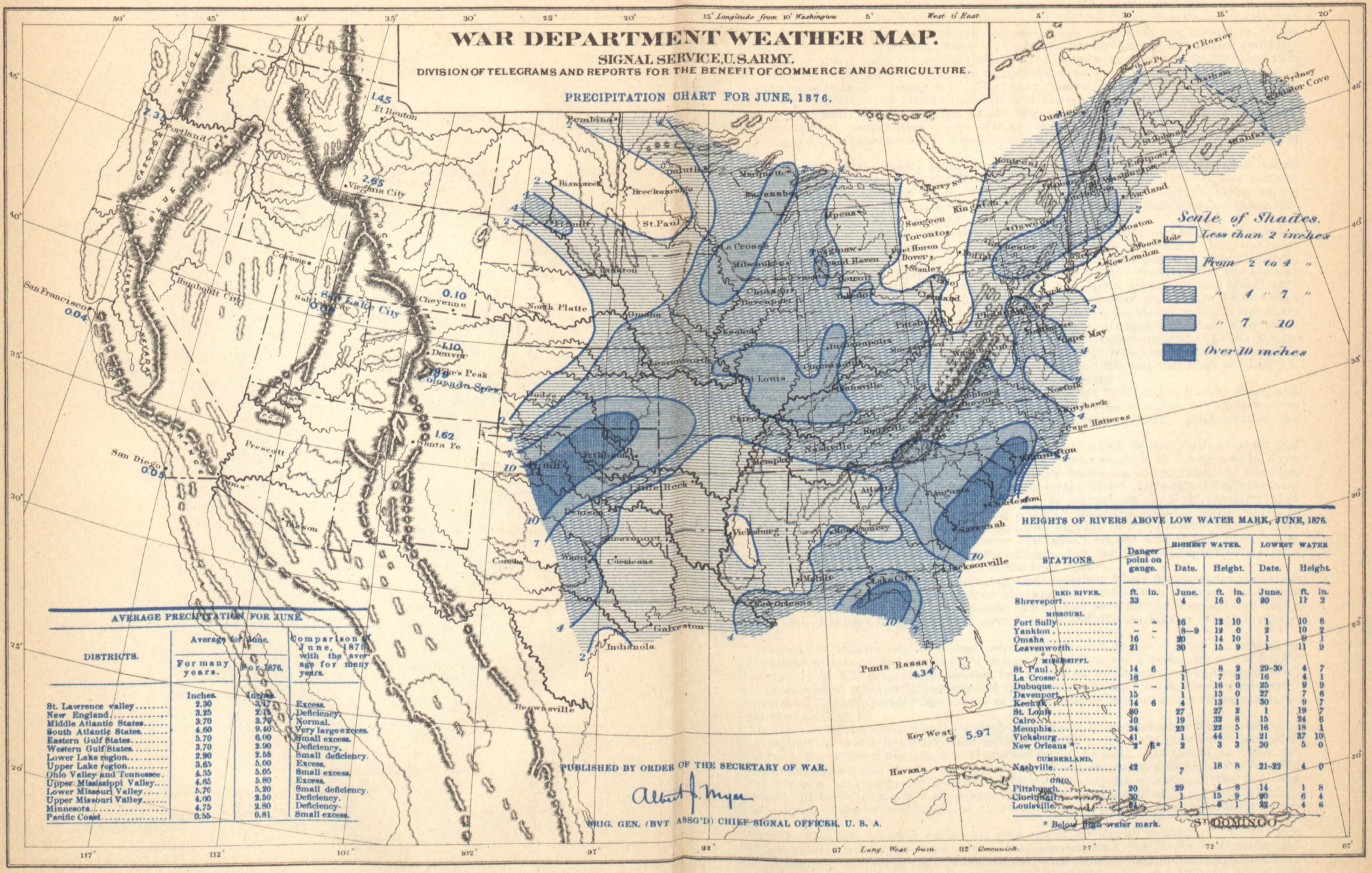
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR JUNE, 1876.



AVERAGE PRECIPITATION FOR JUNE.

DISTRICTS.	Average of June. For many years.	For 1876.	Comparison of June, 1876, with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	2.30	3.75	Excess.
New England	3.25	2.15	Deficiency.
Middle Atlantic States	3.70	3.70	Normal.
South Atlantic States	4.60	9.40	Very large excess.
Eastern Gulf States	5.70	6.00	Small excess.
Western Gulf States	3.70	2.90	Deficiency.
Lower Lake region	2.90	2.55	Small deficiency.
Upper Lake region	3.65	5.00	Excess.
Ohio Valley and Tennessee	4.35	5.05	Small excess.
Upper Mississippi Valley	4.65	5.80	Excess.
Lower Missouri Valley	5.70	5.20	Small deficiency.
Upper Missouri Valley	4.00	2.50	Deficiency.
Minnesota	4.75	2.80	Deficiency.
Pacific Coast	0.55	0.81	Small excess.

HEIGHTS OF RIVERS ABOVE LOW WATER MARK, JUNE, 1876.

STATIONS.	Danger point on gauge.		Highest water. Date.	Highest water. Height.		Lowest water. Date.	Lowest water. Height.	
	ft.	in.	June.	ft.	in.	June.	ft.	in.
RED RIVER.								
Shreveport	33		4	16	0	30	11	2
MISSOURI.								
Fort Sully	-	*	16	12	10	1	10	6
Yankton	-	-	8—9	12	0	2	10	2
Omaha	16		20	14	10	1	9	1
Leavenworth	21		30	15	9	1	11	9
MISSISSIPPI.								
St. Paul	14	6	1	8	2	29-30	4	7
La Crosse	12		1	7	3	16	4	1
Dubuque	-	-	1	16	0	25	9	9
Davenport	15		1	13	0	27	7	6
Keokuk	14	6	4	13	1	30	9	7
St. Louis	30		27	27	2	1	19	7
Cairo	40		19	32	8	15	24	6
Memphis	34		23	22	5	16	18	1
Vicksburg	41		1	44	1	21	37	10
New Orleans	2	6*	2	3	3	30	5	0
CUMBERLAND.								
Nashville	42		7	18	8	21-22	4	0
OHIO.								
Pittsburgh	20		29	4	8	14	1	8
Cincinnati	50		1	15	9	30	6	4
Louisville	51		1	8	1	22	4	8

* Below high water mark.

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BRIG. GEN. (BVT ASSG'D) CHIEF SIGNAL OFFICER, U. S. A.

ure in the interior of the country. The connection between barometric changes on the Pacific coast and those in the interior of the continent has not been so apparent as it is in the winter months. The heating of the dry air over the western plains, and the consequent inflow of cold air from all sides, both from the mountains on the west, and from British America on the northeast, and the Gulf States on the southeast, has been well marked. The areas of low pressure have been, with one exception, ill-defined and not very permanent; those of high pressure have at no time passed centrally over our territory, but have made themselves felt only on the borders, showing that an area of one thousand miles square is not sufficient for the complete elucidation of the movements of the atmosphere. The heavy rain-fall upon the coasts of Georgia and South Carolina from the 11th to the 17th, and the gales a short distance off the coast, which were, however, scarcely felt at the Signal-Service stations, were not accompanied by any barometric depression, so far as yet heard from.

Areas of high pressure.—No. I. Pressure was highest off the South Atlantic on the 1st and 2d.

II. Moved from the Rocky Mountains southeastward on the 2d; it was over Indian Territory on the 4th; over the Western Gulf States on the 5th; over the Eastern Gulf States on the 6th, and on the 7th was merged into the rising barometer on the South Atlantic coast. Pressure continued highest off the Carolina coast on the mornings of the 8th, 9th, 10th, and 11th.

III. During the 10th, pressure rose decidedly in the valley and Gulf of the Saint Lawrence and in the Canadian provinces, and extending southward along the coast was merged into No. II. At 7.35 a. m. of the 12th the high pressure extended from South Carolina to Cape Breton, being higher in the latter. On the 13th the highest pressure was in Nova Scotia, and the barometer had fallen slightly in the Middle Atlantic States and the interior of the country. The pressure was on the 14 and 15th highest in Nova Scotia, but had, on the latter day, fallen decidedly, while it had risen slightly over the Middle Atlantic States. Pressure continued high from Cape Hatteras to Cape Breton on the 16th; it had on the 17th fallen somewhat in the Middle States, and continued highest in Nova Scotia, where it was also highest on the 18th and 19th. It rose in the South Atlantic States on the 19th, and still more on the 20th, on the morning of which day it had fallen in Nova Scotia.

IV. The high pressure that was on the 14th, 15th, and 16th off the Pacific coast, and the low pressure then central in Missouri and the Upper Lake region were followed on the 16th by a rapid rise in Manitoba and Dakota, with northerly winds, but on the 17th pressure again fell.

V. The barometer rose with southerly winds on the 19th in the South Atlantic and Gulf States, and at 7.35 a. m. of the 20th, pressure was as high in Georgia as in Nova Scotia; it continued highest in the Eastern Gulf States on the mornings of the 21st, 22d, and 23d, and over the Western Gulf States on the 24th. Although it had generally fallen somewhat, at 7.35 a. m., of the 25th, it was highest on the Gulf coast, but still falling decidedly, the greatest fall being reported from the stations in the extreme northeast; on the 26th and 27th pressure was highest in Florida and Eastern Gulf coast, and was rising both there and over the lakes; on the 28th it had risen in the Gulf States and Lake region, but continued highest in the former; on the 30th it was high in Florida but had fallen in most of the Gulf States.

VI. Northwest winds, rising barometer, and generally lower temperature prevailed on the 27th in the Lake region, and on the morning of the 28th pressure was higher from the Missouri Valley to Lake Ontario than it had been for the previous five days; on the 29th this high barometer was over Illinois and Missouri, after which it disappeared.

Areas of low pressure.—I. This depression appears at 7.35 a. m. of the 1st central in Northeastern Dakota, and southerly winds prevailed from the Alleghanies to the Rocky Mountains; by 4.35 p. m. the depression had moved northeastward beyond our stations and pressure had risen in Minnesota and the Missouri Valley; brisk south winds were reported on Lake Superior; the course of the central depression is too uncertain to be published on Map I.

II. On the 2d there was formed a slight depression in the Arkansas Valley, between the regions of warm southerly and cold northerly winds; the depression extended eastward, but without forming a well-marked trough or oval. On the 3d, at 7.35 a. m., a slight depression was located near Toledo, which was central at 4.35 p. m. over Western Pennsylvania, and, progressing slowly eastward, was, on the morning of the 4th, over the State of New York, and disappeared over New England after 11 p. m. of that day. The position of the central track, as charted on Map I, is liable to considerable uncertainty.

III. On the 5th, while a cold west gale prevailed at the summit of Pike's Peak, warm southerly winds prevailed over the plains between the Rocky Mountains and the Mississippi, extending rapidly northward, with falling barometer, until, at 4.35 p. m. of the 6th, the lowest pressure was central over Nebraska and Dakota, while cool northeast winds, with rising barometer, had extended southward over the upper lakes,

and west winds, with rising barometer, were reported from the Pacific coast. During the next 24 hours the pressure rose in the Atlantic States, but fell, with north and west winds, over the interior of the continent, and at 4.35 p. m. of the 7th the lowest pressure was on the southwest border of Minnesota, whence it moved slowly eastward, and was, at 4.35 p. m. of the 8th, in Western Wisconsin. During the subsequent night this depression disappeared on the upper lakes, where the barometer continued rather low.

IV. At 11 p. m. of the 8th, northerly winds were reported from Dakota, but, during the 9th, barometer fell to the westward of our stations, and the region of southerly winds and falling barometer extended from Texas to Southern Dakota, while easterly winds and stationary or rising barometer prevailed in Manitoba and Lake Superior. By 11 p. m. of the 9th, the depression had extended northward along the west border of Minnesota, with cool northerly winds to the westward, but brisk and high south winds on the eastern side. During the 10th this depression disappeared in British America, leaving only southerly winds over the Lake region.

V. During the 12th, the barometer fell decidedly on the California coast, and, simultaneously, there formed in the interior of the Gulf States a slight depression, which was, at 11 p. m., central in Northern Alabama. During the 13th the area of falling barometer extended over a large region, and on the 14th, at 7.35 a. m., local depressions were found in Georgia and Indian Territory. On account of its uncertainty, the track of this depression, if it had any, is not given on Chart No. I.

VI. This, the principal area of low pressure, began to be developed on the 15th in Arkansas. The pressure was then high on the Atlantic coast, and the depression extended northward, until, by 4.35 p. m. of the 16th, the central area had moved into Northern Illinois; during this day severe local storms prevailed on the lakes, and lighter storms and rains over nearly the whole country east of the Rocky Mountains. During the 17th the lowest pressure remained in the neighborhood of Lake Michigan, while the highest pressure continued on the East Atlantic coast, but diminished in the Southern States, and rain fell more abundantly, with southeast winds, throughout the United States. On the 18th the principal depression continued moving northward over Lake Superior, although a subsidiary local area of low pressure is traced to Lake Erie, and the barometer continued low but rising over Wisconsin until 11 p. m. of the 19th.

VII. On the 28th and 29th rain fell generally in the interior of Texas, several very heavy local rains being reported in the Red River Valley; the region of heavy rain moved slowly northward over Indian Territory, and in advance of it the pressure fell decidedly over Kansas, Missouri, &c. At 4.35 p. m. of the 30th an area of low barometer apparently extended from Colorado eastward through Northern Kansas and Southern Missouri to Mississippi. During the evening of the 30th a very heavy snow-storm prevailed on Pike's Peak, where for two days the pressure had been rapidly falling. The subsequent history of this depression and its sudden violence in the Lake region belongs to July.

TEMPERATURE OF THE AIR.

In general.—The isothermal lines on Chart No. II show the general distribution of the temperature for the month, from which it appears that, in comparison with the average of many years, the temperature has been above the mean in the Saint Lawrence Valley, New England, the Lower Lake region, the Middle and South Atlantic States, and, to a less extent, on the Pacific coast. It has been slightly below the mean in the Upper Lake region, and decidedly below in Minnesota, Upper Mississippi, and Lower Missouri Valleys, Ohio Valley, and Tennessee. In comparison with June, 1875, but slight changes are noticed, except the somewhat lower temperatures in the Gulf States. The temperature in the Gulf States, Tennessee, and the Ohio Valley during the past month has averaged from 2 to 5 degrees below that of June, 1874. The average temperature at the summit of Mount Washington has been 48°, and at the summit of Pike's Peak 31°. In June, 1874, the temperatures were, respectively, 43° and 35°, and in June, 1875, 43° and 34°. The temperature on the Pacific coast is generally considered to have been higher than ever before known.

Maximum temperatures.—Maximum temperatures exceeding 95° have been reported as follows: 98° at Augusta, Mobile, Saint Mark's; 96° at Breckenridge and Washington; 97° Charleston, Denver, Kittyhawk, Memphis, Tybee Island, Vicksburg, and Yankton; 99° Corsicana, Jacksonville, Montgomery, Savannah, and Wilmington; 100° Dodge City and Norfolk; 101° North Platte; 111° Fort Sully; 115° at several stations in Arizona.

Minimum temperatures.—Temperatures below 45° have been reported as follows: 40° at Alpena, La Crosse, and Santa Fé; 44° Boston, Milwaukee, Evanston, Portland, Me., and Wytheville; 33° Bismarck; 37° Breckenridge, Colorado Springs, and Marquette; 28° Cheyenne; 43° Davenport, New London, and Omaha; 38° Denver and Yankton; 41° Fort Sully, Dodge City, Dubuque, and Eastport; 36° Duluth and Manhattan; 39° Escanaba and Saint Paul; 32° Mount Washington; 42° New Haven, Salt Lake City, and Springfield; 34° Pembina.

Ranges of temperature.—The greatest ranges that have been reported during the month are at Alpena, 50°; Bismarck, 60°; Breckenridge, Denver, Dodge City, Yankton, 59°; Cheyenne, 65°; Colorado Springs, 56°; Dubuque, Omaha, 51°; Duluth, Salt Lake City, 52°; Marquette, Saint Paul, 53°; North Platte, 68°; Manhattan, 68°; Pembina, 57°; Fort Sully, 70°. The smallest ranges have been at Cape Hatteras, 32°; Cape May, Montgomery, 38°; Charleston, 31°; Galveston, 24°; Indianola, 20°; Jacksonville, 33°; Kittyhawk, Memphis, Rochester, 39°; Lexington, Mobile, Toledo, 35°; Mount Washington, Savannah, Vicksburgh, 34°; New Orleans, 26°; Cape Lookout, 27°; Punta Rassa, 22°; Tybee Island, 27°.

Frosts are reported as follows: On the 1st, Bangor, Me., Westborough, Mass., destructive; 1st, 2d, and 8th, Orono, Me.; 1st, 2d, 3d, 4th, 6th, 11th, 14th, and 21st, Portland, Me.; 1st, 16th, 17th, and 18th, severe, at Plattsmouth, Nebr.; 2d, light at Gardiner, Me., Auburn, N. H.; 3d, Breckenridge, Minn.; heavy on 3d and light on 4th, Platte County, Nebr.; on the morning of the 4th, at Fort Pembina, Fort Sully, Dak., Moorehead, Minn., Neillsville, Wis.; 6th, Traverse City, Mich.; 18th, Crawford County, Iowa; 19th, severe at Abingdon, Ill., and light at Muscatine, Iowa, and Wooster, Ohio; 21st, Monticello, Iowa.

PRECIPITATION.

The distribution of rain and snow during the month is represented on Chart No. III. A comparison of the average rain-fall for many years shows that an excess has fallen on the coast of the South Atlantic States, Indian Territory, the Upper Mississippi and Lower Ohio Valleys. Small regions of deficiency are reported from Mississippi, the neighborhood of New York City, and Southern New England. In June, 1873, there was a decided excess throughout Tennessee and the Gulf States, in the eastern portions of South Carolina, and also in the Ohio Valley and the Northwest. In June, 1874, the regions of excess were the Saint Lawrence Valley, Eastern Gulf States, Upper Lake region, and especially Minnesota. In June, 1875, the regions of excess were New England, the Upper Mississippi Valley, the Pacific coast, and especially the Lower Missouri and Ohio Valleys. The rain-fall at Mount Washington was 9.32 inches, and at Pike's Peak 2.88 inches; the greater part of the latter was snow.

Rainy days.—The number of days on which rain fell, as reported by the Signal-Service observers, was, at the Atlantic-coast stations from Norfolk to Wood's Holl, from 4 to 13; in New England, from 10 to 12, except 19 at Boston; in the Lower Lake region, from 13 to 22; in the Upper Lake region, from 15 to 22; in the Upper Mississippi Valley, from 10 to 18; in the Lower Missouri Valley, from 12 to 20; in the Southwest, from 8 to 11; in the Eastern Gulf States, 7 to 11; in Tennessee and the Ohio Valley, 14 to 20; South Atlantic States, 9 to 18.

Cloudy days, as reported by voluntary observers, average 6 in the South Alantic States, 8 in New England, 4 in the Gulf States, and ten in the Northwest and Upper Lake region.

Cloudless days.—At Clarksville, Texas, 6 cloudless days are reported.

Foggy days.—Fog has prevailed to a large extent along the entire coast of Maine, and an unusual amount is also reported southward to New London. At Mount Desert, Me., 19 foggy days are reported, and the morning of the 22d was the first clear one for four weeks.

Heavy rains.—Especially heavy rains have been reported as follows: On the 3d, a high wind and cloud burst near Seneca Lake, New York, covered an area of 4 square miles to an estimated depth of 2 feet of water; 3d, near Shelburne, N. H., 8th, Syracuse, N. Y., 8 inches in 3½ hours; 10th, Corning, Mo.; 12th, Austin, Tex.; 12th to 17th, Lenoir and Asheville, N. C., over 6 inches; 13th, Burlingame, Kans., 5 inches in 36 hours; 16th, Gainesville, Ga., and for 100 miles east and south, causing damages of $1,000,000 and a loss of 8 lives; 16th, Independence, Mo.; 16th and 17th, Mount Solon, Va., 6 inches; 17th, Cumberland, Md., 3.30 inches, Goldsboro, N. C., 5.60 inches, Attaway Hill, N. C., 2 inches in 30 minutes, Lynchburgh, Va., 2.50 inches; 18th, Nichols, N. Y., 2.85 inches; 19th, Utica, Wis.; 28th and 29th, Ringgold, Ohio, 3.25 inches; 29th, Baxter Springs, Kans., (from 5 a. m. 28th to 6 a. m. 29th,) 4.50 inches; 30th, Fort Larned, Kans., 1.14 inches, Carbondale, Ill., 4.33 inches.

Snows.—Snow is reported on the 1st at Fort Sanders, Wyoming; 18th, Havana, Ill., and Independence, Iowa; and on the 30th at Pike's Peak.

Droughts.—At Newark, N. J., no rain fell from the 20th to close of month; 30th, at Freehold, N. J., corn was suffering; Ardenia, N. Y., latter part of month dry, and rain needed; North Hammond, N. Y., month dry, rain needed; Stapleton, N. Y., no rain during last ten days; Flushing, N. Y., month dry and hot; Palermo, N. Y., vegetation suffering for rain on the 7th; in the neighborhood of Dodge City, Kans., and Breckenridge, Minn., drought experienced during the former half of the month.

Hail-storms were reported as follows: 1st, Iowa City, Iowa; 3d, Belmont Farm, Tex.; 4th, Oneida, N. Y.; 7th, Wabash, Ind.; 11th, Morristown, Penn., Northport, Mich.; 12th, near Indianapolis, Ind.; 16th, Milledgeville, Ky.; 17th, near Wabash, Ind.; 18th, Kenton, Ohio; 20th, Prospect Hill, Va., Ringgold, Ohio, Canton, N. Y., Muskogee, Ill.;

22d, near Columbiana, Ala., Laconia, Ind., and Keokuk, Iowa; 23d, Lancaster, Ohio; 25th, South Hartford, N. Y., Mendon and Fall River, Mass.; 26th, near Independence, Iowa, and Southington, Conn. At Pike's Peak the principal hail-storms were on the 19th, 27th, 28th, 29th, 30th.

RELATIVE HUMIDITY.

The relative humidity, as reported from the Signal-Service stations, averages from 70 to 75 per cent. in the South Atlantic States, from 70 to 74 in New England, from 71 to 77 in the Upper Mississippi Valley and the Upper Lake region, from 62 to 67 in the interior of the Middle States, from 64 to 67 in the Ohio Valley, from 70 to 71 in Texas, and from 71 to 83 on the Middle Atlantic coast. The highest average for the month is 88 at Mount Washington. The lowest at the sea-coast stations is 64 at Norfolk. At the Rocky Mountain stations the averages, uncorrected for altitude, are 33 at Salt Lake City, 37 at Denver, 39 at Cheyenne, 43 at Colorado Springs, 47 at Santa Fé, and 64 at Pike's Peak.

WINDS.

Prevailing winds.—The prevailing winds for the month are shown by the arrows on Chart No. II. They have been south and southeast in the Gulf States, southerly from North Carolina to Massachusetts, southwest over the Lake region, Ohio Valley, and Missouri, northwest in Minnesota, Dakota, and Nebraska.

Total movements of the air.—At the Signal-Service stations the largest monthly movements are as follows: Pike's Peak, 13,021; Cape Lookout, 11,360; Dodge City, 11,333; Breckenridge, 10,769; Cape Hatteras, 9,512; Cape May, 9,276. The smallest total movements are: Salt Lake City, 3,570; Springfield, 3,567; Montgomery, 3,404; Morgantown, 3,380; Wytheville, 3,268; Albany, 3,219; Augusta, 3,105; Nashville, 2,935; Vicksburg, 2,906; Lynchburg, 2,367. The voluntary observer at Atlanta, Ga., reports 3,470.

Highest winds.—Among the highest wind-velocities reported at the Signal-Service stations are the following: Yankton, 18th, N. W., 40; Indianola, 18th, S. E., 40; Long Branch, 27th, S., 40; Barnegat, 21st, S., 40; Escanaba, 17th, S. 40; Punta Rassa, —, E., 40; Salt Lake City, —, N. E, 40; Charleston, 12th, S. E, 41; Dodge City, 17th, S. E, 41; Smithville, 17th, S. W., 41; Breckenridge, —, N., 46; Denver, 3d, S, 48; Grand Haven, 26th, W., 48; Knoxville, 25th, S. W., 48; North Platte, 23d, N., 48; Evanston, 23d, S. W., 48; Malone, 19th, S. W., 48; Louisville, 23d, S., 52; Davenport, 6th, S. W., 60; Mount Washington, 18th and 22d, and 24th, 26th, and 28th, N. W., 60; Pike's Peak, 6th, N., 66. A severe gale was reported off the Georgia coast on the 14th.

High winds, generally attending hail-storms or tornadoes, are reported from volunteer stations, as follows: 3d, Starkey, N. Y., destructive wind-storm; 6th, Corning, Mo., strong S. wind; Fort Sully, Dak., gale for 10 minutes; Davenport, Iowa, gale for 3 minutes; De Soto, Nebr., heavy wind; Coalville, Utah, high wind; 8th, Starkey, N. Y.; 9th, Madison Barracks, N. Y., high wind; 11th, Ephrata, Pa., destructive wind; 18th, Kenton, Ohio, severe wind-storm; 18th, Blooming Grove, Pa.; 20th, Olive Furnace, Ohio, severe wind; 23d Milledgeville, Ky., violent wind; Alpena, gale for 15 minutes; 30th, Ellinwood, Kans., high wind.

Tornadoes.—On the 7th and the 15th, tornadoes occurred near Dodge City, the former was quite severe; 23d, Paris, Ky.; 24th, at Portage, Pa.; on the 25th, at 3.45 p. m., a tornado passed just east of Lenoir, N. C., where several houses were blown down; the storm passed from N.W. to S.E. On the 25th, about 4 p. m., a tornado or water-spout passed through Kingsbury, Hartford, and Hebron, N. Y.; the width of the storm-track was about 200 yards, its duration at any point was 17 or 18 minutes; heavy hail-stones fell, of which 15 per cent. were one inch in diameter. At the same time with the preceding storm, a more violent one passed in nearly the same direction, 40 or 50 miles to the northward, passing into Vermont, near Rutland. On the 26th, near Pueblo and Hard Scrabble Cañon, Colo., between 3 and 4 p. m., a very severe storm is reported, having a track about two miles wide; hail-stones, to the depth of 18 inches, were lying on the ground next day; it is noted that clouds had been collecting for two days previously, and that shortly before the storm they were seen to be rising from the neighborhood of Pike's Peak in huge, black masses.

VERIFICATIONS.

Cautionary signals.—Twenty-four cautionary signals have been displayed at the United States Signal-Service stations, of which four were ordered too late, five were not justified, and nineteen were reported justified. Eighty-five additional cases were reported, in which winds passed the limit of 25 miles per hour, but most of them were of a local and temporary nature, for which cautionary signals were not required.

Probabilities.—A comparison of the published tri-daily probabilities with the weather of the succeeding 24 hours, gives 82.3 as the general average percentage of verifications. The percentages for the separate districts are as follows: New England, 83.9; Middle States, 87.0; South Atlantic States, 82.3; Eastern Gulf States, 81.2; Western Gulf States, 84.6; Tennessee and Ohio Valley, 80.0; Lower Lake region, 82.6; Upper Lake

region, 79.7; Upper Mississippi Valley, 81.0; Lower Missouri Valley, 82.4. The percentages for the separate meteorological elements were, for temperature, 83.1; wind, 86.3; weather, 84.2; barometer, 76.3.

NAVIGATION.

Stage of water.—The highest and lowest readings on the river-gauges are given in the table on Chart No. III, from which it will appear that the rivers were lowest during the latter portion of the month at Shreveport and Saint Paul, but were highest at that time at Leavenworth, Pittsburgh, and Saint Louis. The Missouri River rose above "danger line" at a few stations between Leavenworth and Saint Louis. The Mississippi was above "danger line" during the first part of the month in the neighborhood of Vicksburgh. Reports from Fort Benton show that throughout the month the Missouri was higher, perhaps by four feet, than was ever before known, which was attributed, by the observer at that place, to the unusual quantity of melting snow. The changes in the river below Yankton seem, however, not to have been, as yet, materially affected by the high water of the Upper Missouri, but were almost entirely due to the local rains in the Northwest; the rise due to the melting snows of the Rocky Mountains will probably affect the lower river during July. The melting snows have caused similar extraordinary floods in Oregon.

Freshets.—The heavy rains that occurred in South Carolina and Georgia during the middle of the month gave rise to one of the highest stages of water on record at Savannah, and probably throughout that region. The observer at Gainesville reports eight lives lost and damage to the extent of $1,000,000. The observers in Kansas report waters high in consequence of excess of rain. The observer at Corning, Mo., reports that destructive floods followed heavy rains. The observer at Asheville, N. C., reports on the 17th a great freshet in the French Broad River, and on the same date floods are reported from Lenoir, N. C. The observer at Neillsville, Wis., reports the extreme rise of Black River this spring eight feet.

Ice in lakes and rivers.—The observer at Ashland, Wis., reports that the navigation of Lake Michigan was interfered with by ice up to the 14th. Lake Superior, at Duluth, was obstructed by ice until the 25th; the harbor was cleared on the 28th.

WATER-TEMPERATURES.

The table on Chart No. II gives the maximum and minimum temperatures of the water near the bottoms of rivers and harbors. The lowest minima temperatures reported are 40° at Marquette and Eastport; 32° at Duluth; 48° at Burlington; 50° at Portland, Me. The highest maxima are 92° at Punta Rassa; 90° at Key West; 89° at Jacksonville and Norfolk; 85° at Montgomery and Augusta; 84° at Charleston and Mobile; 83° at Nashville. The largest ranges of temperature are 24° at Burlington; 17° at Omaha, New York, Keokuk, and Saint Paul; 16° at New London, Pittsburgh, and Norfolk; 14° at Alpena, Augusta, Leavenworth, and Wood's Hole. The least ranges are 7° at Detroit and Saint Mark's; 6° at Saint Louis; 5° at Chicago, Milwaukee, Mobile, and Savannah; 4° at Eastport, and 3° at Wilmington.

ATMOSPHERIC ELECTRICITY.

Aurora.—Auroras have been faint, ill-defined, and often the observers have been doubtful as to the true nature of the phenomena. They are reported as follows: On the 3d and 4th, at Corning, Mo.; 7th, Eastport, Me.; 10th, Litchfield, Mich., Fort Sully, Dak.; 11th, Duluth, Minn.; 12th, Dodge City, Kans., Pike's Peak, Colo.; 13th, Pike's Peak, Colo.; 18th, Pike's Peak, Colo.; 23d, Cleveland, Ohio, Eastport, Me.; 26th, Eastport, Me.; 27th, Le Roy, Wis., Malone, N. Y.; 29th, Abingdon, Ill., Carthagena, Ohio, Duluth, Minn.; 30th, Eastport, Me.

Telegraphic ground-currents were noted on the 15th at Colorado Springs; 3d and 27th at Philadelphia; 16th, 27th, and 28th, at Pike's Peak; 17th, 23d, and 28th at Santa Fé.

Lightning.—In order to obtain an approximate idea of the number of thunder-storms during the month, a count has been made of every case recorded at the 445 stations of lightning or thunder, whether near to or distant from the station; by including silent or distant lightning, it is presumed that the record for each station may be assumed to represent all cases that occur within a radius of fifty miles, and although in many instances the same storm having been observed at several stations will therefore be counted more than once, yet, on account of the fragmentary nature of most records, it is safe to presume that the sum-total for the whole country, which is 1,344, is below rather than above the truth. The chronological distribution of these cases is given in the following statement: On the 1st, 38; 2d, 40; 3d, 53; 4th, 37; 5th, 7; 6th, 34; 7th, 27; 8th, 25; 9th, 58; 10th, 82; 11th, 64; 12th, 47; 13th, 23; 14th, 47; 15th, 39; 16th, 34; 17th, 24; 18th, 15; 19th, 24; 20th, 53; 21st, 43; 22d, 39; 23d, 67; 24th, 63; 25th, 96; 26th, 68; 27th, 84; 28th, 41; 29th, 39; 30th, 33. The geographical distribution is shown in the following statement: For the Atlantic and Gulf States—Maine, 37; New Hampshire, 28; Vermont, 33; Massachusetts, 56; Rhode Island, 2; Connecticut, 22; New Jersey, 32; Delaware, 7; Maryland, 24; District of Columbia, 8; Virginia, 38; North

Carolina, 52; South Carolina, 9; Georgia, 29; Florida, 22; Alabama, 17; Mississippi, 46; Louisiana, 41; Texas, 18. For the Appalachian region—New York, 110; Pennsylvania, 40; West Virginia, 14; Kentucky, 22; Tennessee, 56. For the interior—Ohio, 74; Indiana, 38; Illinois, 91; Iowa, 111; Missouri, 19; Arkansas, 6. For the western plateau—Nebraska, 43; Kansas, 65; Indian Territory, 3; Wyoming Territory, 1; Colorado, 11; New Mexico, 21. For the northern boundary—Michigan, 38; Wisconsin, 31; Minnesota, 11; Dakota, 22; Montana, 1. For the Pacific slope—Idaho, 4; Nevada, 4; Utah, 1.

OPTICAL PHENOMENA.

Mirage.—This phenomenon was observed on the 6th, 7th, and 29th, at New London, Conn.; 10th, Sandy Hook, N. J.; 19th and 20th, Ellinwood, Kans.

Solar halos have been observed on the 1st in Rhode Island; 2d, Georgia, Wisconsin, Virginia, Illinois; 3d, Rhode Island, Georgia; 4th, Georgia; 5th, Connecticut, New Jersey; 6th, Michigan, Colorado; 7th, Maine, Ohio, Wisconsin, Pennsylvania, Nevada, Illinois; 8th, Illinois, Maine, Nebraska, New York, New Jersey; 9th, Michigan, New York, Wisconsin, Kansas; 10th, Ohio, Utah, New Jersey, Georgia, Nevada; 11th, Kansas, Alabama; 12th, New York, Ohio, Louisiana; 13th, Michigan, New York; 14th, Iowa, New Hampshire, New York; 15th, Maine, New York, Ohio; 16th, New York, Ohio; 17th, Delaware, New Jersey; 18th, Dakota; 19th, New York, North Carolina, Georgia; 20th, Maine; 21st, Illinois, Iowa, Ohio, Wisconsin, New Mexico, North Carolina; 22d, Mississippi, New York, Ohio, Iowa, Texas; 23d, New York; 24th, Georgia; 25th, New York, Ohio, Wisconsin, New Jersey; 26th, Ohio, Nebraska; 27th, Illinois; 28th, New Hampshire, Maine, Florida; 29th, Indiana, Maine, New York, Ohio, Iowa, Georgia; 30th, Illinois, Iowa, Michigan, New York, Ohio, Pennsylvania, Maine, Minnesota, North Carolina.

Lunar halos have been observed on the 1st in Georgia, Michigan, Wisconsin, Indian Territory, Virginia, Illinois; 2d, Ohio, South Carolina, Illinois, Michigan, Virginia, West Virginia, New York, Mississippi; 3d, Illinois, New York, North Carolina, New Jersey; 4th, Iowa, Illinois; 5th, Illinois, North Carolina; 6th, Illinois, North Carolina; 7th, Kentucky, New Hampshire, New York, North Carolina, Nevada; 8th, New York, North Carolina; 10th, New Jersey, Connecticut, Michigan, New York; 11th, Kansas; 14th, Maine; 15th, Connecticut; 24th, North Carolina; 25th, Iowa, Wisconsin, New Jersey, Georgia, Kansas, Tennessee, North Carolina, Ohio; 26th, Massachusetts, New Jersey, Georgia, Florida, Kansas; 27th, New Jersey, Wisconsin, Kansas, New York; 28th, Illinois, Iowa, Massachusetts, Florida, Tennessee, Alabama, Georgia; 29th, Illinois, Iowa, Pennsylvania, Virginia, South Carolina, North Carolina, Kansas, Florida, Tennessee, Georgia, Mississippi; 30th, Iowa, New Hampshire, Pennsylvania, Wisconsin, New York, Illinois, North Carolina, Mississippi.

MISCELLANEOUS PHENOMENA.

Zoological.—*Swallows* appeared on the 8th at Mount Washington, N. H.; returned on the 4th to Coalville, Utah. *Cuckoos* first appeared on the 2d at West Charlotte, and on the 10th at Strafford, Vt. *Colorado beetles*, on the 20th, appeared at Dumbarton, N. H.; 9th, New London, Conn.; 20th, Florida, Mass.; 12th, Fall River, Mass.; abundant during month near Detroit and doing much damage at Litchfield, Mich.; 4th at Auburn, and 11th at Contoocookville, N. H.; numerous at Ardenia, N. Y., Tarentum, Pa., and Embarrass, Wis. *Grasshoppers* at Pembina, Dak., but few appeared during the month; at Las Vegas, N. Mex., appeared 19th; Virginia City, Mont., 30th, numerous throughout Territory; 27th began to fly; June 28th, a letter from Windom, Cottonwood County, Minn., states that every grasshopper examined is troubled by a red-fly parasite; they are rapidly dying, and probably not a single one will survive to lay its eggs. A similar statement has been made by Dr. Bell, of Colorado Springs, who states that flocks of grasshoppers, in various parts of the country, are suffering from the attacks of this parasite; and Mr. Thomas Belt, the entomologist, advises that the infected insects be widely distributed, so as to check the increase of grasshoppers. *Crickets* heard on the 2d at Contoocookville, N. H. *Katydids* first seen on the 30th at Gilmer, Tex. *Tobacco-worms* appeared on the 25th at Bennettsville, Ky. *Gooseberry* and *currant worms* destructive on the 6th at Shelburne, N. H. *Locusts* first seen on the 29th at Gilmer, Tex. *Fire-flies* first seen on the 11th at Freehold, N. J.; 7th, Monticello, Iowa, and Decatur, Ill.; 3d, Morgantown, W. Va.; 25th, Afton, Iowa; 6th, Cornish, Me.; 1st, Northport, Mich.; 8th, Palermo, N. Y.; 11th, Flushing, N. Y.; 2d, Wooster, Ohio; 17th, Woodstock, Vt.; 5th, Salem, W. Va.; 9th, Embarrass, Wis. *Tree-toads* first heard on the 9th at Monticello, Iowa.

Botanical.—*Apple-trees* in bloom on the 7th at Standish, Me.; 4th, Florida, Mass., and Shelburne, N. H.; 1st, Strafford, Vt. *Lilacs* in bloom on the 4th at Shelburne, N. H.; 2d, Palermo, N. Y. *Locust-trees* in bloom on the 11th at Palermo, N. Y. *Cotton* in bloom on the 9th at Monticello, Ark.; crop "promising" at La Grange, Tenn.; crop looks well at Clarksville, Tex. *Catalpa* in flower on the 7th at Peoria, Ill. *Dahlias* in bloom on the 10th at Hot Springs, Ark. *Syringa* in blossom on the 5th at Southington, Conn. *Green pease* ripe 20th at Jacksonburg, Ohio; 7th, Abingdon, Ill. *Cher-*

ries: May cherries ripe on the 19th at Jacksonburg, Ohio; May Dukes ripe on the 7th at Fallston, Md.; ripe 13th at Abington, Ill.; 17th, Fort Madison, Iowa; 8th, Vineland, N. J. Currents ripe on the 21st at Jacksonburg, Ohio. Raspberries ripe on 15th at Abington, Ill.; 23d, Fort Madison, Iowa; 25th, Burlingame, Kans. Blackberries in bloom on the 24th at Florida, Mass.; 12th, Palermo, N Y. Strawberries in bloom on the 1st, and ripe on the 23d, at West Charlotte, Vt.; ripe on the 5th at Abington, Ill.; 1st, Fort Madison, Iowa; 15th, Shelburne, N. H. Gooseberries ripe on the 10th at Benettsville, Ky. Whortleberries in bloom on the 1st at Auburn, N. H. Roses in bloom on the 2d at Independence, Iowa. Wheat harvest began on the 20th at Havana, Ill., and on the 23d at Carlisle, Pa.; crop very fine at Litchfield, Mich.; ripe on 22d at Vineland, N. J.; wheat, oat, and barley crops all in at Clarksville, Tex.; winter wheat harvested on the 26th at Jacksonburg, Ohio; wheat is ripening, fair crop of oats and grass, light crop of fruit on the 30th at Ruggles, Ohio; harvest of winter barley began 19th at Jacksonburg, Ohio. Corn in silk on the 27th at Abington, Ill.; ripe on the 16th at New Orleans, La.; crop promising at La Grange, Tenn., Clarksville and Melissa, Tex. Grasses—red clover in bloom on the 19th at Abington, Ill.; crop promising at Melissa, Tex.; timothy in bloom on the 21st at Abington, Ill. Chestnut trees in bloom on the 26th at Abington, Ill.; horse-chestnuts in bloom on the 1st at Auburn, N. H.

Forest fires are reported near Freehold, N. J.

Polar bands were observed on the 6th at Wilmington, N. C.; 9th, Freehold, N. J.; 20th, Vicksburg, Miss.; 10th and 24th, Guttenberg, Iowa; 5th, Fayette, Miss.; 28th and 29th, Carthagena, Ohio; 24th, Wytheville, Va.

Meteors are reported on the 2d, in Illinois; 8th, Ohio; 9th, Illinois; 10th, Illinois, North Carolina; 11th, New Mexico, New York; 16th, Louisiana, Mississippi; 18th, Dodge City, Kans., and Ellsworth, Kans.; 19th, Ohio; 20th, Indiana, Kentucky; 21st, Michigan, Georgia, New York; 23d, Tennessee, Rhode Island; 24th, Iowa, Maryland; 25th, Louisiana, Illinois, Iowa; 26th, Massachusetts, Ohio; 28th, Indian Territory, Wisconsin.

Published by order of the Secretary of War.

ALBERT J. MYER,
Brig. Gen. (Brevet Assg'd,) Chief Signal-Officer, U. S. A.

PAPER 26.

FARMERS' BULLETIN.

WAR DEPARTMENT, OFFICE OF THE CHIEF SIGNAL-OFFICER,
DIVISION OF TELEGRAMS AND REPORTS FOR THE
BENEFIT OF COMMERCE AND AGRICULTURE,
Washington, D. C., Friday, June 30, 1876—1 a. m.

SYNOPSIS FOR THE PAST TWENTY-FOUR HOURS.

The barometer has risen during Thursday in the eastern portion of the Gulf States. The pressure has also risen in the Northwest, but fallen in the Western States. A decided rise is reported from Maine and the adjacent provinces. South and southwest winds continue in the southern portion of the United States; northeast to northwest winds and clear weather on the Upper Lakes. Cloudy or partly cloudy weather is reported from most stations on the Atlantic coast and the Lower Lake region.

The Lower Missouri and the Ohio have risen, especially at Pittsburgh.

Heavy local rains have been reported from the Indian Territory, where an area of low pressure now exists.

PROBABILITIES.

For Friday, in the South Atlantic and Gulf States, southwest winds will prevail, with rising barometer, stationary or lower temperatures, and cloudy weather.

For the Upper Mississippi and Lower Missouri Valleys, north winds, cooler, partly cloudy weather, possibly local rains, and stationary or falling barometer.

For the Lake region, cooler northeast to northwest winds, rising barometer, partly cloudy weather, and possibly local rains.

For New England, stationary barometer, light local winds, except northeast in the northern portions, stationary temperature, cloudy weather, and possibly light rains.

For the Middle Atlantic States, southwest and possibly opposing northwesterly winds, partly cloudy and foggy weather, stationary temperatures and pressures.

For Tennessee and the Ohio Valley, stationary or rising barometer, stationary temperature, cloudy or partly cloudy weather, and possibly light local rains.

The rivers will generally rise slightly.

For the Middle Atlantic States, and during the month of June, winds blowing from

southeast to southwest, or from directions between those points, are found to be the winds most likely to be followed by rain. Winds blowing from northwest to northeast, or from directions between those points, are found to be the winds least likely to be followed by rain.

Published by co-operation of the War and Post-Office Departments.

ALBERT J. MYER,
Brig. Gen., (Brevet Assgd,) Chief Signal-Officer, U. S. A.

PAPER 27.

WAR DEPARTMENT,
OFFICE CHIEF SIGNAL-OFFICER,
Washington, D. C., November 26, 1875—10.30 a. m.

SYNOPSIS FOR PAST TWENTY-FOUR HOURS.

The low barometer, yesterday morning over the Northwest, has moved eastward to Lake Huron, accompanied by cloudy and rainy weather from the Lakes to the Gulf, South Atlantic and Middle States, except light snow from Dakota to Upper Michigan. The pressure is now increasing from the northwest and Upper Lakes to the southwest, with cold west to north winds, and clearing weather, and diminishing in the East Gulf States, Atlantic States, and Lower Lake region, with northeast to southeast winds, rising temperature, and cloudy or rainy weather. The rivers in Western Pennsylvania commenced falling during Thursday and the Ohio and Cumberland continued rising

PROBABILITIES.

For the South Atlantic States, falling barometer, northeast to southeast winds, warmer, cloudy, and rainy weather are probable to-day. For Gulf States, Tennessee, Ohio Valley, and Lower Lake region, cloudy and rainy weather, followed by winds shifting to northwest and northeast, rising barometer, colder, clearing weather, and in West Gulf a "norther," except higher temperature to-day in East Gulf States. For Upper Lake region, Upper Mississippi, and Lower Missouri Valleys rising and high barometer, west to north winds, colder, clear, or partly cloudy weather, and followed in the northwest by falling barometer and warmer southerly winds. For Middle and Eastern States falling barometer, southeast to southwest winds, increasing to brisk and probably high on the coast, warmer, cloudy, and rainy weather, followed to-night by rising barometer, west to north winds, colder and clearing weather in former, and Saturday morning in latter.

The Ohio and Cumberland Rivers will continue rising. For canal regions of Indiana, Ohio, and Northern and Western portions of Pennsylvania and New York temperature fall below freezing to-night.

Cautionary signals continue at Grand Haven and along Lakes Huron, Erie, and Ontario, and are ordered along the coast from Cape Hatteras to Eastport.

PAPER 28.

[Circular No. 7.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF SIGNAL-OFFICER,
Washington, D. C., March 10, 1874.

The following rules will be observed, in addition to those contained in General Orders No. 28, War Department, Office Chief Signal-Officer, dated Washington, September 1, 1873.

The officer or assistant in charge of the preparation of facts, &c., for publication, will, in addition to his other duties, determine the percentage of verification of the current probabilities, in accordance with the following instructions:

1. The blank forms already prepared to facilitate this work will be used with the following modifications: The column of the blank headed "Wind velocity" will not be used. The percentage of verifications of predictions referring to wind will be determined by considering only that portion of the predictions which refers to the direction of the wind. Predictions referring to the velocity of the wind are of decided importance, and should be frequently made, but the limited number of stations now reporting will not justify the consideration of such predictions as an independent element of verifications.

2. The sixth column of the blank will be used for special predictions, and so designated. Three blanks will be used for each month's percentages, and will be numbered, respectively, 1, 2, and 3. Blank No. 1, referring to New England, Middle States, South Atlantic States, and Eastern Gulf States; blank No. 2, referring to the Lower Lakes, Upper Lakes, Tennessee, and Ohio Valley, and Western Gulf States; blank No. 3, referring to Upper Mississippi Valley, Lower Missouri Valley, the Northwest, and the Pacific States.

3. The probabilities made up from each report will be carefully compared with the facts as obtained from the three succeeding tri-daily reports, unless the prediction applies to a definite time, in which case the prediction will determine the facts with which it is to be compared.

4. In estimation of percentages it will be determined whether the conditions announced as to prevail in each district named have prevailed over geographical sections of that district to the amount of one-fourth, one-half, three-fourths, or the whole of the extent of the district. All predictions which are found to be more than three-fourths verified will be considered completely verified, and represented by 100, or 100 per cent., in that column of the blank to which the prediction refers. Predictions which are not wholly verified will be represented in the proper column of the blank by 75 per cent., 50 per cent., or 25 per cent., as the facts may warrant. Predictions which fall below 25 per cent. in verification will be rated as not verified, and represented by 000 in the proper column.

5. If, in the probabilities for any particular district, any class of prediction is not referred to, such omission will be represented by a dash, (—.)

6. The percentage of verifications of a single class of predictions will be determined by dividing the sum of the percentages of that class for the month by the number of predictions of that particular class. The percentage of verifications of probabilities for any district will be determined by dividing the sum of the percentages of the several classes of predictions by the number of classes.

The percentage of verification of probabilities for the United States will be determined by dividing the sum of the percentage of verifications of probabilities by the number of districts.

7. A maximum percentage of verifications can only be obtained when the four elements under each district are named in the probabilities of the entire month.

8. The percentage of failures to predict for any element will be determined by dividing the number of failures to predict for that particular element by the entire number of tri-daily reports during the month.

By order of the Chief Signal-Officer of the Army:

GARRICK MALLERY,
Capt. and Bvt. Lieut. Col. U. S. A., Acting Signal-Officer and Assistant.

PAPER 29.

A BILL to limit and fix the Signal-Service.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the President is hereby authorized to appoint, as assistants to the Chief Signal-Officer, two majors; six officers, who shall have the rank and pay of captains mounted; six who shall have the rank and pay of first lieutenants mounted; and six who shall have the rank and pay of second lieutenants mounted, or to detail as such assistants the said number of officers, who shall have, respectively, the said rank and pay while so serving.

SEC. 2. That the enlisted force shall be maintained as hitherto upon duty, and not to exceed one hundred and fifty sergeants, thirty corporals, and three hundred privates; and the enlisted men of the Signal-Service shall receive pay and allowances at the rates formerly fixed for enlisted men of the Signal-Corps of the Army of similar grades: *Provided*, That all acts or parts of acts relating to the duties of the Chief Signal-Officer and the Signal-Service shall remain in force.

PAPER 80.

RESOLUTIONS OF CHAMBERS OF COMMERCE, BOARDS OF TRADE, AND OTHER ASSOCIATIONS.

BUFFALO, N. Y.

BOARD OF TRADE, *Buffalo, N. Y., April* 6, 1876.

Whereas the members of this board of trade hear with regret the possibility of the good work of the Signal-Service Corps being crippled and reduced for the want of sufficient funds to carry it on for 1876;

Whereas we deem it of the utmost importance that liberal funds and means should be provided by Congress and placed at the disposal of the Chief Signal-Officer of the Army to carry on this meritorious work in the interest of human life, commerce, and navigation; Therefore, be it

Resolved, That as a petition from this Buffalo Board of Trade to the Congress of the United States in Washington assembled, we most respectfully ask those bodies to provide the means to carry on this most desirable work, as your petitioners will ever pray, and that a copy of these preambles and resolutions be forwarded to our member of Congress, Hon. Lyman K. Bass, for presentation to both houses of Congress.

(Introduced in House of Representatives May 26, 1876, and referred to Committee on Appropriations.)

BOSTON, MASS.

BOARD OF TRADE, *Boston, April* 24, 1876.

The value of the United States Signal-Service or weather bureau, even its necessity, is, in the belief of the Boston Board of Trade, fully established and unquestioned. They have faith in its still greater usefulness and more extended benefits.

To this end they beg respectfully to urge on Congress and the country the appropriations necessary to its full efficiency, and that the independent organization and action called for in the bill now before Congress, and sanctioned by the Chief Signal-Officer of the Army, shall have the aid requisite for its passage into law.

Toward the attainment of these results, the board ask the co-operation of every member of Congress from Massachusetts.

(Introduced in the House of Representatives May 5, 1876. Referred to Committee on Appropriations.)

OFFICE OF THE BOARD OF MARINE UNDERWRITERS,
Boston, Mass., September 27, 1875.

The undersigned, marine insurers of Boston, wish to express to the War Department their full appreciation of the great value rendered the country by the meteorological division of that service. They fully coincide with the Board of Trade of this city in desiring that that branch may soon be permitted an independent organization, and that the office here may be so improved and extended as to be second to none other in the land.

They would further express the hope that such appropriation may be made as shall enable the Department to further establish storm-signals on the nearest prominent headlands of the coast at an early date, thus greatly reducing the risk to life and property which there concentrates, believing the almost universal acknowledgment of their present usefulness is the strongest argument for their further extension.

Washington Fire and Marine Insurance Company, by Isaac Sweetser, president.
New England Marine Insurance Company, by George C. Lord, president.
Mercantile Marine Insurance Company, by George R. Rogers, president.
Boyleston Mutual Insurance Company, by J. W. Bulch, president.
Delaware Mutual Safety Insurance Company, by William V. Hutchings, agent.
Mercantile Mutual Insurance Company, by William V. Hutchings, agent.
Insurance Company of North America, by Foster & Scott, agents.
Orient Mutual Insurance Company, by Foster & Scott, agents.
Boston Marine Insurance Company, by P. W. F. Fuller, president.
American Insurance Company, by Francis Peabody, president.
China Mutual Insurance Company, by Francis Bacon, president.
Manufacturers' Fire and Marine Insurance Company, by T. Gould, president.

CINCINNATI, OHIO.

CHAMBER OF COMMERCE, *Cincinnati, Ohio, March* 29, 1876.

Whereas the great value of the United States Signal-Service to the commercial and other industries of the country has been amply demonstrated by experience; and

Whereas in its present condition it is subject to constant embarrassment, as shown in the Chief Signal-Officer's annual report; and

Whereas its usefulness can be largely increased by its establishment on a permanent and extended footing: Therefore, be it

Resolved, That the Cincinnati Chamber of Commerce respectfully and earnestly urges upon the attention of Congress the importance of a generous consideration of the claims of the Signal-Service to an established footing, and such appropriations as may secure its increased efficiency and enlarged usefulness.

(Introduced in House of Representatives April 11, 1876. Referred to Committee on Appropriations.)

CHICAGO, ILL.

BOARD OF TRADE, *Chicago, Ill., April* 11, 1876.

Whereas during the five years the Signal-Service branch of the Army has been making predictions of the weather for the benefit of commerce and agriculture it has proven to be of great value to the commercial interests of the country, and has been the means of saving annually large amounts of property and life by its timely warning of the approach of storms and flood; and

Whereas efforts are now being made to place this service on a permanent basis by establishing it as a Bureau, in a similar manner as the Engineer and other Corps of the Army, through the means of a bill now before the House of Representatives of the United States: Therefore, be it

Resolved, That this board recognize in the Signal-Service valuable means of saving life and property, a sufficient number of instances having come to their knowledge to attest to them the practical value of the service.

Resolved, That this board desire to see the Signal-Service made a Bureau of itself, and to be placed on the same footing as the most favored branch of the Army, and that they deprecate any attempts made to abridge the service as established. They would, therefore, respectfully urge Congress to establish this service as a Bureau of the Army.

Resolved, That the Illinois delegation in both houses of Congress be respectfully requested to use all the influence consistent with a proper administration of the affairs of the country to further the benefits of the Signal-Service, and that a copy of these preambles and resolutions, properly attested by the president and secretary of the board, be transmitted to each Senator and Representative in Congress assembled.

(Introduced in House of Representatives April 18, 1876. Referred to Committee on Military Affairs.

Introduced in Senate May 17, 1876. Referred to Committee on Military Affairs.)

DETROIT, MICH.

BOARD OF TRADE, *Detroit, Mich., March* 28, 1876.

Resolved, That the Detroit Board of Trade tender their thanks to the United States Signal-Service Corps for the efficient manner in which the weather-reports have been furnished them during the past season.

Resolved, That in view of the great benefit to our trade and commerce from these reports, we respectfully request our Representatives in Congress to use their influence for the permanent formation of the Corps, and against any reduction in the amount appropriated therefor.

(Introduced in Senate April 3, 1876. Referred to Committee on Commerce.

In House of Representatives April 3, 1876. Referred to Committee on Appropriations. Also in House of Representatives May 12, 1876. Referred to Committee on Military Affairs.)

DETROIT, *April* 21, 1876.

At the regular semi-monthly meeting of the Wayne County Medical Society, held last evening, the following preamble and resolutions were unanimously adopted:

Whereas a bill has recently been submitted to Congress, the purport of which is to permanently establish the United States Signal-Service and to secure to the observers connected therewith a just remuneration: Be it therefore

Resolved, That this society recognize in the United States Signal-Service, first, a worthy and efficient means for the determination, by meteorological data, of the influence of the elements in the dissemination of disease; second, a valuable and indispensable medium, through its daily weather-predictions, for the protection of our food-crops; and, third, a life-saving institution, the value and magnitude of whose labors cannot be overestimated, inasmuch that by the display of cautionary storm-signals the mariner and the traveler are alike warned of impending danger.

Resolved, That in view of these facts and in the interests of humanity this society earnestly expresses the hope that the present efficiency of the Signal-Service may in no way be impaired, but rather that its labors may be extended and its means of usefulness increased by wise and appropriate legislation.

Resolved, That we respectfully request our Representatives in Congress to use their influence for the permanent organization of this service, and to protest against the reduction in the amount usually appropriated for its maintenance.

Resolved, That the secretary of this society be instructed to forward a copy of these resolutions to the Chief Signal-Officer of the Army and to each of our Representatives in Congress.

(Introduced in House of Representatives May 16, 1876. Referred to Committee on Military Affairs.)

LANSING, MICH.

STATE BOARD OF HEALTH,
Lansing, Mich., April 11, 1876.

Whereas the Signal-Service Bureau of the United States has demonstrated its great usefulness in securing benefits to public safety of life in this State, particularly to the large number of citizens employed upon or journeying over the great lakes, and in promoting health through better protection of cereal and other food-crops because of its warnings, and also through the valuable data for the study of the relations of health and of diseases to the climatic conditions, knowledge of which is essential to an avoidance of causes of death now statistically shown to be of great influence on the death-rate: therefore,

Resolved, That the hope be expressed by this board that the means of usefulness of the United States Signal-Service Bureau be in no way abridged, but rather increased; that it be permanently organized, and that its sphere of labor be enlarged, especially in the direction of obtaining and recording meteorological data bearing still more closely upon important questions relating to the public health.

Resolved, That, although not essential in connection with its work for the prediction of storms, it is desirable, for the purpose of progress in public health, that we have at least monthly statements of the absolute humidity of the atmosphere, and of the exact atmospheric pressure at different stations, (not calculated to sea-level, as required for other purposes,) and that it is also desirable that observations on ozone be recorded.

Resolved, That, in the opinion of this board, such an enlargement of the means and labor of the Signal-Service as is contemplated in the foregoing will add to its present acknowledged usefulness, and is desirable in the interest of public health in this State.

Resolved, That the secretary of the board be directed to forward a copy of the foregoing preamble and resolutions to the Chief Signal-Officer of the United States, and to each of the members of Congress from this State.

(Introduced in the Senate April 24, 1876, and referred to Committee on Commerce. Introduced in House of Representatives April 24, 1876, and referred to Committee on Appropriations.)

INDIANAPOLIS, IND.

BOARD OF TRADE,
Indianapolis, Ind., March 30, 1876.

Whereas it has come to our knowledge that there is a disposition on the part of some of the members of our present Congress to abolish or cripple the efficiency of the Signal-Service by changing its status or making an inadequate appropriation for its maintenance: therefore,

Resolved, That we recognize the importance of this branch of the service as being conducive and highly beneficial to our interests, and so thoroughly reliable as to determine and influence large commercial transactions, giving us a medium upon which we can calculate future transactions to such an extent that its abolishment or suspension would incur incalculable injury to various interests centering here. We have been especially favored with an efficient, energetic officer, who has contributed largely to the success of the service throughout the country; and, in consideration of the benefits accruing from this branch of the service, we do respectfully request our Representatives in Congress to favor any just appropriation and give their hearty co-operation in having it put on a permanent basis and its efficiency increased to that degree which its originators anticipated for it.

(Introduced in the Senate April 3, 1876, and referred to Committee on Commerce.)

MADISON, WIS.

MADISON, WIS., *February* 7, 1876.

Resolutions of the Wisconsin State Horticultural Society.

Resolved, That this society memorialize our Senators and Representatives in Congress, so to extend the scope of the Signal-Service as to give the benefits of its observations and deductions to agriculture, by sending warning to every telegraphic station of the approach and probable extent and severity of such storms as may occur between April and November; and also the cold waves, their path and probable severity.

We hope, also, that they will make every practicable effort to extend one circuit of observation around one entire great circle of the globe, in our own general latitude, without which no philosophic observations of the weather can be considered in any degree complete.

Resolved, That the secretary of the society be instructed to transmit a copy of the report of this committee to each of our Senators and Representatives in Congress.

(Introduced in the House of Representatives March 6, 1876. Referred to Committee on Agriculture.)

MOBILE, ALA.

BOARD OF TRADE,
Mobile, March 30, 1876.

DEAR SIR: At the last meeting of the board of control a resolution was adopted requesting the president to urge upon our Representatives in Congress the importance to the commercial and agricultural interests of the country of the present governmental system of Signal-Service, and to ask their influence in behalf of any proper measure that may be proposed in Congress, looking to the establishment of such system as a permanent organization. I have only to add that the loss of that branch of the public service, either wholly or partially, by the failure to make a sufficient appropriation for the purpose, would result to the great disadvantage of the business-interests of the entire country.

Hoping that you and your colleagues will interest yourselves in our behalf,

I remain, very respectfully, your obedient servant,

L. E. BROOKS,
President Board of Trade.

HON. B. B. LEWIS,
House of Representatives, Washington, D. C.

COTTON EXCHANGE,
Mobile, March 31, 1876.

DEAR SIR: As the branch of the public service known as the "Signal-Service," has, since its organization, been of invaluable benefit to the commercial and agricultural interests of the country, and as its services are daily becoming more beneficial and indipensable, we desire, in behalf of the "Mobile Cotton Exchange," to impress our Representatives in Congress with the importance of a permanent organization and further extension of such service, and urgently request that you and your honorable colleagues will interest yourselves and exert your influence during the present Congress for the passage of a bill providing for the permanent organization of the Signal-Service.

Very respectfully, your obedient servants,

A. J. INGERSOLL,
Vice-President.

T. K. IRWIN,
Chairman Committee Information and Statistics, Mobile Cotton Exchange.

R. H. BOLLING,
Superintendent and Secretary.

HON. B. B. LEWIS,
House of Representatives, Washington, D. C.

MILWAUKEE, WIS.

CHAMBER OF COMMERCE,
Milwaukee, April 5, 1876.

At a meeting of the Chamber of Commerce of the city of Milwaukee, held this day, the following preamble and resolutions were introduced by Mr. Jno. B. Merrill, and were unanimously adopted:

Whereas there is a bill now pending in Congress, known as House bill No. 2750, to limit and fix the Signal-Service; and

Whereas the great importance and incalculable benefits of this service to the commercial and agricultural interests of the country have been already fully demonstrated, and the service now regarded as a public necessity: therefore,

Resolved, That, in the opinion of this chamber, it is of vital importance that the Signal-Service should be established and maintained upon a permanent basis, and that such appropriations be made as may be necessary to maintain this branch of the public service at the highest point of efficiency, (the estimated appropriation asked for the coming fiscal year being about $415,000;) and be it further

Resolved, That the secretary of this chamber be, and he is hereby, directed to transmit a copy of this preamble and resolutions to each of our Senators and Representatives, with the earnest request that they do all in their power to secure the passage of the bill above mentioned and the appropriation asked for.

N. VANKIRK,
President.

W. J. LANGSTON,
Secretary.

(Introduced in Senate April 11, 1876, and referred to Committee on Appropriations. Introduced in House of Representatives April 20, 1876, and referred to Committee on Commerce.)

MEMPHIS, TENN.

CHAMBER OF COMMERCE,
Memphis, Tenn., March 31, 1876.

Be it resolved by the Memphis Chamber of Commerce and Cotton Exchange, That it is the sense of these bodies that the great importance of the Signal-Service department of the United States Army to the commercial and agricultural interests of the United States at large and the people of the Mississippi Valley in particular cannot be overestimated, and its continuance in effective operation is a consummation to be earnestly desired by every inhabitant of this great valley, and its suspension or inefficient working should be deplored and avoided as inflicting irreparable injury on the growing necessities of commerce, trade, and agriculture.

Be it further resolved, That any reduction of appropriation for this department, by Congress, to such an extent as would impair its effective operation, would be deplored by its countless beneficiaries as a public calamity, while such action as would tend to establish this most valuable department on a permanent and lasting basis would be hailed with delight as a national blessing.

Be it further resolved, That to this end the Representatives in Congress from our State be earnestly requested to support such measure or measures as have been or may be introduced in the House of Representatives looking to the organization and establishment of this department upon an effective and permanent basis.

MORGANTOWN, W. VA.

[Extract from the minutes of the faculty of West Virginia University.]

MORGANTOWN, *April* 25, 1876.

Whereas from our personal knowledge of the operations of the signal station established at this university January 16, 1873, and now under the faithful and efficient management of Sergeant L. Dunne, we are thoroughly convinced of the great advantages rendered to agriculture, commerce, and science in general by the United States Signal Service: Therefore,

Resolved, 1. That the full organization and permanent establishment of said Signal Service is exceedingly important to many of our great national interests, and, therefore, highly desirable.

2. That our West Virginia Senators and Representatives in Congress be respectfully requested to use their best endeavors to secure the passage of the bill introduced by Mr. Spencer in the United States Senate, April 12, 1876, "To limit and fix the Signal Service."

3. That a copy of the above be forwarded to each of our Senators and Representatives.

(Introduced in House of Representatives May 1, 1876. Referred to Committee on Commerce.)

NEW YORK.

COTTON EXCHANGE, NEW YORK, *April* 3, 1876.

Whereas the interests of commerce and agriculture in the United States demand the fullest consideration from the Government, as forming the true basis of the country's wealth and greatness; and

Whereas the growth and exportation of cotton has contributed largely to the development of the resources of the Southern States and the commercial prosperity of the North by reason of the immense impetus these industries have given to the construction of railroads and the building up of a grand merchant navy, devoted especially to the cotton-carrying trade; and

Whereas every one who is engaged in the production and exportation of cotton has recognized the great importance and advantages of the reliable and timely meteorological information and weather news by the Weather Bureau of the United States Signal Service, by means of which shipments are almost entirely regulated, large losses prevented, and the trade is surrounded with a safeguard which renders it steady and profitable:

Resolved, That we, the members of the Cotton Exchange of New York, recognizing the present value and efficiency of the Weather Bureau of the Signal Service, United States Army, to our trade, do most heartily recommend this public service to the favorable consideration of Congress, and that such steps be taken and such appropriations be made as will enable the service to be raised to the highest standard of efficiency for the benefit of commerce and agriculture. That Congress is hereby urged and requested to take favorable action on the bill now pending in the House of Representatives, making a permanent organization of the Weather Bureau, as recommended by the Chief Signal-Officer of the Army.

Resolved, That copies of these resolutions be forwarded to each Senator and member of Congress from New York State.

(Introduced in Senate April 19. Referred to Committee on Commerce. Introduced in House of Representatives April 10, 1876. Referred to Committee on Commerce.)

PRODUCE EXCHANGE, NEW YORK, *April* 4, 1876.

Whereas the board of managers of this exchange, recognizing the great benefits it has already derived from the Signal Service, the daily reports furnished bearing a very important part in the commercial transactions of the day, and being impressed with the importance and utility of the system and the future advantages which agriculture and the various departments of commercial industry may derive from its labors; and

Whereas a general increasing confidence in the utility of the Weather Bureau is manifested by all classes because of the practical and immediate benefit derived from the weather reports; and

Whereas the future efficiency, not to say existence, of the Bureau is to be secured only by a more permanent organization, whereby officers and men whose services have become invaluable by years of study and experience may be retained: Therefore,

Resolved, That to this end Congress is hereby earnestly requested to make such appropriations as shall be, in its judgment, necessary, and that we recommend and urge the passage of the bill now pending in the House of Representatives, making the Weather Bureau a fixed organization, as recommended by the Chief Signal-Officer of the Army.

Resolved, That a copy of these resolutions be forwarded to each member of Congress from New York State.

(Introduced in House of Representatives April 10, 1876, and referred to Committee on Commerce.)

MARITIME ASSOCIATION, PORT OF NEW YORK,
New York City, April 3, 1876.

Whereas the great value of the national Signal Service to all classes is now fully established, and especially as shown in the cautionary signals displayed on the coast, warning vessels days and hours in advance of approaching storms, whereby many lives have been saved and property more than covering in value the cost of the service for a whole year; and

Whereas the great commercial and agricultural interest which now throughout the United States depends upon the Service demand legislative enactment, fixing the permanency of the service and provision for the proper pay of the officers and enlisted men: Therefore,

Resolved, That we earnestly ask the attention of Congress to this subject and recommend the plan of organization approved by the Chief Signal-Officer in his last annual report, and now pending action in the House of Representatives.

Resolved, That a copy of these resolutions be forwarded to each member of Congress from the State of New York, with request that such action be taken as the importance of this subject demands.

(Introduced in Senate April 11, 1876. Referred to Committee on Commerce.)

CHAMBER OF COMMERCE OF THE STATE OF NEW YORK.

At the one hundred and eighth annual meeting of the Chamber of Commerce, held Thursday, May 4, 1876, Samuel D. Babcock, president, in the chair, the following resolutions, reported by the committee of the chamber on internal trade, were unanimously adopted:

Whereas the great usefulness of the Signal-Service Weather Bureau to commerce and other interests of our country has been demonstrated beyond doubt, and this department became under its present management a great public service, which should receive continued support and encouragement; and

Whereas some permanent provision should be made for its officers and enlisted men: Therefore,

Resolved, That Congress is hereby respectfully requested to be liberal in its appropriations of money for the maintenance and support of the Weather Bureau.

Resolved, That this chamber approve of a permanent organization of the Signal-Service Weather Bureau, as recommended by the Chief Signal-Officer of the Army, especially in reference to its officers and its enlisted men.

Resolved, That a copy of these resolutions be forwarded to the Representatives in Congress from this State.

(Introduced in the House of Representatives May 13, 1876. Referred to Committee on Military Affairs. Introduced in Senate May 15, 1876. Referred to Committee on Commerce.)

NATIONAL BOARD OF FIRE UNDERWRITERS.

To the honorable the Senate of the United States:

The undersigned, officers of the National Board of Fire Underwriters, by order and in behalf of said board, acknowledge with much pleasure the assistance they have received in the study of their business, and in the knowledge of its hazards, from the United States Signal-Service Bureau. They have also discovered that much which is calculated to be of still greater value, and which it is in the power of the bureau to supply, remains to be known, but which cannot be furnished with the force now employed by that bureau. The possession of this information is believed to be of great value to the inhabitants of many of the places at which signal-stations are established, by showing them the liability of their places to be destroyed by a fire likely to be made great on account of the prevalence of high winds, and in its leading them to take precautions against such hazards, and also to teach them to realize the need of compelling insurance companies, so far as possible, to insure such places to such extent only as they can pay, in case of such great fires.

The undersigned, therefore, pray your honorable body to make such a law as will enable such bureau to furnish information to the end that the advantages named may be secured to the property-holders and to the company.

By order of the National Board of Fire Underwriters.

NEW YORK, *May* 3, 1876.

(Introduced in the Senate May 31, 1876. Referred to the Committee on Finance. Introduced in the House of Representatives May 31, 1876. Referred to Committee on Commerce.)

NEW HAVEN, CONN.

CHAMBER OF COMMERCE,
New Haven, Conn., April 6, 1876.

Resolved, That in the opinion of this chamber the work of the Signal-Service during the past few years has amply demonstrated its great utility; and that the saving of property, to say nothing of life, resulting from its reports, many times exceeds its cost.

Resolved, That our Senators and Representatives in Congress be, and they are hereby, requested to favor any proper measures for extending its operation and promoting its efficiency, and that a copy of the foregoing resolutions be forwarded by the secretary of this chamber to each.

NEW ORLEANS, LA.

NEW ORLEANS CHAMBER OF COMMERCE.

The chamber of commerce held a special meeting on Monday evening, July 5, Mr. J. M. Sandidge presiding.

The committee appointed by the chamber, at its June meeting, to report on the matter of the extension of the telegraph storm-signals on the North American continent, reported the following preamble and resolutions:

Whereas the construction of lines of telegraphic communication throughout the interior of the United States and Territories and British North America has resulted in the establishment, by the Signal-Corps of the United States Army, of a system of meteorological reports called storm-signals, which has, in a few years, become as invaluable to commerce as to agriculture, and to the whole movement of human industry; and

Whereas experience and science have well demonstrated the relations of the Gulf and Atlantic slopes to the origin and direction of storms and great atmospheric movements in the Gulf, the Caribbean Sea, and the proximate Mexican and Central American regions, rendering the extension of lines and signal facilities in those regions absolutely necessary for the safety of our Atlantic and Gulf commerce; and

Whereas the present signal-stations beyond the longitude of New Orleans and south of Red River and the Gila are so few and so widely separated as to leave the regions south and west of those lines, and the whole of the Gulf States and Mexico, down to Yucatan, without the benefit of storm-signals in the degree enjoyed by the other United States and British America: Therefore,

Be it resolved by the New Orleans Chamber of Commerce:

1. That proper measures should be initiated for the further and ample extension of telegraphic lines for the benefit of commerce generally, and for weather-signals specially over West Louisiana, Texas, Mexico, and Central America.

2. That we urge upon the members of Congress from Louisiana to bring before the National Legislature, in the name of a common and national interest, the matter of extending the Weather Signal-Service, and to enlist the co-operation of their fellow-members from all the Gulf States in the premises.

3. That we invite the co-operation of the chambers of commerce of our sister cities in urging the same upon the members of Congress of the several States interested.

4. That we extend our friendly salutations to the Lonja Mercantil and all similar organizations in Mexico, Central America, and the West India Islands, inviting them to unite with us in accomplishing the establishment of an international system of weather-signals, by urging the same upon their supreme governments.

5. That we do most respectfully commend to the President of the United States, through the State Department, to lay before the several executives of the foreign states we have indicated, the importance of legislation and commercial treaties to effect the objects of our memorial.

6. That in entering upon this new field of beneficence, so becoming enlightened governments, in this age of applied science, we suggest and respectfully urge that our Representatives take the very broadest views and reach at once to the result of perfectly gratuitous weather-signal information to the daily press, wherever desired, on the routes of telegraphic lines.

7. That while this chamber is mainly prompted by the want we have severely felt in the special region described, we would cheerfully and gladly co-operate with our sister chambers in the Northern United States, in British America, and all transatlantic countries, in perfecting an international system of weather-reports and storm-signals, co-extensive with telegraphy and civilization.

8. That the secretary be requested to furnish a copy of this preamble and these resolutions to the press of this city, that they may thus obtain a general publicity; and that he procure a translation into the Spanish language, and that he send an official copy to the Lonja Mercantil in Mexico.

CHAMBER OF COMMERCE,
New Orleans, La., April 3, 1876.

Whereas it has come to the knowledge of this chamber that the appropriation for the conduct of the Signal Bureau is likely to be diminished, and its efficiency abridged or periled; and

Whereas the services that this corps has rendered to the mariner, the agriculturist, and the commercial man, and, in fact, to all classes and conditions of life, in the foreknowledge of the weather, is such that the people demand, and must have it in the future, as they must have light and free ventilation. Their industry is interwoven with it; their appointments made dependent upon it; their comfort and happiness and their feeling of security derived daily from its prognostics, that, so far from withdrawing the Government support from the Signal-Service they would desire it to be extended and placed on the permanent basis of an independent corps. In view of all these considerations, this chamber would adopt these resolutions:

Resolved, That this chamber respectfully memorialize the Congress of the United States to sustain by ample appropriation the Signal Bureau, that it may furnish the people of the United States the usual abstract of the weather, which has by telegraph been thrown broadcast over the land; and that in every way our prayer be that the Congress extend those facilities and blessings.

Resolved, That we renew the prayer once before addressed to the Congress by this chamber, to open such negotiations through the State Department as shall result in the establishment of international signal observations with Mexico, Yucatan, Spain, and the Antilles; and, if possible, to further establish an adequate number of signal-stations at sea, by anchored vessels, over cables laid for the purpose, where not established, for commercial interests, and in this manner place New Orleans and the Southwest upon a footing with territory further north and east in the blessings of the telegraph; and that the information of the present status and foreknowledge of the weather be rendered omnipresent by observation and telegraphic communication.

PHILADELPHIA, PA.

ROOMS OF THE COMMERCIAL EXCHANGE,
CHAMBER OF COMMERCE BUILDING,
Philadelphia, April 13, 1876.

At a meeting of the board of managers of the commercial exchange, held April 13, 1876, the following resolutions were adopted:

Resolved, That we recognize in the Signal-Service a most valuable organization in protecting the interests of commerce, agriculture, and the industries generally, by forecasting the approach of storms or other important meteorological changes.

Resolved, That we urge upon Congress the national desire and great importance of making a liberal appropriation for the continuance and extension of this service.

Resolved, That we deem it advisable, for the retention of experienced officers who have become thoroughly acquainted with the duties connected with the service, that Congress favorably act upon the appeal of the Chief Signal-Officer, in his report of 1875, requesting a permanent organization of the Signal-Service.

Resolved, That a copy of these resolutions be sent to each member of Congress from this State.

GEORGE W. MEARS,
President.

Attest:
GEORGE G. PIERIE, *Secretary.*

(Introduced in House of Representatives April 24, 1876, and referred to Committee on Military Affairs.)

VESSEL-OWNERS' AND CAPTAINS' ASSOCIATION,
Philadelphia, Pa., March 16, 1876.

At the annual meeting of the Vessel-Owners' and Captains' Association, held March 1, 1876, the following resolutions were unanimously adopted, and ordered to be sent to the members of Congress:

Resolved, That this association does hereby recognize the efficiency of the United States Signal-Service, and the importance of the results of its observations to commerce.

Resolved, That we do hereby authorize and instruct the board of directors to at all times urge upon Congress the great importance of making liberal appropriations to the

United States Signal-Service to the end that its observations may be extended in all directions, but more especially to storms approaching our coasts from the Atlantic.

* * * * * * *

Extract from the minutes.

JOHN W. EVERMAN,
President.
CHARLES H. STEELMAN,
Secretary.

(Introduced in Senate April 4, 1876, and referred to Committee on Commerce.
Introduced in House of Representatives April 4, 1876, and referred to Committee on Appropriations.)

ROOMS OF THE BOARD OF TRADE,
Philadelphia, April 17, 1876.

Mr. Thomas C. Hand presented the following memorial to Congress, which was adopted unanimously:

The Board of Trade, of the city of Philadelphia, recognizing in the Signal-Service an important institution of the Government, whose increasing usefulness is being continually manifested, respectfully memorialize your honorable bodies on the advisability of placing the Signal-Service under a permanent organization, and of making such adequate provisions for its maintenance as its growing importance seems to require.

(Introduced in Senate April 19, 1876, and referred to Committee on Commerce.
Introduced in House of Representatives April 21, 1876, and referred to Committee on Appropriations.)

FRANKLIN INSTITUTE, HALL OF THE INSTITUTE,
Philadelphia, April 19, 1876.

Whereas the present Signal-Service has most emphatically vindicated the anticipations of scientists in furnishing valuable practical information to important interests both on sea and land: Therefore,

Resolved, That we cordially recommend the establishment of said service on a permanent basis, under ample provisions for its general introduction throughout our coasts, as well as inland, and respectfully invite the action of Congress on this subject.

(Introduced in House of Representatives April 24, 1876. Referred to Committee on Appropriations.
Introduced in Senate May 16, 1876. Referred to Committee on Military Affairs.)

SAINT LOUIS, MO.

COTTON EXCHANGE,
Saint Louis, Mo., April 3, 1876.

Resolved, That we, the members of the Cotton Exchange of the city of Saint Louis, State of Missouri, are desirous that our Senators and Representatives in the Congress of the United States should lend their votes and voices to the enactment of any law recognizing the Signal-Service as a Department of the Government and placing it (the Signal-Service) on a sound and lasting basis.

Resolved further, That we regard the Signal-Service as a triumph of civilization and an honor to the American Republic.

And resolved further, That we recognize in General Myer, the Chief Signal-Officer, a public benefactor, and commend him and his corps to the favor and consideration of Congress, and that we would regard additional appropriations by Congress in a light of true economy. We would further especially represent that additional signal-stations, especially in the cotton States, are required, and, if established, would add to the nation's wealth and greatness.

Resolved, That copies of the foregoing be forwarded to the Senators and Representatives of Missouri now in Congress.

(Introduced in House of Representatives April 10, 1876, and referred to Committee on Appropriations.)

MERCHANTS' EXCHANGE,
Saint Louis, April 10, 1876.

To the Honorable the Senate and House of Representatives in Congress assembled:

Your petitioners, the board of directors of the Merchants' Exchange of Saint Louis, would respectfully represent that there is now pending in Congress a bill for the organization and full recognition of the Signal Service on a basis due to the most favored branch of the Army. Further, being convinced of the value and efficiency of this branch of the service, they would deplore any legislation tending to limit its sphere of usefulness, or any act reducing the appropriation required for its maintenance, and consider the passage of the bill named would be productive of great good to the whole people.

The board, therefore, respectfully requests the Senators and Representatives from Missouri to support such measures as will promote the efficiency of the Signal Service.

By order of the board of directors:

GEO. H. MORGAN, *Secretary.*

(Introduced in House of Representatives April 17, 1876; referred to Committee on Appropriations.)

SAVANNAH, GA.

SAVANNAH COTTON EXCHANGE,
Savannah, Ga., April 5, 1876.

[Extract from minutes.]

* * * * * * *

Whereas this board is informed of the pending legislation in Congress to permanently fix and provide for the Signal Service:

Resolved, That the Savannah Cotton Exchange is deeply sensible of the importance of this service. Its reports have been marked by great scientific skill, and its weather indications show high averages of verification. Its benefits to commerce and trade, its importance to agriculture and many diversified interests, command the appreciation of the public, and the strong indorsement of this body.

Resolved, That the Senators and Representatives from Georgia be requested to give a liberal support to legislation which shall establish this important division of the public service on a sure and permanent footing, with enlarged powers of usefulness.

Resolved, That the Hon. Julian Hartridge, Representative from the first district, be requested to submit the foregoing resolutions to his colleagues in Congress.

* * * * * * *

A true extract from the minutes.

E. F. BRYAN,
Superintendent, Secretary to the Board.

The Savannah Chamber of Commerce emphatically recommends to the Georgia delegation their support of the appropriations for the Signal Service.

The value of the daily records of this bureau to the country cannot be overestimated.

CHARLES GREEN,
President of the Chamber.

WILMINGTON, N. C.

CHAMBER OF COMMERCE,
Wilmington, N. C., March 29, 1876.

At a meeting of the Chamber of Commerce held this day, the following proceedings were had:

Whereas the operations of the Signal-Service of the Army have demonstrated the great value of said service to commerce and agriculture; and

Whereas it is the judgment of this chamber that this branch of the service should be as fully and distinctly organized as are the infantry, artillery, and engineer departments, in order to retain with more permanency such officers who may be best fitted for this particular service, without the possibility of their being relieved or transferred to other duty: Therefore,

Be it resolved, That our Senators and Representatives be earnestly requested to do all in their power to secure the passage of the bill now pending in the House of Representatives to organize the Signal Service of the Army.

Resolved, That a copy of this preamble and resolution be sent forthwith to each of our Senators and Representatives.

JNO. L. CANTWELL, *Secretary.*

(Introduced in House of Representatives March 31, 1876, and referred to Committee on Military Affairs.

Introduced in Senate April 3, 1876, and referred to Committee on Commerce.)

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1 Albany, N. Y.
2 Alpena, Mich.
3 Atlantic City, N. J.
4 Augusta, Ga.
5 Baltimore, Md.
6 Barnegat, N. J.
7 Benton, Montana.
8 Bismarck, Dakota.
9 Boston, Mass.
10 Breckenridge, Minn.
11 Buffalo, New York.
12 Burlington, Vt.
13 Cairo, Ill.
14 Cape Hatteras, N. C.
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20 Chicago, Ill.
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22 Cleveland, Ohio.
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112 Havana, Cuba, W. I.
113 St. Georges, Bermuda.
114 St. John's, Porto Rico, W. I.
115 Navassa, W. I.
116 Clifton, Jamaica, W. I.
117 Paramaribo, D. Guiana, S. A.
118 Batavia, Dutch Guiana, S. A.
119 Medellin, Colombia, S. A.
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47 Stornoway, Lews C. Hebr.
48 Stratfield Turgiss.
49 Streatley Vicarage.
50 Thurso.
51 Truro, Royal Institution.
52 Valencia Observatory.

SUB-SERIES.

58 Calf of Man, Isle of Man.
54 Cape of Good Hope Observa'y.
55 Leith, Restalrig Park.
56 Mauritius.
57 Monach Lt-house, Hebrides.
58 North Unst, Shetland Islands.

ALGERIAN SERIES.

59 Nemours.
60 Algiers.
61 La Calle.
62 Tunis.
63 Sfax.
64 Saïda.
65 Tebessa.
66 Geriville.
67 Laghouat.
68 Biskra.

AUSTRIAN SERIES.

69 Agram.
70 Buda-Pesth.
71 Cracow.
72 Eperies.
73 Gratz.
74 Hermannstadt.
75 Kremsmünster.
76 Lemburg.
77 Nyiregyhaza.
78 Pola.
79 Szegedin.
80 Trieste.
81 Vienna.

BELGIAN SERIES.

82 Brussels.

DANISH SERIES.

83 Copenhagen.
84 Fanöe.
85 Godthaab, Greenland.
86 Stykkisholm, Iceland.
87 Thorshavn, Faröe.
88 Vestervig.

FRENCH SERIES.

89 Alençon.
90 Amiens.
91 Avignon.
92 Bar-sur-Seine.
93 Beaumette, (near Angers.)
94 Beauvais.
95 Besançon.
96 Bourg en Bresse.
97 Bourges.
98 Brest.
99 Caen.
100 Chartres.
101 Chaumont.
102 Clermont.
103 Commercy.
104 Commune de Grèasque.
105 Grenoble.
106 Le Mans.
107 Loches.
108 Lons-Le-Saulnier.
109 Mâcon.
110 Mirecourt.
111 Metz.
112 Nismes.
113 Orleans.
114 Paris Observatory.
115 Parthenay.
116 Privas.
117 La Roche-sur-Yon.
118 Rochefort, Observatory.
119 Rouen.
120 Saint Lo.
121 Tarbes.
122 Toulouse.
123 Villefranche.

SUB-SERIES.

124 Fort de France, Martinique.
125 Goree.
126 Marseilles.
127 Mont-Louis.
128 Montsouris, Paris.
129 Perpignan.
130 Pic du Midi, (Summit) H. P.
131 Pic du Midi, (Plantade.)
132 Saint Maur, (near Paris.)
133 Toulouse.
134 Tours.
135 Versailles, (near Paris.)
136 Zi-Ka-Wei, (near Shanghai.)

GERMAN SERIES.

137 Bamberg.
138 Berlin.
139 Breslau.
140 Carlsruhe.
141 Cassel.
142 Cologne.
143 Emden.
144 Frankfort-on-the-Main.
145 Friedrichshafen.
146 Hamburg.
147 Kiel.
148 Königsberg.
149 Köslin.
150 Leipsic.
151 Memel.
152 Münster.
153 Neufahrwasser.
154 Posen.
155 Strassburg, (in Alsace.)
156 Stuttgart.
157 Thorn.
158 Treves, Trier.
159 Wustrow, Naval School.

GREEK SERIES.

160 Athens.

ITALIAN SERIES.

161 Udine.
162 Padua.
163 Vicenza.
164 Verona.
165 Bergamo.
166 Domodossola.
167 Milan.
168 Pavia.
169 Moncalieri.
170 Mondovi.
171 Porto Maurizio.
172 Genoa.
173 Piacenza.
174 Parma.
175 Bologna.
176 Florence.
177 Leghorn.
178 Siena.
179 Urbino.
180 Pesaro.
181 Ancona.
182 Grosseto.
183 Rome.
184 Naples, O. U.
185 Lecce.
186 Cosenza.
187 Riposto, Sicily.
188 Palermo.
189 Caltanissetta.

SUB-SERIES.

190 Naples, S. R.

JAPANESE SERIES.

191 Tokio.

NETHERLANDS' SERIES.

192 Flushing.
193 Groningen.
194 Helder.
195 Utrecht.

NORWEGIAN SERIES.

196 Bergen.
197 Brönö.
198 Christiania.
199 Tromsö.

PORTUGUESE SERIES.

200 Angra, Azores.
201 Campo Major.
202 Funchal, Madeira.
203 Lisbon.

RUSSIAN SERIES.

204 Warsaw.
205 Wilna.
206 Dorpat.
207 St. Petersburg.
208 Kuopio.
209 Kieff.
210 Nikolaiev.
211 Kertch.
212 Moscow.
213 Lugan.
214 Archangel.
215 Tiflis.
216 Astrakhan.
217 Kasan.
218 Orenburg.
219 Ekaterinburg.
220 Nukuss.
221 Kasaly.
222 Tashkend.
223 Barnaul.
224 Yeniseisk.
225 Irkutsk.
226 Oorga.
227 Peking, China.
228 Nertchinsk.
229 Vladivostock.
230 Nikolaievsk, on the Amoor.

SPANISH SERIES.

231 Madrid.
232 San Fernando.

SWEDISH SERIES.

233 Haparanda.
234 Umea.
235 Hernosand.
236 Stockholm.
237 Wisby.

SUB-SERIES.

238 Upsala.

SWISS SERIES.

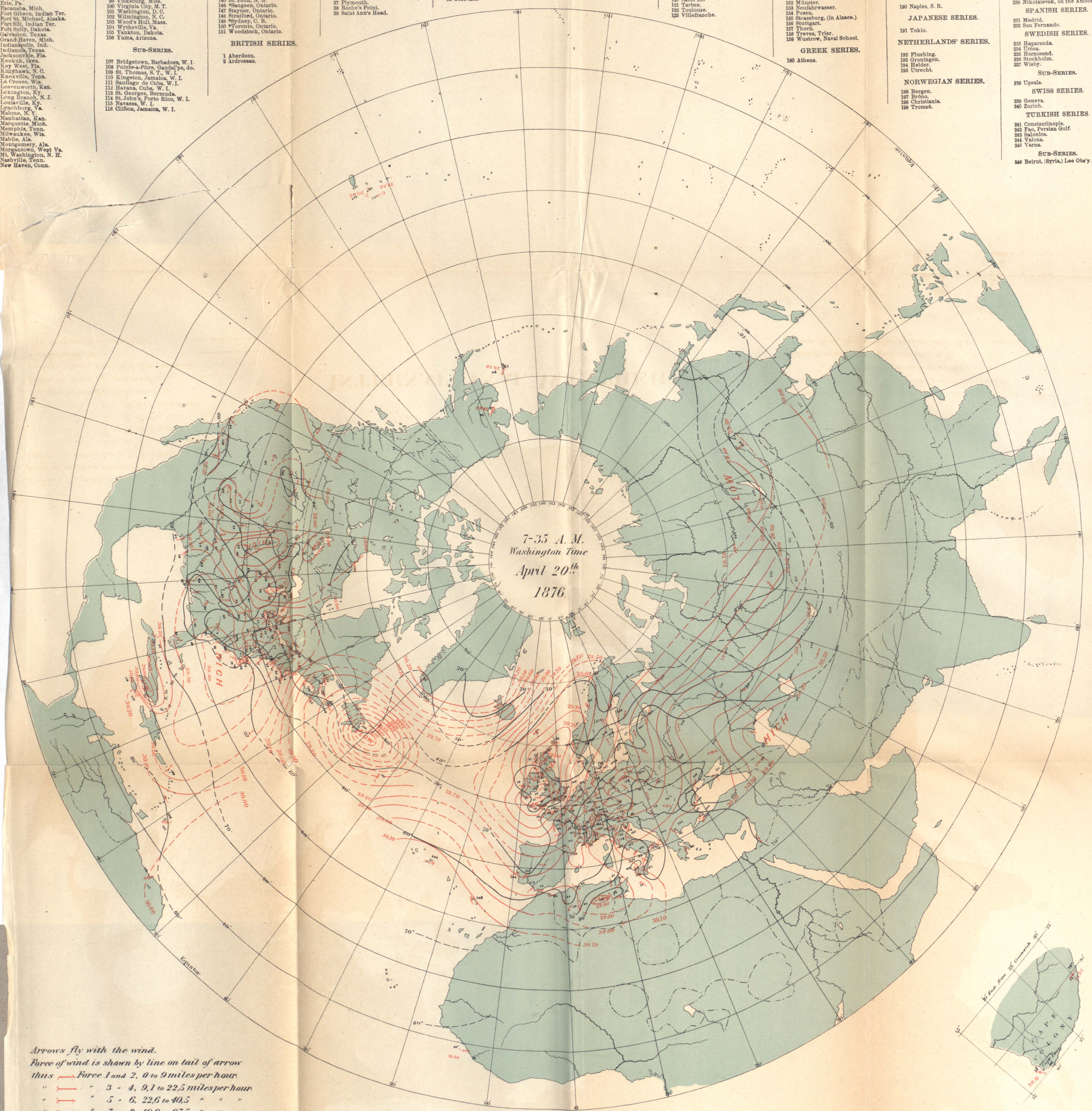
239 Geneva.
240 Zurich.

TURKISH SERIES.

241 Constantinople.
242 Fao, Persian Gulf.
243 Salonica.
244 Valona.
245 Varna.

SUB-SERIES.

246 Beirut, (Syria,) Lee Obs'y.



Arrows fly with the wind.
Force of wind is shown by line on tail of arrow
thus — *Force 1 and 2, 0 to 9 miles per hour.*
" — " 3 " 4, 9,1 to 22,5 miles per hour.
" — " 5 " 6, 22,6 to 40,5 " " "
" — " 7 " 8, 40,6 to 67,5 " " "
" — " 9 " 10, 67,6 upwards.
Absence of wind is indicated by C
Isobaric lines are marked ————
Isobaric lines doubtful are marked - - - - -
Isothermal lines " " ————
Isothermal lines doubtful " - - - - - - -

INTERNATIONAL WEATHER MAP.

Clear weather or cloudiness of 1/10 is indicated thus C○ *or*
Fair " " " 2/10 to 3/10 *or clear weather with Fog is indicated thus* C+ *or*
Cloudy weather or cloudiness of 8/10 to 10/10 C● *or*
Rain, Hail, Snow or Sleet is indicated thus C● *or*

PAPER 31.

Bulletin of international meteorological observations, taken simultaneously on January 24, 1876.

7.35 a. m., Washington mean time.
0.6 p. m., Lisbon mean time.
0.28 p. m., Madrid mean time.
0.43 p. m., Greenwich mean time.
0.53 p. m., Paris mean time.

1.1 p m., Brussels mean time.
1.4 p. m., Utrecht mean time.
1.13 p. m., Berne mean time.
1.23 p. m., Christiania mean time.

1 33 p. m., Copenhagen mean time.
1.33 p. m., Rome mean time.
1.37 p. m., Berlin mean time.
1.49 p. m , Vienna mean time.

1 55 p. m., Stockholm mean time.
2.18 p. m., Athens mean time.
2.39 p. m., Constantinople mean time.
2.44 p. m., St. Petersburg mean time.

ALGERIAN SERIES.

[Furnished by the co-operation of General d'Eudeville, Commandant Supérieur du Génie in Algeria.]

Stations.	Barometer. Corrected for instrumental errors. Inches.	Barometer. Corrected for instrumental errors. Millimeters.	Barometer. Reduced to sea-level. Inches.	Barometer. Reduced to sea-level. Millimeters.	Temperature of the air. Fahrenheit.	Temperature of the air. Centigrade.	Relative humidity. Per cent.	Wind. Direction. From—	Wind. Velocity. Miles per hour.	Wind. Velocity. Meters per second.	Wind. Force. 0—10.	Clouds. Amount. Upper. 0—10.	Clouds. Amount. Lower. 0—10.	Clouds. Direction. Upper. From—	Clouds. Direction. Lower. From—	Rain-fall in the past 24 hours. Inches.	Rain-fall in the past 24 hours. Millimeters.	Weather.	Observer.
Nemours	.....	.....	30.15	765.9	59.0	15.0	53	Calm.	.....	.....	0	.....	10	.....	.....	0	0	Hidden	Charrot.
Algiers	.....	.....	30.24	768.0	54.0	12.2	100	E.	.....	.....	0	.....	10	.....	.....	0.335	8.5	Hidden	Peter.
La Calle	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Kuntz.
Tunis	.....	.....	30.42	772.6	59.9	15.5	80	ESE.	.....	.....	4	.....	10	.....	.....	0.079	2.0	Hidden	Jacques.
Sfax	.....	.....	30.38	771.7	58.5	14.7	82	E.	.....	.....	3	.....	6	.....	.....	0.079	2.0	Fair	Chauvey.
Saida	.....	.....	30.19	766.7	43.7	6.5	78	ENE.	.....	.....	1	.....	6	.....	.....	0.079	2.0	Fair	Grosjean.
Tebessa	.....	.....	30.36	771.1	43.2	6.2	.....	SE.	.....	.....	3	.....	10	.....	.....	0.157	4.0	Hidden	Colin.
Geriville	.....	.....	30.19	766.9	39.9	4.4	78	SE.	.....	.....	3	.....	6	.....	.....	0.177	4.5	Fair	Buard.
Laghouat	.....	.....	30.22	767.5	44.6	7.0	85	SE.	.....	.....	4	.....	3	.....	.....	0.551	14.0	Fair	Simon.
Biskra	.....	.....	30.27	768.9	61.7	16.5	31	SE.	.....	.....	4	.....	10	.....	.....	1.850	47.0	Hidden	Coulon.

NOTE.—In the originals the distinction between the amount of upper and lower clouds is apparently not made. The weather is published as given. The rain-fall is measured at 7 a. m., local time.

Bulletin of international meteorological observations, taken simultaneously on January 24, 1876—Continued.

AUSTRIAN SERIES.

[Furnished by the co-operation of Prof. Carl Jelinek, director of the Imperial and Royal Central Meteorological Institute, at Vienna.]

Stations.	Barometer. Corrected for instrumental errors. Inches.	Barometer. Corrected for instrumental errors. Millimeters.	Barometer. Reduced to sea-level. Inches.	Barometer. Reduced to sea-level. Millimeters.	Temperature of the air. Fahrenheit.	Temperature of the air. Centigrade.	Relative humidity. Per cent.	Wind. Direction. From—	Wind. Velocity. Miles per hour.	Wind. Velocity. Meters per second.	Wind. Force. 0—10.	Clouds. Amount. Upper. 0—10.	Clouds. Amount. Lower 0—10.	Clouds. Direction. Upper. From—	Clouds. Direction. Lower. From—	Rain-fall in the past 24 hours. Inches.	Rain-fall in the past 24 hours. Millimeters.	Weather.	Observer.
Agram	.....	.....	30.72	780.4	31.3	— 0.4	96	SW.	.....	.....	3	.....	10	.....	.....	0	0	Dense fog...	Prof. Ivan Stozir.
Buda-Pesth	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	I. R. Cen. M. I., Hungary.
Cracow	.....	.....	30.60	777.1	38.3	3.5	69	W.	.....	.....	2	.....	1	.....	.....	0	0	.....	I. R. Observatory.
Eperies	.....	.....	30.68	779.2	39.4	4.1	94	Calm.	.....	.....	0	.....	10	.....	.....	0	0	.....	Julius Mikolik.
Gratz	29.41	746.9	30.69	779.5	34.5	1.4	66	S.	.....	.....	2	.....	0	.....	.....	0	0	.....	Andreas Rospini.
Hermannstadt	29.16	740.6	30.67	779.1	33.8	1.0	81	NW.	.....	.....	1	.....	5	.....	.....	0	0	.....	Prof. Reissenberger.
Kremsmünster	29.28	743.8	30.73	780.6	28.4	— 2.0	96	Calm.	.....	.....	0	.....	0	.....	.....	0	0	.....	Prof. C. Wagner.
Lemberg	.....	.....	30.52	775.3	34.0	1.1	89	NW.	.....	.....	2	.....	7	.....	.....	0	0	.....	Dr. T. Stanecki.
Nyiregyhaza	.....	.....	30.73	780.5	23.7	— 4.6	100	N.	.....	.....	1	.....	10	.....	.....	0	0	.....	Habzsuda Daniel.
Pola	.....	.....	30.67	778.9	43.9	6.6	99	NW.	.....	.....	2	.....	Fog	.....	.....	0.004	0.11	Foggy	I. R. Hydrographic Of'ce
Szegedin	.....	.....	30.70	779.7	38.7	3.7	82	S.	.....	.....	2	.....	0	.....	.....	0	0	.....	Karl Stancel.
Trieste	.....	.....	30.67	779.0	39.4	4.1	100	Calm.	.....	.....	0	.....	10	.....	.....	0	0	Dense fog ..	Prof. V. Farolfi.
Vienna	.....	.....	30.67	778.9	32.9	0.5	86	Calm.	.....	.....	0	.....	0	.....	.....	0	0	.....	I. R. Central Institute.

NOTE.—The originals give, occasionally, the weather by the Vienna symbols. The distinction between upper and lower clouds is not made. It is not always certain that the weather remarks refer to the exact moment of observation. At Lemberg the rain-fall is measured at 7 p. m., local time. The elevation of Gratz is 343.5 meters, or 1,126.9 feet; Hermannstadt, 407.8 meters, or 1,337.9 feet; Kremsmünster, 383.6 meters, or 1,253.5 feet.

BELGIAN SERIES.

[Furnished by the co-operation of Prof. E. Quetelet, director of the Royal Observatory at Brussels.]

Brussels	.....	.....	30.61	777.6	40.8	4.9	77	SW.	.....	.....	2	.....	1	.....	.....	0	0	.....	Royal Observatory.

NOTE.—In the originals the weather is occasionally given in general notes.

BRITISH SERIES.

[Furnished by the co-operation of Robert H. Scott, esq., director of the Meteorological Office, London, and Alexander Buchan, secretary of the Scottish Meteorological Society, Edinburgh.]

Aberdeen			30.11	764.8	47.4	8.6		WSW.	19	8.5			1			0.010	0.25	Blue sky	William Boswell.
Ardrossan			30.27	768.8	48.5	9.2		WSW.			4		7					*D. clouds	J. Mayes.
Armagh Observatory			30.38	771.6	47.1	8.4		SW.	10	4.5			8					*D. clouds	S. Cali, for Dr. Robinson.
Bidston, Liverpool Obs'y			30.41	772.4	48.2	9.0		WSW.	10	4.5			10					Overcast	John Hartnup.
Birr Castle, (Parsonstown)			30.37	771.4	50.3	10.2		SW.			1		7					Misty	J. Dreyer.
Bradford			30.33	770.4	48.6	9.2		SW.			4		10			0.02	0.5	Drizzling	J. McLandsborough.
Bridgetown, (Barbados)			29.99	761.7	79.6	26.4		NE.			3		7					*D. clouds	Sergt. G. H. Hunt.
Cambridge Observatory			30.49	774.4	50.0	10.0		SSW.			2		10					Overcast	H. Todd.
Cardington			30.52	775.2	48.0	8.9		SW.			1		9					Overcast	John McLaren.
Carlisle			30.35	770.9	49.9	9.9		W.			6		4			0.06	1.5	*D. clouds	I. Bell, for J. Cartmell.
Chatham, School M. E			30.51	774.9	44.2	6.8		N.			1							Blue sky	Capt. J. Fellowes, R. E.
Dartmoor	29.03	737.3	30.58	776.7	44.0	6.7		SW.			3		10					Gloomy	R. E. Power.
Donaghadee			30.33	770.4	48	8.9		SW.			3		2					Blue sky	J. MacGowan.
Dover			30.56	776.2	43	6.1		WSW.			3		2					¼ clouded	J. Costello.
Eccles, (near Manchester)			30.39	771.9	49.7	9.8		SE.	4.4	2.0			10					Gloomy	Thomas Mackereth.
Falmouth Observatory			30.54	775.7	49.7	9.8		SSW.	19	8.5			10					Overcast	The Staff.
Fort Napier, (Natal)	27.51	698.7	29.76	755.9	76.8	24.9		E.			2		4					*D. clouds	Pvt. G. Salmon, A. H. C.
Free Town, (Sierra Leone)			29.93	760.2	88	31.1		NE.			1		3					Blue sky	
Galway, Queen's College			30.29	769.4	49	9.4		W.			1		7					*D. clouds	B. G. Clare, for Prof. Curtis.
Gibraltar, (Mediterranean)			30.20	767.1	53.8	12.1		E.			3		10					Raining	Pvt. C. Aitken, A. H. C.
Glasgow Observatory			30.24	768.1	47.3	8.5		WSW.			2		7					Fine	Lewis Stuart.
Great Yarmouth			30.47	773.9	41	6.7		WSW.			4		7					Misty	G. T. Watson.
Greenwich Royal Obs'y			30.54	775.7	49.7	9.8		SW.			4		3					*D. clouds	The Staff, for G. B. Airy.
Guernsey			30.58	776.7	46	7.8		SSW.			2		0					Blue sky	Dr. S. E. Hoskins.
Halifax, Mcorside Obs'y			30.40	772.1	48.1	8.9		W.			3		10					Hazy	L. J. Crossley.
Helston			30.51	774.9	51	10.6		SW.			6		4			0.3	7.6	*D. clouds	M. P. Moyle.
Holyhead			30.39	771.9	48	8.9		SW.			3		4					*D. clouds	John Tilston.
Kew Observatory			30.54	775.7	49.8	9.9		WSW.	15	6.7			9					*D. clouds	The Staff.
Kingstown			30.40	772.1	51	10.6		W.			3		3					Blue sky	George Mitchell.
Leicester Museum			30.49	774.4	43.9	6.6		SW.			1		10					Gloomy	William J. Harrison.
Malta, (Mediterranean)			30.49	774.4	59.6	15.3		NE.			2		8k						Fred. Travis, Pvt. A. H. C
Nairn			30.05	763.3	46	7.8		WSW.			2		2					¼ clouded	W. D. Penny.
Nassau, (Bahamas)			30.30	769.6	72.6	22.6		N.			5		8					Raining	Surg. Maj. Henry.
Nottingham			30.44	773.2	47.0	8.3		SSW.			4		10cs'd						E. J. Lowe, F. R. S.
Oscott, St. Mary's College			30.46	773.7	42.3	5.7		SW.			3		10					Misty	Rev. Stephen Whitty.
Oxford, Radcliffe Obs'y			30.50	774.7	48	8.9		SW.			2		10					Overcast	J. Lucas.
Plymouth			30.54	775.7	48.8	9.3		SSW.			2		10					Overcast	John Merrifield.
Roche's Point			30.36	771.1	49	9.4		WSW.			3		10					Foggy	W. Kennedy.
Saint Ann's Head			30.47	773.9	47	8.3		WSW.			6		10					Misty	John C. Walker.
Saint Helier, (Jersey)			30.59	777.0	44.5	6.9		SSE.			3		0					Blue sky	A. P. Amy.
Sandwick Manse, (Orkneys)			29.91	759.7	44.1	6.7		W.	50	22.4			10					Hailing	Rev. Dr. Clouston.
Scarborough			30.34	770.6	47.8	8.8		WSW.			2		10					Overcast	F. Shaw.
Scutari Cemetery, (Turkey)			30.61	752.1	44.8	7.1		NNE.			2		4					*D. clouds	Sergt. W. H. Lyne.
Sheffield			30.38	771.6	49.4	9.7		Calm.			0		10			0	0	Overcast	W. F. Cooper.
Silloth Rectory			30.31	769.9	48.8	9.3		W.			4		2			0	0	*D. clouds	Rev. Francis Redford.
Stonyhurst Observatory			30.37	771.4	47.0	8.3		W.			2		10			Blank	Blank	Hazy	The Staff.
Stornoway, Lewis C. (Hebr.)			30.04	763.0	45	7.2		WSW.			4		8					Threatening	John Smith.

Bulletin of international meteorological observations, taken simultaneously on January 24, 1876—Continued.

BRITISH SERIES—Continued.

Stations.	Barometer. Corrected for instrumental errors. Inches.	Barometer. Corrected for instrumental errors. Millimeters.	Barometer. Reduced to sea-level. Inches.	Barometer. Reduced to sea-level. Millimeters.	Temperature of the air. Fahrenheit.	Temperature of the air. Centigrade.	Relative humidity. Per cent.	Wind. Direction. From—	Wind. Velocity. Miles per hour.	Wind. Velocity. Meters per second.	Wind. Force. 0—10.	Clouds. Amount. Upper. 0—10.	Clouds. Amount. Lower. 0—10.	Clouds. Direction. Upper. From—	Clouds. Direction. Lower. From—	Rain-fall in the past 24 hours. Inches.	Rain-fall in the past 24 hours. Millimeters.	Weather.	Observer.
Stratfield Turgiss			30.51	775.7	48.5	9.2		SW.			1		8					*D. clouds	Rev. Charles H. Griffith.
Streatley Vicarage																			Rev. John Slatter.
Thurso			29.96	761.0	47	8.3		WSW.			6		4					*D. clouds	John Trotter.
Truro, Royal Institution			30.50	774.7	51	10.6		SW.			4		10					Gloomy	W. Newcombe.
Valencia Observatory			30.35	770.9	50.8	10.4		SSE.	11	4.9			10					*D. clouds	The Staff.
SUB-SERIES.																			
Cape Good Hope Obs'y			29.94	760.5	82.7	28.2	41	SSE.	12	5.4			1						The Staff, for E. J. Stone.
Calf of Man, (Isle of Man)																			
Leith, Restalrig Park			30.24	768.1	48.0	8.9		W.			4					0.18	4.6	Fine	Andrew Gibb.
Monach L't-house, Hebrides																			J. Youngclause.
North Unst, (Shetland Isl'd)																			

NOTE.—The originals generally omit the relative humidity and rain-fall. Except in a few cases and the sub-series, they give the wind-force by the scale 0 to 12, the wind-direction to 32 points, and the weather by the Beaufort notation. The cloudiness at Stornoway by the scale 0 to 4. Generally, the distinction between upper and lower clouds is not made. The rain-fall is measured at Aberdeen at 10 a. m., local time. The altitude of Dartmoor is 1,400 feet, or 426.7 meters; Fort Napier, 2,200 feet, or 670.6 meters. * Detached clouds.

DANISH SERIES.

[Furnished by the co-operation of Capt. N. Hofmeyer, director of the Royal Danish Meteorological Institute at Copenhagen.]

Copenhagen			30.21	767.4	37.8	3.2	83	W.			4		10						
Fanöe			30.28	769.1	38.5	3.6	90	WSW.			6		10						
Godthaab, (Greenland)			29.04	737.7	3.6	−15.8	95	SE.			2		10					Snowing	
Stykkisholm, (Iceland)			28.86	733.0	28.9	−1.7	86	S.			6		10					Snowing	
Thorshavn, (Faröe)			29.50	749.3	41.4	5.2	74	W.			7		4					Rain and hail	
Vestervig			30.10	764.6	39.6	4.2	97	WSW.			6		10						

NOTE.—The originals give the wind-force by the scale 0 to 6; occasionally, weather by Vienna symbols; no distinction between the amount of upper and lower clouds.

FRENCH SERIES.

[Furnished by the co-operation of His Excellency U. J. Le Verrier, director of the Paris Observatory, and the respective observers.]

Alençon			30.63	778.1	41.0	5	87	SW.			1		0			0	0	Clear	Normal School.
Amiens			29.84	758.0	42.8	6.0	70	SW.			3		0			0	0	Clear	Normal School.
Avignon			30.63	777.9	48.9	9.4	69	NNE.			1		1			0	0	Light clouds.	Normal School.
Bar-sur-Seine			30.69	779.4	41.4	5.2	72	SW.			1		0			0	0	Clear	C. Saillard.
Beaumette, (near Angers)			30.62	777.7	42.3	5.7	78	SE.	2.7	1.2						0	0		Beaumette Observatory.
Beauvais			30.55	775.9	39.4	4.1	95	SSE.			1		0			0	0	Clear	Normal School.
Besançon			30.74	780.8	37.0	2.8	72	E.			2		0			0	0	Clear	Normal School.
Bourg en Bresse			30.76	781.3	40.5	4.7	82	N.			1		0			0	0	Clear	Normal School.
Bourges			30.66	778.7	42.8	6	74	ESE.			2		0			0	0	Clear	Normal School.
Brest			30.48	774.2	50.9	10.5	70	S.			2		0			0	0	Clear	Naval Observatory.
Caen			30.58	776.8	43.7	6.5	73	S.			2		0			0	0	Clear	Normal School.
Chartres			30.65	778.4	45.9	7.7		SW.			2		0			0	0	Clear	Normal School.
Chaumont																			Normal School.
Clermont			30.67	779.0	47.3	8.5	55	S.			2		0			0	0	Clear	Puy de Dome, Obs.
Commercy			30.69	779.6	36.0	2.2	93	WSW.			2		0			0	0	Clear	Normal School.
Commune de Gréasque*			30.60	777.2	51.1	10.6	58	NE.			2		5		NE.	0	0		
Grenoble			30.72	780.2	38.8	3.8	67	NE.			2		0			0	0	Clear	Normal School.
Le Mans			30.65	778.4	38.5	3.0	83	NE.			2		0			0.008	0.2	Clear	Normal School.
Loches																			
Lons-Le-Saulnier			30.71	779.9	38.5	3.0	93	W.			1		0			0	0	Clear	Normal School.
Mâcon			30.59	776.9	31.5	− 0.3		Calm.			0		10			0	0	Covered	Normal School.
Mirecourt			30.64	778.3	41.5	5.3	85	SSW.			2		1		NNE.	0	0	Clear	Normal School.
Metz																			
Nismes			30.62	777.7	56.1	13.4	83	E.			1					0	0		Normal School.
Orleans			30.67	778.9	39.6	4.2	77	ESE.			2		0			0	0	Clear	Normal School.
Paris Observatory			30.67	778.9	38.5	3.0	83	S.			1		0?			0	0	Misty?	National Observatory.
Parthenay			30.61	777.4	48.2	9	78	SE.			2		8		E.	0	0	Very cloudy	Normal School.
Privas			30.69	779.6	41.7	5.4		ESE.			2		2		ESE.	0	0	Slt'ly cloudy	Normal School.
La Roche-sur-Yon			30.63	778.1	46.8	8.2	61	SW.			2		0			0	0	Clear	Normal School.
Rochefort, Observatory			30.60	777.1	48.6	9.2	69	E.			3		0			0	0	Clear	Naval Observatory.
Rouen			30.65	778.4	41.4	5.2	63	SSE.			2		0			0	0	Clear	Normal School.
Saint Lo			30.61	777.4	45.3	7.4	60	SW.			1		0			0	0		Normal School.
Tarbes			30.13	765.3	48.2	9	69	SE.			2		0			0	0	Clear	Normal School.
Toulouse			30.56	776.2	53.1	11.7	79	SE.			2		5					Cloudy	Normal School.
Villefranche			30.76	781.3	41.0	5	87	NE.			1		0			0	0	Clear	Normal School.

SUB-SERIES.

Fort de France, Martinique			29.95	760.8	77.0	25	83	NE.			2		2k			0.51	13.		L'Abbé Marchési.
Gorée																			
Marseilles			30.55	775.9	58.6	14.8	68	E.			1		4			0	0		Marseilles Observatory.
Mont-Louis	25.21	640.2	30.72	780.2	33.4	0.8	87	SSW.	0.0	0.00			8		S.	0	0		—. Falguère.
Montsouris, Paris			30.65	778.4	41.0	5.0	78	SSE.			1		0			0	0		Montsouris Observ'tory.

* Near Marseilles.

Bulletin of international meteorological observations, taken simultaneously on January 24, 1876—Continued.

FRENCH SUB-SERIES—Continued.

Stations.	Barometer. Corrected for instrumental errors. Inches.	Barometer. Corrected for instrumental errors. Millimeters.	Barometer. Reduced to sea-level. Inches.	Barometer. Reduced to sea-level. Millimeters.	Temperature of the air. Fahrenheit.	Temperature of the air. Centigrade.	Relative humidity. Per cent.	Wind. Direction. From—	Wind. Velocity. Miles per hour.	Wind. Velocity. Meters per second.	Wind. Force. 0—10.	Clouds. Amount. Upper. 0—10.	Clouds. Amount. Lower. 0—10.	Clouds. Direction. Upper. From—	Clouds. Direction. Lower. From—	Rain-fall in the past 24 hours. Inches.	Rain-fall in the past 24 hours. Millimeters.	Weather.	Observer.
Perpignan			30.62	777.8	48.2	9.0	85	NE.	3.7	1.67			10		SE.	0.031	0.8		Dr. Fines.
Pic du Midi, (summit,) H. P.	21.45	544.7			23.0	— 5.0		WSW.			2		8			0	0	Fair	M. Baylac.
Saint Maur, (near Paris)			30.65	778.6	30.9	4.4	82	SSE.			1		0			0	0	Clear	E. Benon.
Toulouse			30.54	775.6	52.3	11.3	50	SSE.			4		1			0	0		Toulouse Observatory.
Tours			30.63	778.0	40.5	4.7	84	SE.			1		0			0	0	Clear	C. Marquet.
Versailles, (near Paris)			30.63	778.0	43.5	6.4	74	SW.			1		0			0	0	Very clear	Dr. A. Bérigny.
Zi-Ka-Wei, (near Shanghai)			30.34	770.6	38.8	3.8	89	NNE.	3.8	1.7			10			Blank Blank	Blank Blank		H. Le Lec, S. J.

NOTE.—The originals generally give the wind-force by the scale 0 to 7; the weather in general terms, as published; the wind-velocity for Beaumette, Mont-Louis, Perpignan, and Zi-Ka-Wei in meters per second. Generally the distinction between upper and lower clouds is not made. The rain-fall is generally measured at 7, 8, or 9 a. m., local time, and at Clermont 9 a. m. of the following day. The records of the amount of rain and snow are frequently omitted. The altitude of Mont-Louis is 1,586.40 meters, or 5,204.8 feet; Chaumont, 332 meters, or 1,080.9 feet; Clermont, 388 meters, or 1,272.9 feet; Commune de Gréasque, 322 meters, or 1,056.4 feet; Pic du Midi, (summit,) 2,877 meters, or 9,439.1 feet; Pic du Midi, (Plantade,) 2,366 meters, or 7,762.6 feet; Tarbes, 308 meters, or 1,010 feet. The rain-fall at Zi-Ka-Wei is given as recorded by two different gauges.

GERMAN SERIES.

[Furnished by the co-operation of George Neumayer, superintendent Imperial Hydrographic Office, Berlin.]

Stations.	Barometer. Corrected for instrumental errors. Inches.	Barometer. Corrected for instrumental errors. Millimeters.	Barometer. Reduced to sea-level. Inches.	Barometer. Reduced to sea-level. Millimeters.	Temperature of the air. Fahrenheit.	Temperature of the air. Centigrade.	Relative humidity. Per cent.	Wind. Direction. From—	Wind. Velocity. Miles per hour.	Wind. Velocity. Meters per second.	Wind. Force. 0—10.	Clouds. Amount. Upper. 0—10.	Clouds. Amount. Lower. 0—10.	Clouds. Direction. Upper. From—	Clouds. Direction. Lower. From—	Rain-fall in the past 24 hours. Inches.	Rain-fall in the past 24 hours. Millimeters.	Weather.	Observer.
Bamberg			30.52	775.3	35.4	1.9	90	SW.			2		3			0	0		Prof. T. Hoh.
Berlin			30.58	776.6	37.4	3.0	70	S.			2		10			0	0		Prof. Arndt.
Breslau			30.61	777.4	37.6	3.1	70	WSW.			1		3			0	0		Dr. P. Neugebauer.
Carlsruhe			30.70	779.7	36.1	2.3	83	S.			2		0			0	0		A. Senz.
Cassel			30.64	778.3	38.1	3.4	73	SSW.			2		6			0	0		Dr. H. Möhl.
Cologne																			Dr. Garthe.
Emden																			Prof. Prestel.
Frankfort-on-the-Main			30.78	781.7	32.5	0.3	98	SW.			1		10			0	0	Foggy	Physical Society.

Friedrichshafen			30.80	782.3	30.2	— 1.0	82	N.					10			0	0	Foggy	M. Wilhelm.
Hamburg			30.47	774.0	39.4	4.1	79	SW.			6		6			0	0		Deutsche Seewarte.
Kiel			30.45	773.4	38.7	3.7	77	W.			4		10			0	0		Prof. G. Karsten.
Königsberg			30.28	769.1	33.6	0.9	90	SW.			5		9			0.016	0.4		Prof. E. Luther.
Köslin			30.40	772.2	34.5	1.4		SW.			4		10			0	0		H. Müller.
Leipsic			30.61	777.6	37.0	2.8	82	SW.			4		3			0	0		Prof. Bruhns.
Münster			30.57	776.4	37.6	3.1	94	SW.			1		0			0	0		Prof. E. Heis.
Posen			30.54	775.6	36.1	2.3	82	SW.			4		10			0	0		Dr. Magener.
Strassburg, (in Alsace)			30.74	780.8	32.2	0.1	98	SW.			2		1			0	0		Dr. Schur.
Stuttgart			30.71	780.0	36.3	2.4	78	NE.					0			0	0		Mr. Wurth.
Thorn			30.42	772.7	34.9	1.6	88	SW.			6		10			Inap.	Inap.		Dr. Hasenbalg.
Treves, (Trier)			30.60	779.7	33.4	0.8	88	W.			2		0			0	0	Dense fog	Prof. Flesch.
Wustrow, naval school			30.39	772.0	35.6	2.0	70	WNW.			4		10			0	0		E. F. Schütz.

NOTE.—In the originals the distinction between the amount of upper and lower clouds is not made; it is not always certain that the remarks in the weather column refer to the moment of observation. The elevation of Friedrichshafen is 413.4 meters, or 1,356.3 feet.

GREEK SERIES.

[Furnished by the co-operation of Prof. Dr. J. F. Julius Schmidt, director of the Royal Observatory at Athens.]

Athens			30.58	776.8	54.7	12.6		NE.										Clear	

NOTE.—The originals give the barometer corrected, but not reduced to sea-level; the weather, and occasionally the wind-force in general terms; occasionally the kind of clouds.

ITALIAN SERIES.

[Furnished by the co-operation of His Excellency the Minister of Agriculture, Industry, and Commerce, and the respective observers.]

Udine			30.64	778.2	46.8	8.2	52	Calm.	0	0			0			0	0		
Padua			30.67	778.9	41.4	5.2	82	NW.	0.7	0.3			0			0	0		
Verona			30.69	779.5	44.6	7.0	54	W.			1		0			0	0		
Bergamo			30.64	778.3	42.8	6.0	59	E.			1		0			0	0		
Milan			30.73	780.6	33.3	0.7	81	NW.			1		0			0	0		
Moncalieri			30.76	781.3	30.4	— 0.9	90	ESE.	3.1	1.4			0			0	0		
Mondovi			30.72	780.3	41.9	5.5	47	NNW.			2		0			0	0		
Porto Maurizio			30.64	778.3	59.0	15.0		ENE.			6		0			0	0		
Genoa			30.64	778.2	53.4	11.9	40	NE.	6.3	2.8			0			0	0		
Piacenza			30.73	780.6	34.9	1.6	72	W.	7.4	3.3			0			0	0		
Bologna			30.66	778.8	44.8	7.1	29	W.			1		2	W.		0	0		
Florence			30.63	778.1	54.5	12.5	60	E.			2		0			0	0		
Leghorn			30.62	777.7	55.2	12.8	54	E.	9.4	4.2			0			0	0		
Siena			30.61	777.4	50.2	10.1	77	ESE.	0.7	0.3			0			0	0		
Urbino																			
Pesaro																			
Ancona			30.71	780.0	53.9	6.6	82	W.			2		1			0	0		
Grosseto			30.40	777.2	55.9	13.3	55	ENE.			4		0			0	0		

Bulletin of international meteorological observations, taken simultaneously on January 24, 1876—Continued.

ITALIAN SERIES—Continued.

Stations.	Barometer. Corrected for instrumental errors. Inches.	Barometer. Corrected for instrumental errors. Millimeters.	Barometer. Reduced to sea-level. Inches.	Barometer. Reduced to sea-level. Millimeters.	Temperature of the air. Fahrenheit.	Temperature of the air. Centigrade.	Relative humidity. Per cent.	Wind. Direction. From—	Wind. Velocity. Miles per hour.	Wind. Velocity. Meters per second.	Wind. Force. 0—10.	Clouds. Amount. Upper. 0—10.	Clouds. Amount. Lower. 0—10.	Clouds. Direction. Upper. From—	Clouds. Direction. Lower. From—	Rain-fall in the past 24 hours. Inches.	Rain-fall in the past 24 hours. Millimeters.	Weather.	Observer.
Rome	.....	.....	30.60	777.1	56.5	13.6	58	N.	9.8	4.4	....	.....	0	.....	.....	0	0	.....	
Naples, O. U	.....	.....	30.60	777.1	62.1	16.7	48	NE.	.....	.....	4	.....	4	.....	.....	0	0	.....	
Lecce	.....	.....	30.63	777.9	54.9	12.7	61	N.	16.1	7.2	...	.....	2	.....	.....	0	0	.....	
Cosenza	.....	.....	30.65	778.4	54.1	12.3	67	NW.	.....	.....	1	.....	10	.....	.....	0	0	.....	
Riposto, (Sicily)	.....	.....	30.53	775.4	54.7	12.6	93	NW.	.....	.....	2	.....	10	.....	.....	0.280	7.1	Light rain ..	
Palermo	.....	.....	30.45	773.5	59.4	15.2	76	NE.	3.1	1.4	....	.....	10	.....	.....	0	0	.....	
Caltanissetta	.....	.....	30.51	774.9	50.9	10.5	9[illegible]	E.	.....	.....	6	.....	10	.....	.....	0.008	0.2	Light rain ..	

ITALIAN SUB-SERIES.

Naples, S. R	.....	.....	30.59	776.9	58.5	14.7	59	NE.	.....	.....	2	.....	—n	.....	.....	0	0	.....	Prof. F. Brioschi.

NOTE.—The originals give the wind-force by the scale 0 to 4, or the velocity in kilometers per hour; generally no distinction between upper and lower clouds; occasionally the weather in general terms. The altitude of Bergamo is not known; Mondovi, 556 meters, or 1,824.2 feet; Urbino, 451 meters, or 1,479.7 feet; Siena, 348.5 meters, or 1,143.3 feet; Caltanissetta, not known.

JAPANESE SERIES.

Tokio	.....	.....	.....	.....	.....	.....	...	.....	.....	.....	...	.....	.....	.....	.....	.....	.....	.....	

NETHERLANDS SERIES.

[Furnished by the co-operation of Prof. Buys Ballot, director of the Royal Meteorological Institute of the Netherlands, at Utrecht.]

Flushing			30.61	777.6	40.3	4.6		SW.			4								
Groningen			30.44	773.2	37.6	3.1		SW.			5								
Helder			30.47	773.0	39.9	4.4		SSW.			5								
Utrecht			30.53	775.0	40.5	4.7	78	SSW.			5		2						Lightcloudy.

NOTE.—The originals give the wind-pressure in kilograms per square meter; the amount of cloudiness without distinguishing between upper and lower clouds. It is assumed that the barometer readings have been reduced to sea-level.

NORWEGIAN SERIES.

[Furnished by the co-operation of Prof. H. Mohn, director of the Royal Norwegian Meteorological Institute, at Christiania.]

Bergen			29.76	755.8	43.5	6.4	73	SW.	12.5	5.6			10			0.016	0.4		
Bröno			29.00	726.7	37.0	3.0	83	W.	45	20			9			0	0		
Christiania			29.59	751.5	42.8	6.0	76	W.	20.4	9.1			7			0	0	Raining	
Tromsö			29.58	725.9	29.5	— 1.4	80	SSW.	19	8.5			10			0.27	7.0		

NOTE.—The originals give the amount of cloudiness without distinguishing between upper and lower clouds; the weather by the Vienna symbols. The cloudiness and weather at Bergen refer to 2h. p. m., local time, instead of 1h. 4m.

PORTUGUESE SERIES.

[Furnished by the co-operation of J. C. de Brito Capello, director of the Meteorological Observatory of the Infante Don Luiz, at Lisbon.]

Angra. (Azores)			29.86	758.5	58.5	14.7	91	WSW.	20.1	8.97			0.7			0.394	10.0	Raining?		Dr. J. A. N. Sampaio.*
Campo Major			30.30	769.6	53.1	11.9	49	E.	29.8	13.33			4	E.		0	0			Dr. A. M. R. dos Santos.
Funchal, (Madeira)			30.17	766.3	59.7	15.4	51	N.	2.4	1.07			10			0	0			Capt. D. A. da Cunha.
Lisbon			30.34	770.5	52.0	11.1	60	NE.	19.9	8.9			0			0.035	0.9			The Observatory.

NOTE.—The originals give the wind-velocity in kilometers per hour; the weather by the Vienna symbols; the amount of cloudiness without distinguishing between upper and lower clouds. The rain-fall at Lisbon is measured at noon, local time, instead of 0h. 6m.

RUSSIAN SERIES.

[Furnished by the co-operation of Prof. H. Wild, director of the Imperial Central Physical Observatory of Russia, at St. Petersburg.]

Warsaw			30.46	773.7	34.5	1.4	91	WSW.	22	10			5							Astronomical Obs'y.
Wilna			30.28	767.8	34.2	1.2	100	SW.	4	2			10							Astronomical Obs'y.
Dorpat			30.02	762.5	27.5	— 2.5	95	SE.	9	4			10							Physical Cabinet.
St. Petersburg			30.13	765.4	6.1	—14.4	86	SE.	7	3			10					Foggy		Central Physical Obs'y.
Knopio			29.72	754.8	11.5	—11.4	100	S.					10			0	0	Stormy		Ch. Forsten.
Kieff			30.39	772.0	28.6	— 1.9	86	NW.	7	3			10							Physical Cabinet.
Nikolaiev			30.54	775.7	29.5	— 1.4	74	N.	4	2			0							Kurdakof.
Kertch			30.51	774.9	33.6	0.9	79	NW.	2	1			2							Lagorio.
Moscow			30.26	768.7	3.4	—15.9	81	S.	9	4			0							Meteorological Obs'y.
Lugan			30.20	769.3	22.3	— 5.4	76	WSW.	18	8			10							Meteorological Obs'y.
Archangel			30.03	764.0	— 5.4	—20.8	88	Calm.	0	0			0							Ogorodnikof.

Bulletin of international meteorological observations, taken simultaneously on January 24, 1876—Continued.

RUSSIAN SERIES—Continued.

Stations.	Barometer. Corrected for instrumental errors. Inches.	Barometer. Corrected for instrumental errors. Millimeters.	Barometer. Reduced to sea-level. Inches.	Barometer. Reduced to sea-level. Millimeters.	Temperature of the air. Fahrenheit.	Temperature of the air. Centigrade.	Relative humidity. Per cent.	Wind. Direction. From—	Wind. Velocity. Miles per hour.	Wind. Velocity. Meters per second.	Wind. Force. 0—10.	Clouds. Amount. Upper. 0—10.	Clouds. Amount. Lower. 0—10.	Clouds. Direction. Upper. From—	Clouds. Direction. Lower. From—	Rain-fall in the past 24 hours. Inches.	Rain-fall in the past 24 hours. Millimeters.	Weather.	Observer.
Tiflis	28.77	730.8	30.26	768.7	33.3	0.7	41	NW.	25	11	...	...	7	...	...	...	...	...	Physical Observatory.
Astrakhan	...	...	30.31	769.8	17.4	— 8.1	80	NW.	22	10	...	...	2	...	...	Bl'k.	Bl'k.	...	Sebastianof.
Kasan	...	...	29.86	758.4	0.5	—17.5	95	NW.	4	2	...	...	6	...	...	...	...	...	Physical Cabinet.
Orenburg	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Tschernischef.
Ekaterinburg	28.63	727.3	29.71	754.6	9.1	—12.7	88	N.	4	2	...	...	10	...	...	...	...	Snowing	Meteorological Obs'y.
Kasaly	...	...	29.96	761.0	21.9	— 5.6	51	SE	4	2	...	...	0	...	...	...	...	...	Bobrof.
Tashkend	28.57	725.7	30.27	771.5	30.2	— 1.0	100	NE.	9	4	...	...	0	...	...	...	...	Light fog	Michelson.
Barnaul	...	...	30.23	767.9	21.9	— 5.6	85	SW.	22	10	...	...	10	...	...	...	...	...	Meteorological Obs'y.
Yeniseisk	...	...	30.14	765.5	3.6	—15.8	90	SE.	11	5	...	...	0	...	...	...	...	...	Marks.
Irkutsk	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Usolzef.
Oorga	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Mossin.
Pekin, (China)	...	...	30.45	773.5	27.1	— 2.7	58	Calm.	0	0	...	...	3	...	...	...	...	...	Physical Observatory.
Nertchinsk	28.47	723.2	30.87	784.0	—13.2	—25.1	54	Calm.	0	0	...	...	0	...	...	Bl'k.	Bl'k.	...	Meteorological Obs'y.
Vladivostock	...	...	30.51	774.9	4.5	—15.3	50	NW.	4	2	...	...	0	...	...	...	...	...	
Nikolaievsk, on the Amoor	...	...	...	...	—12.3	—24.6	72	W.	3	6	...	...	4	...	...	...	...	...	

NOTE.—The originals give the wind-velocity in meters per second, except Kuopio—by an unknown scale; the amount of cloudiness by the scale 0 to 10, except Kuopio—0 to 4—without distinguishing between upper and lower clouds; the weather by the Vienna symbols, except Kuopio—in general terms. The elevation of Tiflis is 409 meters, or 1,341.8 feet; Ekaterinburg, 306.4? meters, or 1,005.2? feet; Tashkend, meters, 494.2?, or 1,621.3? feet; Irkutsk, 392 meters, or 1,286 feet; Nertchinsk, 592.0? meters, or 1,942.2? feet; Oorga, 1,281.0? meters, or 4,202.6? feet.

SPANISH SERIES.

[Furnished by the co-operation of Antonio Aguilar, director of the Royal Observatory at Madrid, and of Don Cecilio Pujazon, captain royal navy, director of the Naval Observatory at San Fernando.]

Madrid	...	...	30.45	773.3	46.2	7.9	70	NE.	21.0	9.4	...	0	6	...	...	0	0	Cloudy	Royal Observatory.
San Fernando	...	...	30.23	767.7	57.6	14.2	72	E.	10.7	4.8	...	1	6	W.	E.	0	0	...	The Naval Observatory.

NOTE.—The originals give the weather in general terms; rain-fall for San Fernando from preceding to following midnight, for Madrid for 8 hours preceding; wind-velocity for Madrid in kilometers per hour.

SWEDISH SERIES.

[Furnished by the co-operation of Prof. R. Rubenson, director of the Royal Swedish Meteorological Institute at Stockholm, and Dr. H. H. Hildebrandsson, chief of the meteorological division of the Upsala Observatory.]

Haparanda	.....	.....	29.35	745.4	13.5	−10.3	90	S.	.....	.....	6	.....	10	.....	.....	0	0	.....		
Umea	.....	.....	29.23	742.4	33.4	0.8	100	SW.	.....	.....	7	.....	10	.....	.....	0	0	.....		
Hernosand	.....	.....	29.23	742.4	37.9	6.6	89	SW.	.....	.....	2	.....	5	.....	.....	0.138	3.5	.....		
Stockholm	.....	.....	29.60	751.8	37.9	3.3	88	SW.	.....	.....	6	.....	10	.....	.....	0.142	3.6	.....		
Wisby	.....	.....	29.97	761.1	36.7	2.6	85	W.	.....	.....	7	.....	10	.....	.....	0.209	5.3	.....		
SUB-SERIES.																				
Upsala	.....	.....	29.58	751.4	38.5	3.6	89	SW.	24.2	10.8	....	.....	10	.....	SW.	0	0	.....	Dr. Hildebrandsson.	

NOTE.—The originals give the wind-force by the scale 0 to 6, and Upsala also velocity in meters per second; the weather by Vienna symbols, or, occasionally, in general terms; no distinction between the amount of upper and lower clouds. The rain-fall is measured at 8 a. m., local time.

SWISS SERIES.

[Furnished by the co-operation of Prof. R. Wolf, director of the observatory at Zurich, and of Prof. E. Plantamour, director of the observatory at Geneva.]

Geneva	29.25	72.9	30.75	781.0	30.2	−1.0	100	ESE.	.....	.....	1	.....	10	.....	.....	0	0	Foggy	The observatory.	
Zurich	29.02	737.1	30.74	780.8	28.6	−1.9	94	SW.	.....	.....	1	.....	10	.....	.....	0	0	Foggy	The observatory.	

NOTE.—For Geneva the corresponding departures from the normal values are: Barometer, +15.5 mm.; thermometer, −2.8 cent.; relative humidity, +23 per cent.

NOTE.—The originals give the wind-force by the scale 0 to 4 for Zurich; the amount of cloudiness without distinguishing between upper and lower clouds; the weather in general terms. The altitude of Geneva is 408 meters, or 1,339 feet, and that of Zurich is 470 meters, or 1,542 feet.

TURKISH SERIES.

[Furnished by the co-operation of A. Coumbary, Effendi, director of the Central Observatory at Constantinople, and Prof. C. V. A. Van Dyck, superintendent of the Lee Observatory at Beirut.]

Constantinople	.....	.....	30.63	778.1	41.9	5.5	62	N.	12	5.5	....	.....	5	.....	N.	0	0	.....		
Fao, (Persian Gulf)	.....	.....	30.32	770.1	55.4	13.0	....	NW.	.....	.....	1	.....	2	.....	.....	.....	.....	.....		
Salonica	.....	.....	30.62	777.8	53.2	11.8	....	NW.	.....	.....	2	.....	0	.....	.....	.....	.....	.....		
Valona	.....	.....	30.50	774.6	54.1	12.3	....	W.	.....	.....	1	.....	0	.....	.....	.....	.....	.....		
Varna	.....	.....	30.47	774.0	42.8	6.0	....	N.	.....	.....	1	.....	0	.....	.....	.....	.....	.....		
SUB-SERIES.																				
Beirut, (Syria,) Lee Obs'y	.....	.....	30.18	766.5	60.1	15.6	64	NW.	.....	.....	3	.....	7ks	.....	NW.	0	0	Rainy	Prof. C. V. A. Van Dyck.	

NOTE.—The originals give the wind-force by the scale 0 to 7, (except Beirut, by the scale 0 to 12, and by Lind's anemometer when strong,) and Constantinople also velocity in meters per second; the weather in general terms; no distinction between upper and lower clouds, and, except Constantinople and Beirut, the amount by the scale 0 to 4. It is assumed that the barometer is reduced to sea-level.

Bulletin of international meteorological observations, taken simultaneously on January 24, 1876—Continued.

CANADIAN SERIES.

[Furnished by the co-operation of Prof. G. T. Kingston, director of the Magnetic Observatory at Toronto, and superintendent of the Meteorological Office of the Dominion of Canada. Those marked with a star (*) are also telegraphed daily to the office of the Chief Signal-Officer, U. S. A.]

Stations.	Barometer. Corrected for instrumental errors. Inches.	Barometer. Corrected for instrumental errors. Millimeters.	Barometer. Reduced to sea-level. Inches.	Barometer. Reduced to sea-level. Millimeters.	Temperature of the air. Fahrenheit.	Temperature of the air. Centigrade.	Relative humidity. Per cent.	Wind. Direction. From—	Wind. Velocity. Miles per hour.	Wind. Velocity. Meters per second.	Wind. Force. 0—10.	Clouds. Amount. Upper. 0—10.	Clouds. Amount. Lower. 0—10.	Clouds. Direction. Upper. From—	Clouds. Direction. Lower. From—	Rain-fall in the past 24 hours. Inches.	Rain-fall in the past 24 hours. Millimeters.	Weather.	Observer.
Bathurst, New Brunswick	.....	.....	29.73	755.1	5.5	—14.7	66	NW.	7.0	3.1	...	.....	.....	.....	.....	0	0	.....	Hon. J. Ferguson.
Brockville, Ontario	.....	.....	30.32	770.1	11	—11.7	...	Calm.	0	0	...	.....	10s	.....	W.	0.04	1.0	Cloudy	W. R. Bigg.
*Chatham, New Brunswick	.....	.....	29.75	755.6	6	—14.4	85	NW.	15	6.7	...	0	0	.....	.....	0.20	5.1	Clear	G. A. Blair.
Charlottetown, Pr. Edw's Is	.....	.....	29.67	753.6	8	—13.3	91	NW.	13	5.8	...	.....	5ks	.....	.....	0.50	12.7	Cloudy	H. J. Cundall, C. E.
Cornwall, Ontario	.....	.....	30.18	766.6	10.7	—11.8	86	N.	.....	.....	1	.....	10s,c	.....	.....	0	0	Clearing	James Smith, M. A.
Dalhousie, New Brunswick	.....	.....	29.92	760.0	2.8	—16.2	72	NW.	.....	.....	4	.....	.....	.....	.....	0.10	2.5	.....	H. A. Johnson.
Esquimault, Br. Columbia	.....	.....	30.24	768.1	27.0	— 2.8	76	N.	2	0.9	...	.....	.....	.....	.....	0	0	Clear	W. H. Bevis.
Fredericton, New Brunswick	.....	.....	29.86	758.4	6.9	—13.9	79	W.	15	6.7	...	.....	.....	.....	.....	0	0	Fair	Professor Harrison.
*Fort Garry, Manitoba	.....	.....	30.59	777.0	—32	—35.6	100	Calm.	0	0	...	0	0	.....	.....	0	0	Clear	James Stewart.
Goderich, Ontario	.....	.....	30.37	774.4	23.3	— 4.8	73	NW.	.....	.....	3	.....	10n	.....	.....	0	0	Threatening	H. J. Strang, M. A.
Granton, Ontario	.....	.....	30.33	770.4	22.3	— 5.4	...	NW.	.....	.....	3	.....	10n	.....	.....	Inap.	Inap.	Cloudy	James Grant.
*Halifax, Nova Scotia	.....	.....	29.68	753.9	16	— 8.9	78	N.	19	8.5	...	.....	5ks	.....	W.	0.343	8.72	Clearing	F. Allison, M. A.
*Kingston, Ontario	.....	.....	30.31	769.9	15	— 9.4	84	Calm.	0	0	...	8c	0	.....	.....	Inap.	Inap.	Fair	S. Woods, M. A.
Little Current, Ontario	.....	.....	30.36	771.1	12.1	—11.1	...	Calm.	0	0	...	.....	9s	.....	.....	0	0	.....	G. B. Abrey, C. E.
*Montreal, Quebec	.....	.....	30.19	766.8	11	—11.7	70	NW.	14	6.3	...	5k	2ks	NW.	.....	0.20	5.1	Cloudy	C. H. McLeod, C.
*Ottawa, Ontario	.....	.....	30.23	767.8	12	—11.1	80	NW.	8	3.6	...	.....	10ks	.....	W.	0.05	1.3	Cloudy	J. B. Haney.
*Parry Sound, Ontario	.....	.....	30.33	770.4	11	—11.7	90	NW.	3	1.3	...	8k	2ks	W.	W.	0	0	Cloudy	Rev. R. Mooley.
*Port Dover, Ontario	.....	.....	30.30	769.6	27	— 2.8	76	NW.	9	4.0	...	10k	0	NW.	.....	0	0	Cloudy	H. Morgan.
Port Hastings, Nova Scotia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	.....	.....	.....	.....	.....	Peter Grant.
*Port Stanley, Ontario	.....	.....	30.34	770.6	25	— 3.9	89	NW.	26	11.6	...	.....	10n	.....	NW.	0	0	Cloudy	M. Payne.
*Quebec, Quebec	.....	.....	30.09	764.3	7	—13.9	78	W.	14	6.3	...	2c	0	W.	.....	0.10	2.5	Clear	Captain Ash, R. N.
St. John, New Brunswick	.....	.....	29.86	758.4	10.0	—12.2	89	W.	16	7.2	...	0	0	.....	.....	0.01	0.3	.....	G. Murdoch, C. E.
*Saugeen, Ontario	.....	.....	30.29	769.4	21	— 6.1	85	N.	5	2.2	...	.....	10s	.....	.....	0.13	3.3	Light snow	K. Stewart.
Stayner, Ontario	.....	.....	30.32	770.1	17	— 8.3	83	N.	3	1.3	...	.....	10n	.....	N.	0.10	2.5	Threatening	R. J. Cole.
Stratford, Ontario	.....	.....	30.34	770.6	21.9	— 5.6	87	NW.	12	5.4	...	.....	10n	.....	.....	0	0	Cloudy	C. J. MacGregor, M. A.

*Sydney, Cape Breton			29.46	748.3	16	— 8.9	81	NW.	13	5.8			10s		NW.	0.30	7.6	Cloudy	T. C. Hill.
*Toronto, Ontario			30.29	769.4	26	— 3.3	88	W.	12	5.4			10n			0	0	Cloudy	Magnetic Observatory.
Woodstock, Ontario																			J. Montgomery.

NOTE.—The originals for Brockville, Charlottetown, Stayner, and those telegraphed give the cloudiness by the scale 0 to 4. The altitude of Granton is 1,015 feet, or 309.4 meters; Stratford, 1,182 feet, or 360.3 meters.

UNITED STATES SERIES.

[Furnished by the co-operation of Bvt. Brig. Gen. Albert J. Myer, Chief Signal-Officer, U. S. Army.]

Albany, N. Y			30.14	765.5	24	— 4.4	74	NW.	10	4.5		0	5ks		NW.	0.06	1.5	Fair	
Alpena, Mich			30.34	770.6	19	— 7.2	84	W.	6	2.7			10s		W.	Inap.	Inap.	Cloudy	
Atlantic City, N. J			30.13	765.3	35	1.7	90	N.	10	4.5		2k	8s	W.	N.	0.03	0.8	Clearing	
Augusta, Ga			30.20	767.1	61	16.1	82	SW.	1	0.4		2cs	5s	W.	NW.	0	0	Cloudy	
Baltimore, Md			30.18	766.6	42	5.6	74	N.	5	2.2		2ck	5ks	NW.		0.10	2.5	Clearing	
Barnegat, N. J			30.14	765.5	33	0.6	89	N.	5	2.2			10n			0.13	3.3	Light snow	
Benton, Mont	27.44	697.0	30.24	768.1	—22	—30.0	100	SE.	1	0.4		0	0			0	0	Clear	
Bismarck, Dak	28.58	725.9	30.60	777.2	—30	—34.4	37	NE.	2	0.9		0	0			0	0	Clear	
Boston, Mass			30.06	763.5	23	— 5.0	73	W.	16	7.2		5c	2s	W.		0.18	4.6	Fair	
Breckenridge, Minn			30.63	778.0	—23	—30.6	59	Calm.	0	0		0	0			0	0	Clear	
Buffalo, N. Y			30.28	769.1	26.5	— 3.1	77	NW.	11	4.9			10n		W.	0.01	0.3	Light sleet	
Burlington, Vt			30.20	767.1	15	— 9.4	65	N.	10	4.5		2k	5s	N.		0.08	2.0	Cloudy	
Cairo, Ill			30.52	775.2	27	— 2.8	88	N.	12	5.4			10s		N.	1.96	49.8	Cloudy	
Cape Hatteras, N. C			30.01	762.2	62	16.7	83	W.	12	5.4			10ks		NW.	0	0	Cloudy	
Cape Henry, Va			30.15	765.8	51	10.6	79	N.	16	7.2			10s		NE.	0.78	19.8	Cloudy	
Cape May, N. J			30.14	765.5	38	3.3	91	N.	11	4.9			10n			0.10	2.5	Light rain	
Charleston, S. C			30.20	767.1	61	16.1	77	SW.	8	3.6		5ck	0	SW.		0	0	Fair	
Cheyenne, Wyo	24.04	610.6	29.98	761.5	6	—14.4	100	NW.	8	3.6		0	2s			0	0	Fair	
Chicago, Ill			30.51	774.9	17	— 8.3	83	NW.	10	4.5		0	0			0	0	Clear	
Cincinnati, Ohio			30.40	772.1	33	0.0	69	N.	9	4.0			10s		N.	0.49	12.4	Cloudy	
Cleveland, Ohio			30.38	771.6	26.9	— 2.8	75	NW.	16	7.2			10ks		NW.	0.01	0.3	Cloudy	
Colorado Springs, Colo	24.14	613.1	30.01	762.2	10	—12.2	58	N.	1	0.4		5cs	0			0	0	Fair	
Corsicana, Tex			30.43	772.9	35	1.7	90	N.	10	4.5			10s			0.07	1.8	Cloudy	
Davenport, Iowa			30.62	777.7	11	—11.7	79	NW.	3	1.3		1ck	0			0	0	Clear	
Denison, Tex			30.45	773.4	28	— 2.2	88	N.	5	2.2			10s			0	0	Cloudy	
Denver, Colo	24.87	631.7	30.09	764.3	14	—10.0	63	S.	2	0.9		0	0			0	0	Clear	
Detroit, Mich			30.38	771.6	28	— 2.2	77	NW.	6	2.7			10s		W.	0	0	Cloudy	
Dodge City, Kans	27.77	705.4	30.30	769.6	13	—10.6	100	Calm.	0	0			Fog.			Inap.	Inap.	Foggy	
Dubuque, Iowa			30.58	776.7	10	—12.2	58	NW.	4	1.8		0	0			0	0	Clear	
Duluth, Minn			30.55	776.0	— 5	—20.6	63	SW.	4	1.8		0	0			0	0	Clear	
Eastport, Me			29.86	758.1	16	— 8.9	66	NW.	16	7.2		0	5s		NW.	0.19	4.8	Fair	
Erie, Pa			30.30	769.6	28	— 2.2	88	N.	12	5.4			10ks		N.	Inap.	Inap.	Cloudy	
Escanaba, Mich			30.42	772.7	12	—11.1	70	W.	8	3.6		0	1s		W.	Inap.	Inap.	Fair	
Fort Gibson, Ind. T			30.49	774.4	24	— 4.4	74	N.	8	3.6		5c	2s	SW.	SW.	0.70	17.8	Fair	
Fort Sill, Ind. T	29.19	741.4	30.42	772.7	22	— 5.0	72	N.	12	5.4		0	5s		N.	0	0	Fair	
Fort Sully, Dak	28.66	728.0	30.64	778.2	—19	—28.3	33	NW.	8	3.6		0	0			0	0	Clear	
Galveston, Tex			30.28	769.1	60	15.6	94	N.	22	9.8			10s		N.	0	0	Threatening	
Grand Haven, Mich			30.43	772.9	25	— 3.9	81	NW.	10	4.5			10s		NW.	0	0	Cloudy	
Indianapolis, Ind			30.47	773.9	28	— 2.2	77	NW.	6	2.7			10s		N.	0.04	1.0	Cloudy	

Bulletin of international meteorological observations, taken simultaneously on January 24, 1876—Continued.

UNITED STATES SERIES—Continued.

Stations.	Barometer. Corrected for instrumental errors. Inches.	Barometer. Corrected for instrumental errors. Millimeters.	Barometer. Reduced to sea-level. Inches.	Barometer. Reduced to sea-level. Millimeters.	Temperature of the air. Fahrenheit.	Temperature of the air. Centigrade.	Relative humidity. Per cent.	Wind. Direction. From—	Wind. Velocity. Miles per hour.	Wind. Velocity. Meters per second.	Wind. Force. 0—10.	Clouds. Amount. Upper. 0—10.	Clouds. Amount. Lower. 0—10.	Clouds. Direction. Upper. From—	Clouds. Direction. Lower. From—	Rain-fall in the past 24 hours. Inches.	Rain-fall in the past 24 hours. Millimeters.	Weather.	Observer.
Indianola, Tex			30.31	769.9	55	12.8	97	N.	28	12.5			10s		N.	0	0	Cloudy	
Jacksonville, Fla			30.2	769.1	57	13.9	87	S.	4	1.8		0	0			0	0	Clear	
Keokuk, Iowa			30.58	776.7	12	—11.1	80	N.	5	2.2		0	0			0	0	Clear	
Key West, Fla			30.26	768.6	70.0	21.1	90	E.	16	7.2		5ck	5s	E.	E.	0	0	Cloudy	
Kittyhawk, N. C			30.07	766.7	61	16.1	71	N.	16	7.2		10k	0	NW.		0.01	0.3	Cloudy	
Knoxville, Tenn			30.31	779.6	46	7.8	77	N.	12	5.4			10ks		NE.	0.06	1.5	Cloudy	
La Crosse, Wis			30.58	776.7	3	—16.1	59	N.	1	0.4		5c	0	N.		0	0	Fair	
Leavenworth, Kans			30.62	777.7	15	— 9.4	83	NE.	4	1.8		0	0			0	0	Clear	
Lexington, Ky	29.28	743.7	30.46	773.7	32	0.0	79	NW.	8	3.6			10s			0.96	24.4	Cloudy	
Long Branch, N. J			30.14	765.5	36	2.2	80	NW.	6	2.7		2k	0	W.		0.07	1.8	Fair	
Louisville, Ky			30.46	773.7	31	— 0.6	89	NW.	12	5.4			10s			1.14	29.0	Cloudy	
Lynchburgh, Va			30.17	766.3	53	11.7	61	NE.	8	3.6			10s		NW.	0.03	0.8	Cloudy	
Malone, N. Y			30.20	767.1	13	—10.6	81	NW.	5	2.2			10s		NW.	0	0	Cloudy	
Marquette, Mich			30.41	772.4	16	— 8.9	83	W.	8	3.6			10s		W.	0.02	0.5	Cloudy	
Memphis, Tenn			30.44	773.2	36	2.2	90	NE.	10	4.5			10s			0.71	18.0	Cloudy	
Milwaukee, Wis			30.56	776.2	7	—14.4	54	NW.	8	3.6		5c	2s	NW.		Inap.	Inap.	Fair	
Mobile, Ala			30.29	769.4	65	18.3	90	Calm.	0	0			Fog			0	0	Foggy	
Montgomery, Ala			30.25	768.3	65.5	18.6	94	SW.	6	2.7			10s		W.	0.08	2.0	Threatening	
Morgantown, W. Va			30.33	770.4	38	3.3	81	N.	1	0.4			10s		NW.	1.22	31.0	Cloudy	
Mount Washington, N. H	23.24	590.3	29.60	751.8	— 9	—22.8	100	NW.	48	21.5			Fog			0.31	7.9	Foggy	
Nashville, Tenn			30.39	671.9	39	3.9	81	N.	10	4.5			10ks		N.	0.36	9.1	Cloudy	
New Haven, Conn			30.10	764.5	30	— 1.1	67	N.	16	7.2		0	2s		N.	0	0	Fair	
New London, Conn			30.08	764.0	32.5	0.3	59	NW.	12	5.4		5ck	2s	W.	W.	0.04	1.0	Clearing	
New Orleans, La			30.27	768.8	63	17.2	100	Calm.	0	0			Fog			0	0	Foggy	
Newport, R. I			30.05	763.3	31	— 0.6	68	NW.	14	6.3			10s		NW.	0.04	1.0	Cloudy	
New York, N. Y			30.14	765.5	34	1.1	80	NW.	8	3.6		0	Fog			0.17	4.3	Fair	
Norfolk, Va			30.18	766.6	46	8.1	88	N.	24	10.7			10s		N.	0.25	6.3	Threatening	
North Platte, Neb	27.30	693.4	30.14	765.5	9	—12.8	78	Calm.	0	0		Haze	8s			0	0	Cloudy	
Omaha, Neb	29.40	746.8	30.62	777.7	5	—15.0	100	Calm.	0	0		2c	0			0	0	Clear	

Oswego, N. Y			30.24	768.1	25.5	— 3.6	88	NW.	12	5.4			10n		NW.	0.13	3.3	Light snow
Peck's Beach, N. J			30.15	765.8	37	2.8	90	N.	8	3.6			10ks		W.	0.06	1.5	Cloudy
Pembina, Dak			30.54	775.7	—24	—31.1	100	Calm.	0	0		0	0			0	0	Clear
Philadelphia, Pa			30.16	766.1	35	1.7	80	N.	15	6.7		8k	Sm'e	NW.		0.11	2.8	Clearing
Pike's Peak, Colo	17.60	447.0	29.81	757.2	3	—16.1	59	W.	60	26.8		8cs	0			0	0	Cloudy
Pittsburgh, Pa			30.31	769.9	36	1.7	80	NW.	5	2.2			10s		NW.	0.31	7.9	Cloudy
Port Huron, Mich			30.38	771.6	23	— 5.0	73	NW.	7	3.1			10s			Blank	Blank	Cloudy
Portland, Me			30.04	763.0	22	— 5.6	72	NW.	4	1.8		Haze	2s		NW.	0.40	10.2	Fair
Portland, Oreg			30.13	765.3	27	— 2.8	55	NE.	13	5.8		0	0			0	0	Clear
Punta Rassa, Fla			30.30	769.6	67.0	19.8	94	N.	4	1.8			10ks		NE.	0.04	1.0	Cloudy
Rochester, N. Y			30.25	768.3	27	— 2.8	88	NW.	12	5.4			10n			0.09	2.3	Light snow
Salt Lake City, Utah	25.67	626.6	30.00	764.0	29	— 1.7	59	SE.	6	2.7		0	0			0	0	Clear
Sandy Hook, N. J			30.11	764.8	34	1.1	79	NW.	16	7.2		0	5ks		NW.	0.04	1.0	Fair
San Diego, Cal			30.09	764.3	51	10.6	79	E.	8	3.6		0	2s		E.	0.01	0.3	Fair
San Francisco, Cal			29.71	754.6	46	7.8	83	Calm.	0	0		0	5s			1.76	45.7	Fair
Santa Fé, N. Mex	23.36	593.3	29.90	750.4	23	— 5.0		E.	6	2.7		0	0			0	0	Clear
Savannah, Ga			30.24	768.1	59	15.0	87	SW.	8	3.6		5k	0	SW.		0	0	Fair
Shreveport, La			30.38	771.6	48	8.9	78	N.	6	2.7			10s		N.	0.12	3.0	Threatening
Smithville, N. C			30.13	765.3	57	13.9	87	W.	8	3.6		10cs	0	W.		0	0	Cloudy
Springfield, Mass			30.10	764.5	29	— 1.7	67	N.	4	1.8		1k	2s	NW.	W.	0.05	1.5	Fair
Saint Louis, Mo			30.58	776.7	29	— 6.1	71	N.	4	1.8			10s			0.04	1.0	Cloudy
Saint Mark's, Fla			30.29	769.4	57	13.9	100	Calm.	0	0			Fog.			0.03	0.8	Foggy
Saint Paul, Minn			30.55	776.0	1.2	—17.1	69	W.	2	0.9		8cs	0			0	0	Fair
Saint Paul's Island, Alaska			30.08	764.0	33	0.6	89	NW.	10	4.5		5cs	5ks		NW.	0.07	1.8	Cloudy
Squan Beach, N. J			29.90	759.4	25	— 3.9	87	NNW.	23	10.3		0	2k			0.79	20.1	
Thatcher's Island, Mass			30.06	763.5	24	— 4.4	48	NW.	24	10.7		5c	0	NW.		0.31	7.9	Clear
Toledo, Ohio			30.38	771.6	29	— 1.7	78	W.	7	3.1			10s		W.	0	0	Cloudy
Tucson, Ariz	27.65	702.3	30.12	765.0	31	— 0.6		SE.				0	0			0	0	Clear
Tybee Island, Ga			30.21	767.3	61	16.1	94	SW.	4	1.8		5c	Sm'e	SW.		0	0	Fair
Vicksburgh, Miss			30.33	770.4	55	12.8	87	N.	7	3.1			10s			0	0	Cloudy
Virginia City, Nev	24.20	614.7	29.68	753.9	—15	—26.1	74	SE.	5	2.2		10k	0	W.		0.01	0.3	Cloudy
Washington, D. C			30.20	767.1	41	5.0	83	NW.	10	4.5		0	5s		W.	0.05	1.3	Fair
Wilmington, N. C			30.12	765.0	61	16.1	82	SW.	5	2.2		8cs	0	W.		0	0	Fair
Wood's Hole, Mass			30.02	762.5	30	— 1.1	68	NW.	17	7.6			10s		N.	0.16	4.1	Cloudy
Wytheville, Va	27.82	706.6	30.04	763.0	41	5.0	83	NW.	16	7.2		8k	0	NW.		0.30	7.6	Cloudy
Yankton, Dak	29.15	740.4	30.68	779.3	—15	—26.1	70	NE.	1	0.4		0	0			0	0	Clear
Yuma, Ariz			30.13	765.3	44	6.7		E.				0	0			0	0	Clear

UNITED STATES SUB-SERIES.

Bridgetown, Barbadoes, W.I.			30.06	763.5	79	26.1	82	N.	5	2.2		5k	10s	NE.		0	0	Fair	E. Racker.
Pointe-a-Pitre, Guadaloupe, W. I			30.06	763.5	74	23.3	81	E.				0	2k			0.26	6.6	Clear	L. V. Bigard.
Havana, Cuba, W. I			30.24	768.1	67	19.4	90	Calm.	0	0		1fk, k	0	E.		0	0	Foggy	Charles Hasselbrink.
Kingston, Jamaica, W. I			30.27	768.8	74	23.3	76	Calm.	0	0		8c	8s	NE.		0	0		James Gall.
St. Thomas, St. Thomas, W. I			30.32	770.1	76	24.4	67	ENE.	9	4.0		0	2ks			0	0	Clear	W. S. Cameron.
Santiago de Cuba, W. I			29.92	760.0	72	22.2	76	SW.	1.2	0.5		0	0					Clear	Robert Mason.

Bulletin of international meteorological observations, taken simultaneously on January 24, 1876—Continued.

UNITED STATES SUB-SERIES—Continued.

Stations.	Barometer. Corrected for instrumental errors. Inches.	Barometer. Corrected for instrumental errors. Millimeters.	Barometer. Reduced to sea-level. Inches.	Barometer. Reduced to sea-level. Millimeters.	Temperature of the air. Fahrenheit.	Temperature of the air. Centigrade.	Relative humidity. Per cent.	Wind. Direction. From—	Wind. Velocity. Miles per hour.	Wind. Velocity. Meters per second.	Wind. Force. 0—10.	Clouds. Amount. Upper. 0—10.	Clouds. Amount. Lower. 0—10.	Clouds. Direction. Upper. From—	Clouds. Direction. Lower. From—	Rain-fall in the past 24 hours. Inches.	Rain-fall in the past 24 hours. Millimeters.	Weather.	Observer.
Saint Georges, Bermudas			30.12	765.0	65.0	18.3	78	SW.	30.0	13.4			10k			0	0	Stormy, gale.	C. F. Allen.
Honolulu, Oahu, H. I.																			E. P. Church.
Makawao, Maui, H. I																			F. L. Clarke.
York Factory, B. A.			30.13	765.3	—32	—35.6		SW.	4	1.8		2c	Haze	SW.		0	0	Aurora	J. Fortescue.
Saint John's, Newfoundland			29.54	750.6	25.0	— 3.9		SE.					10n			0.30	7.6	Snowing	John Delaney.
Saint John's, Porto Rico, W. I.																			Leon M. Acuña.
Clifton, Jamaica, W. I.	27.27	692.6	30.05	763.3	64	17.8	90	N.	1.0	0.4		2c	8k	NE.		0	0	Dull	C. Partridge.
Navassa, W. I																			
Medellin, Colombia, S. A.	25.18	639.6			64.5	18.1	85		0	0			9s			0.22	5.6	Cloudy	Thomas Herran.
Paramaribo, D. Guiana, S. A			29.98	761.5	81	27.2	87	E.			3		6ks			0.180	4.57		C. J. Hering.
Batavia, Dutch Guiana, S. A			30.02	762.4	82.4	28										0.217	5.50		Dr. H. Groot.

NOTE.—The originals give the cloudiness by the scale 0 to 4, except York Factory, Medellin, and Paramaribo. The temperatures at York Factory, when below—40° Fahrenheit, are read from a spirit thermometer. The rain-fall at Saint John's, Porto Rico, is measured at 5.25 p. m. on the same day. The altitude of the barometer at Bismarck is 1,677 feet, or 511.1 meters; Cheyenne, 6,057.3 feet, or 1,846.2 meters; Clifton about 2,892 feet, or 881.5 meters; Colorado Springs, 6,032.4 feet, or 1,838.7 meters; Denver, 5,135 feet, or 1,565.1 meters; Dodge City, 2,478.8 feet, or 755.5 meters; Benton, 2,678.4 (?) feet, or 816.4 (?) meters; Fort Sill, 1,100 (?) feet, or 335.3 (?) meters; Fort Sully, 1,678 (?) feet, or 511.4 (?) meters; Lexington, 1,083 (?) feet, or 330.1 (?) meters; Medellin, 4,912 feet, or 1,497.2 meters; Mount Washington, 6,285 feet, or 1,915.6 meters; North Platte, 2,846 feet, or 867.4 meters; Omaha, 1,054.6 feet, or 321.4 meters; Pike's Peak, 14,150.7 feet, or 4,313.1 meters; Salt Lake City, 4,268.8 feet, or 1,301.1 meters; Santa Fé, 6,862.2 (?) feet, or 2,091.6 (?) meters; Tucson, 2,533 (?) feet, or 772.1 (?) meters; Virginia City, 5,480 (?) feet, or 1,670.3 (?) meters; Wytheville, 2,294.8 feet, or 699.4 meters; Yankton, 1,278 feet, or 389.5 meters. The following constants are used in correcting the barometric observations for altitude: Cheyenne, 5.94 inches; Colorado Springs, 5.87 inches; Denver, 5.22 inches; Benton, 2.80 inches; Makawao, 2.170 inches; Mount Washington, 6.36 inches; Pike's Peak, 12.21 inches; Salt Lake City, 4.33 inches; Santa Fé, 6.54 inches; Tucson, 2.59 inches; Virginia City, 5.48 inches. The direction of the wind is given by Medellin in an unknown cypher.

* Observation not simultaneous.

Collated at the Office of the Chief Signal-Officer of the Army, Washington, D. C.

The records which appear in this bulletin are copied from the regular exchanges of this office, made in each instance in compliance with an especial request, and are published for the uses of the co-operating observers. The barometric readings in the first two columns are reduced to freezing and their respective standards; those in the second two also to mean sea-level.

Excepting the United States and Canadian series, the distinction between the upper and lower strata of clouds is rarely reported. In the latter case the clouds are, therefore, generally published with the amount in the lower cloud-column. The types of clouds, cirrus, cumulus, stratus, nimbus, scud, fracto, pallio, and smoke, are indicated, respectively, by the letters c, k, s, n, d, f, p, and sm'e, as well as their combinations.

ALBERT J. MYER,

Brigadier General, (Brevet Assigned,) Chief Signal-Officer, U. S. A.

(PAPER 32.)

WAR DEPARTMENT, SIGNAL-SERVICE, UNITED STATES ARMY,

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

Meteorological record for the week ending November 18, 1876.

TELEGRAPHIC SERIES.

Day and date of observation.	Time of observation.	Barometer.	Thermometer.		Barometer corrected for temp. and inst. error.	Corrected barometer.	Hygrometer.		Relative humidity, (per cent.)	Wind.			Upper clouds.		
			Attached.	Exposed.			Dry bulb.	Wet bulb.		Direction.	Velocity per hour.	Daily velocity.	Kind.	Amount.	Direction (moving from—)
Sunday, 12	7.35 a. m.	30.140	57	35	30.051	30.171	35	33	80	N. W.	8	.....	0	0	0
	4.35 p. m.	30.117	74	54	29.982	30.097	54	46	48	W.	5	157	0	0	0
	11.00 p. m.	30.100	68	41	29.981	30.099	41	39	83	N.	1	.....	0	0	0
Monday, 13	7.35 a. m.	30.066	58.5	39	29.973	30.091	39	38	91	N. W.	2	.....	Cirrus ..	2	0
	4.35 p. m.	30.045	77	68	29.902	30.013	68	59	56	N. W.	1	66	Hidden .	.....	.....
	11.00 p. m.	30.050	76	59	29.910	30.023	59	55	76	W.	5	.....	Hidden .	.....	.....
Tuesday, 14	7.35 a. m.	30.062	72	50.5	29.932	30.048	50.5	48.5	86	0	0	.....	Cirrus ..	4	0
	4.35 p. m.	30.025	77	58	29.882	29.995	58	56	87	N. E.	9	68	Hidden .	.....	.....
	11.00 p. m.	30.014	76	52	29.874	29.989	52	51	93	N. E.	7	.....	Hidden .	.....	.....
Wednesday, 15	7.35 a. m.	29.934	72.5	48	29.803	29.917	48	48	100	N. E.	6	.....	Hidden .	.....	.....
	4.35 p. m.	30.104	74	47	29.969	30.086	47	45	85	N.	14	158	Hidden .	.....	.....
	11.00 p. m.	30.233	71	45	30.105	30.223	45	43	85	N.	8	.....	Hidden .	.....	.....
Thursday, 16	7.35 a. m.	30.298	68	43	30.179	30.298	43	41	83	N. E.	5	.....	Hidden .	.....	.....
	4.35 p. m.	30.280	72	45	30.149	30.267	45	42	75	E.	3	201	Hidden .	.....	.....
	11.00 p. m.	30.302	70	44	30.177	30.296	44	41	75	S.	4	.....	Hidden .	.....	.....
Friday, 17	7.35 a. m.	30.284	67	42	30.166	30.286	42	39	75	E.	8	.....	Hidden .	.....	.....
	4.35 p. m.	30.236	69	42	30.114	30.234	42	42	100	N. E.	7	106	Hidden .	.....	.....
	11.00 p. m.	30.227	70	44	30.102	30.220	44	44	100	N. E.	8	.....	Hidden .	.....	.....
Saturday, 18	7.35 a. m.	30.210	69	46	30.088	30.206	46	46	100	N. E.	8	.....	Hidden .	.....	.....
	4.35 p. m.	30.157	73	53	30.024	30.139	53	52	93	E.	8	155	Hidden .	.....	.....
	11.00 p. m.	30.116	76	50	29.976	30.092	50	50	100	N. E.	8	.....	Hidden .	.....	.....

Meteorological record for the week ending November 18, 1876—Continued.

Day and date of observation.	Time of observation.	Lower clouds.			Rain or snow.		Amount of rain or melted snow.	Depth of water.	Maximum and minimum thermometer, (at midnight observations.)	Mean weekly—		Minimum thermometer, a.m.	State of weather.
		Kind.	Amount.	Direction, (moving from—)	Commenced.	Ended.				Barometer.	Thermometer.		
Sunday, 12	7.35 a. m.	Haze		0	0	0	0.00					33	Clear.
	4.35 p. m.	0	0	0	0	0	0.00						Clear.
	11.00 p. m.	0	0	0	0	0	0.00		54.5 33				Clear.
Monday, 13	7.35 a. m.	Fog		0	0	0	0.00					36	Fair.
	4.35 p. m.	Stratus	4	W.	0	0	0.00						Cloudy.
	11.00 p. m.	Stratus	3	0	0	0	0.00		69 36				Cloudy.
Tuesday, 14	7.35 a. m.	Haze		0	0	0	0.00					49	Cloudy.
	4.35 p. m.	Stratus	4	S. W.	1.57 p. m.	3.20 p. m.	0.05						Cloudy.
	11.00 p. m.	Nimbus		0	7.30 p. m.	0	0.04		69.5 49				Light rain.
Wednesday, 15						1.30 a. m.							Foggy.
	7.35 a. m.	Fog	4	0	5.15 a. m.	6.30 a. m.	0.15					47	
	4.35 p. m.	Stratus	4	N. W.	2 p. m.	2.25 p. m.	(*)						Cloudy.
	11.00 p. m.	Stratus	4	0	0	0	0.00		52 45				Cloudy.
Thursday, 16	7.35 a. m.	Stratus	4	N. E.	0	0	0.00					42	Cloudy.
	4.35 p. m.	Stratus	4	S. E.	8.25 a. m.	8.30 a. m.	(*)						Cloudy.
	11.00 p. m.	Stratus	4	0	0	0	0.00		46.5 45.5				Cloudy.
Friday, 17	7.35 a. m.	Stratus	4	S. E.	0	0	0.00					41	Cloudy.
	4.35 p. m.	Nimbus	4	0	2.43 p. m.	0	(*)						Light rain.
	11.00 p. m.	Nimbus	4	0	0	0	0.03		45 41				Light rain.
Saturday, 18	7.35 a. m.	Fog; nimbus	4	N. E.	0	0	0.05			30.145	43.3	44	Light rain.
	4.35 p. m.	Nimbus	4	E.	4.15 p. m.	3.30 p. m.	0.19			30.119	52.4		Light rain.
	11.00 p. m.	Nimbus	4	0	0	0	0.06		53 44	30.135	47.8		Light rain.

* Too small to measure.

Number of barometer used during week, standard; instrumental error, +.013; elevation corrected for 105.5. Station, Washington, D. C.

THEODORE MOSHER, JR.,
Sergeant, Signal-Service, United States Army.

PAPER 33.

WAR DEPARTMENT, SIGNAL-SERVICE UNITED STATES ARMY,
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

Meteorological record for the week ending November 18, 1876.

LOCAL SERIES.

Day and date of observation.	Time of observation.	Barometer.	Thermometer.		Barometer corrected for temp. and inst. error.	Corrected barometer.	Hygrometer.		Relative humidity, (per cent.)	Wind.			Upper clouds.		
			Attached.	Exposed.			Dry bulb.	Wet bulb.		Direction.	Velocity per hour.	Daily velocity.	Kind.	Amount.	Direction, (moving from—)
Sunday, 12	7 a. m...	30.122	56	34	30.035	30.155	34	32	79	N. W.	8	.....	0	0	0
	2 p. m...	30.126	74	52	29.991	30.107	52	44	48	W.	8	157	0	0	0
	9 p. m...	30.102	69	42	29.980	30.098	42	40	83	N.	1	.....	0	0	0
Monday, 13	7 a. m...	30.068	58	38	29.976	30.094	38	37	90	N. W.	2	.....	Cirrus ..	2	0
	2 p. m...	30.036	76	69	29.896	30.007	69	59	52	N. W.	4	66	Cirrus ..	1	N.W.
	9 p. m..	30.039	75	62	29.901	30.014	62	56	66	W.	4	.....	Hidden .	.....	.....
Tuesday, 14	7 a. m...	30.062	73	50.5	29.930	30.046	51	49	86	0	0	.....	Cirrus ..	2	0
	2 p. m...	30.012	76	65	29.872	29.984	65	60	73	N. W.	8	68	Hidden .	.....	.....
	9 p. m...	30.027	76	53	29.887	30.001	53	52	93	N. E.	10	.....	Hidden .	.....	.....
Wednesday, 15	7 a. m...	29.928	73	48	29.797	29.911	48	48	100	N. E.	6	.....	Hidden .	.....	.....
	2 p. m...	30.000	70	50	29.876	29.991	50	48	86	N.	12	158	Hidden .	.....	.....
	9 p. m...	30.204	72	45	30.073	30.191	45	43	85	N.	9	.....	Hidden .	.....	.....
Thursday, 16	7 a. m ..	30.290	69	43	30.167	30.286	43	42	91	N. E.	4	.....	Hidden .	.....	.....
	2 p. m...	30.286	75	45	30.147	30.205	45	42	75	N. E.	3	201	Hidden .	.....	.....
	9 p. m...	30.299	70	44	30.174	30.293	44	41	75	E.	6	.....	Hidden .	.....	.....
Friday, 17	7 a. m...	30.270	67	42	30.152	30.272	42	39	75	E.	8	.....	Hidden .	.....	.....
	2 p. m...	30.226	70	45	30.101	30.219	45	41	67	N. E.	6	106	Hidden .	.....	.....
	9 p. m...	30.243	70	43	30.118	30.236	43	43	100	N.	7	.....	Hidden .	.....	.....
Saturday, 18	7 a. m...	30.204	69	46	30.082	30.200	46	46	100	N. E.	6	.....	Hidden .	.....	.....
	2 p. m...	30.160	74	52.5	30.024	30.140	52.5	52.5	100	N. E.	5	155	Hidden .	.....	.....
	9 p. m...	30.133	75	50	29.994	30.110	50	50	100	N. E.	12	.....	Hidden .	.....	.....

Meteorological record for the week ending November 18, 1876—Continued.

Day and date of observation.	Time of observation.	Lower clouds.			Rain or snow.		Amount of rain or melted snow.	Mean humidity.	Maximum and minimum thermometer, (at midnight observation.)	Mean daily—		Minimum thermometer a. m.	State of weather.
		Kind.	Amount.	Direction, (moving from—)	Commenced.	Ended.				Barometer.	Thermometer.		
Sunday, 12	7 a. m.	Haze		0									Clear.
	2 p. m.	Haze; stratus	½	0				70.0		30.114	42.5		Clear.
	9 p. m.	0	0	0									Clear.
Monday, 13	7 a. m.	Fog											Fair.
	2 p. m.	Haze; stratus	2	0				69.3		30.032	57.7		Cloudy.
	9 p. m.	Stratus	4	0									Cloudy.
Tuesday, 14	7 a. m.	Haze		0									Fair.
	2 p. m.	Nimbus	4	S. W.				84.0		30.008	55.4		Light rain.
	9 p. m.	Nimbus	4	0									Light rain.
Wednesday, 15	7 a. m.	Fog		0									Foggy.
	2 p. m.	Nimbus	4	N.				90.3		30.071	47.0		Light rain.
	9 p. m.	Stratus	4	0									Cloudy.
Thursday, 16	7 a. m.	Stratus	4	N. E.									Cloudy.
	2 p. m.	Haze; cir. str	4	0				80.3		30.284	44.0		Cloudy.
	9 p. m.	Stratus	4	0									Cloudy.
Friday, 17	7 a. m.	Stratus	4	S. E.									Cloudy.
	2 p. m.	Haze; stratus	4	0				80.7		30.241	43.2		Cloudy.
	9 p. m.	Nimbus	4	0									Light rain.
Saturday, 18	7 a. m.	Fog; nimbus	4	N. E.									Light rain.
	2 p. m.	Nimbus	4	0				100.0		30.140	49.6		Light rain.
	9 p. m.	Nimbus	4	0									Light rain.

Number of barometer used during week, standard.
Instrumental error, +.013.
Elevation corrected for, 105.5.
Station, Washington, D. C.

THEODORE MOSHER, JR.,
Sergeant Signal-Service, U. S. A.

PAPER 34.

WAR DEPARTMENT, SIGNAL-SERVICE, UNITED STATES ARMY,

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

Meteorological record for the week ending November 18, 1876.

MIDDAY SERIES.

Day and date of observation.	Time of observation.	Barometer.	Thermometer.		Barometer corrected for temp. and inst. error.	Corrected barometer.	Hygrometer.		Relative humidity, (per cent.)	Wind.			Upper clouds.		
			Attached.	Exposed.			Dry bulb.	Wet bulb.		Direction.	Velocity per hour.	Daily velocity.	Kind.	Amount.	Direction, (moving from —)
Sunday, 12	Noon	30.158	70	49	30.034	30.150	49	41	42	N. W.	8	.....	0	0	0
Monday, 13	Noon	30.056	72	60	29.926	30.039	60	53	61	W.	2	.....	Cir. str.	2	0
Tuesday, 14	Noon	30.020	73	66	29.888	30.001	66	59	64	0	0	.....	Cir. str.	1	0
Wednesday, 15	Noon	29.966	70	50	29.842	29.957	50	49	93	N.	8	.....	Hidden.	.....	.....
Thursday, 16	Noon	30.328	77	44	30.184	30.303	44	41	75	N. E.	8	.....	Hidden.	.....	.....
Friday, 17	Noon	30.260	70	45	30.135	30.253	45	41.5	70	N. E.	4	.....	Hidden.	.....	.....
Saturday, 18	Noon	30.196	73.5	51	30.063	30.180	51	51	100	N. E.	4	.....	Hidden.	.....	.....

Day and date of observation.	Time of observation.	Lower clouds.			Rain or snow.		Amount of rain or melted snow.	Depth of water.	Maximum and minimum thermometer, (at midnight observations.)	Change in barometer since 7.35 a. m.	Thermometer.	Minimum thermometer, a. m.	State of weather.
		Kind.	Amount.	Direction, (moving from —)	Commenced.	Ended.							
Sunday, 12	Noon	Haze	.....	0	.....	.....	.....	.....	.....	—.021	.....	.....	Clear.
Monday, 13	Noon	Haze	.....	0	.....	.....	.....	.....	.....	—.052	.....	.....	Hazy.
Tuesday, 14	Noon	Haze; cir. str.	1	0	.....	.....	.....	.....	.....	—.047	.....	.....	Hazy.
Wednesday, 15	Noon	Stratus	4	0	.....	.....	.....	.....	.....	+.040	.....	.....	Cloudy.
Thursday, 16	Noon	Haze; cir. str.	4	N. E.	.....	.....	.....	.....	.....	+.005	.....	.....	Cloudy.
Friday, 17	Noon	Haze; stratus	4	0	.....	.....	.....	.....	.....	—.033	.....	.....	Cloudy.
Saturday, 18	Noon	Nimbus	4	0	.....	.....	.....	.....	.....	—.026	.....	.....	Light rain.

Number of barometer used during week, standard; instrumental error, +.013; elevation corrected for, 105.5. Station, Washington, D. C.

THEODORE MOSHER, JR., *Sergeant, Signal-Service, U. S. A.*

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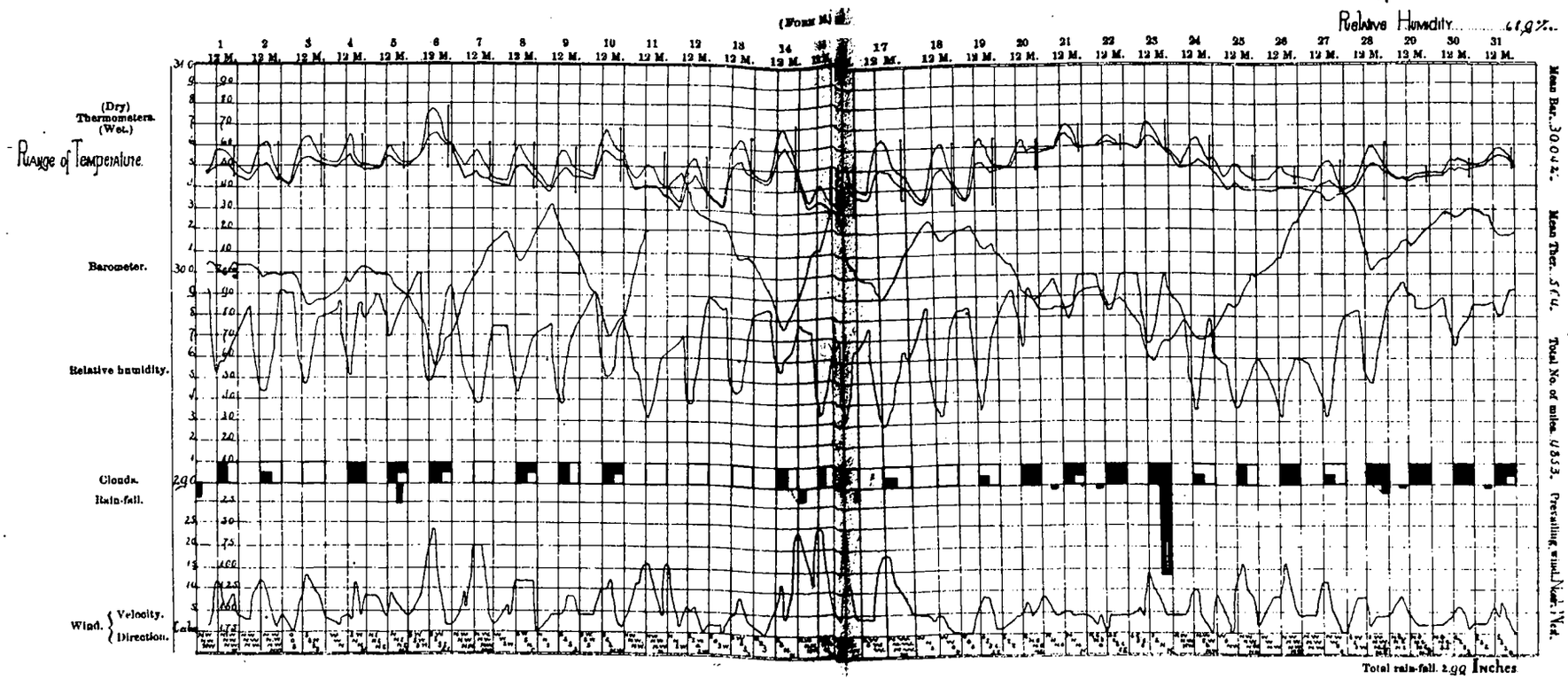
CHIEF SIGNAL OFFICE.

Washington D.C. October 1876.

Paper XXXV.

Relative Humidity 61.9%



Mean Bar. 30.042. Mean Ther. 57.4. Total No. of miles 4353. Prevailing wind Nor. West.

PAPER 36.

WAR DEPARTMENT, SIGNAL-SERVICE, UNITED STATES ARMY.
DIVISIONS OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

Table showing daily and monthly means of barometer and thermometer, monthly velocity of wind, and amount of rain-fall, with the prevailing direction of wind, &c., for the month of October, 1876.

Day of month.	Telegraphic observations.						Local observations.				Prevailing direction of wind.	Remarks.
	Barometer.			Thermometer.			Mean daily barometer.	Mean daily thermometer.	Mean daily humidity.	Rain-fall, or melted snow in inches.		
	a. m.	p. m.	Mid-night.	a. m.	p. m.	Mid-night.						
1	30.041	29.985	30.038	48	57	50	30.030	52.1	71.0	.22	N. W.	
2	30.044	29.987	29.990	48	61	45	30.005	50.5	64.3	.00	N. W.	
3	30.004	29.862	29.878	45	64.5	53.5	29.907	53.5	72.7	.00	S.	
4	29.938	29.982	30.033	52	56.5	51	29.991	54.7	73.7	.....	N.	
5	29.996	29.948	29.896	49.5	57	52	29.950	53.4	82.0	.....	N. E.	
6	29.779	29.562	29.702	55	76	61	29.690	64.0	80.0	.25	S. W.	
7	29.923	30.020	30.135	51	54	45	30.029	50.9	52.7	.00	N. W.	
8	30.184	30.061	30.191	43	58	48	30.143	50.7	62.3	.00	S. W.	
9	30.323	30.170	30.079	41	57.5	48	30.189	48.7	61.7	.00	S.	
10	29.921	29.705	29.804	46	65.5	57	29.804	56.7	73.3	.00	S.	
11	30.117	30.250	30.382	45	50	40	30.252	44.7	48.7	.00	N. W.	
12	30.466	30.302	30.265	36.5	55	38	30.337	42.5	63.3	.00	S. W.	
13	30.242	30.082	30.071	37	64	48.5	30.132	50.0	67.0	.00	S.	
14	29.939	29.758	29.892	48.5	69	49	29.848	58.2	69.0	.....	S.	
15	30.098	30.167	30.287	35	40	34	30.185	36.7	53.7	.15	N. W.	
16	30.295	30.082	30.022	34	53	41	30.135	42.0	55.3	.00	S. W.	
17	29.979	29.898	30.075	41	62	46.5	30.006	49.7	56.3	.00	N. W.	
18	30.258	30.162	30.196	38	61	40	30.201	47.1	66.0	.00	W.	
19	30.229	30.125	30.104	38	61	52	30.157	51.5	63.0	.00	S.	
20	30.053	29.920	29.838	52	58	58.5	29.939	58.0	82.3	.....	E.	
21	29.853	29.853	29.926	59.5	70	59	29.874	61.6	93.7	.05	N.	
22	29.944	29.860	29.875	60	65	60.5	29.900	61.2	94.3	.01	S. E.	
23	29.758	29.594	29.685	58.5	63	58	29.682	61.2	89.0	2.16	S.	
24	29.772	29.686	29.729	52	64	54	29.718	55.0	67.0	.....	N. W.	
25	29.874	29.926	29.991	46	47	44	29.932	46.6	49.3	.00	N. W.	
26	30.053	30.137	30.240	45	47	45	30.144	46.1	47.7	.00	N. W.	
27	30.379	30.344	30.373	44.5	53	39	30.365	44.9	54.7	.00	N. W.	
28	30.261	30.018	30.072	43.5	60	49	30.122	51.6	67.0	.07	S. W.	
29	30.148	30.143	30.210	45	46	46	30.163	45.6	91.0	.03	N. E.	
30	30.277	30.273	30.297	48	53	51	30.285	50.4	78.0	.00	S.	
31	30.273	30.175	30.176	52	58	51	30.203	54.4	86.7	.05	S.	
Monthly means	30.078	30.001	30.047	46.0	58.4	47.8	30.042	51.4	68.9	.....		

SUMMARY OF PRECEDING TABLE.

Highest barometer, 30.466, 7.35 a. m., 12th. Lowest barometer, 29.562, 4.35 p. m., 6th. Monthly range of barometer, 0.904. Highest temperature, 78°, 6th. Lowest temperature, 29°.5, 16th. Monthly range of temperature, 48°.5. Greatest daily range of temperature, 33°, 19th. Mean of maximum temperatures, 61°.1. Mean of minimum temperatures, 42°.7. Mean daily range of temperatures, 18°.4. Total rain-fall, or melted snow, 2.99 inches. Prevailing wind, northwest. Total number of miles traveled, 4,853. Maximum velocity of wind, 32 miles, 9.50 a. m., 15th. Number of cloudy days, other than those on which rain fell, 3. Number of days on which rain or snow fell, 14. Number of fair days, 4. Number of clear days, 10.

THEODORE MOSHER, JR.,
Sergeant, Signal-Service, U. S. A.

Station, Washington, D. C.
Date, October 18, 1876.

PAPER 37.

WAR DEPARTMENT, OFFICE OF THE CHIEF SIGNAL-OFFICER,
DIVISION OF TELEGRAMS AND REPORTS FOR THE
BENEFIT OF COMMERCE AND AGRICULTURE.

Record of river-observations made at Pittsburgh, Pa., during the week ending Saturday, November 18, 1876.

Day and date.	Time of observation.	Depth of water—				Change in twenty-four hours.			
		Above bench-mark.		Below bench-mark.		Rise.		Fall.	
		Feet.	Inches.	Feet.	Inches.	Feet.	Inches.	Feet.	Inches.
Sunday, November 12	3 p. m	3	9	.....	.....	.....	.....	0	3
Monday, November 13	3 p. m.	3	5	.....	.....	.....	.....	0	4
Tuesday, November 14	3 p. m.	3	4	.....	.....	.....	.....	0	1
Wednesday, November 15	3 p. m.	3	5	.....	.....	0	1	.....	.....
Thursday, November 16	3 p. m.	4	7	.....	.....	1	2	.....	.....
Friday, November 17	3 p. m.	5	6	.....	.....	0	11	.....	.....
Saturday, November 18	3 p. m.	5	6	.....	.....	0	0	0	0

J. MITCHELL,
Sergeant, Signal-Service, U. S. A.

NOTE 1.—The bench-mark or point of reference from which all measurements are made will be the one in common use by steamboatmen at the station making the report.

NOTE 2.—Under the head of "Remarks" will be noted all unusual occurrences connected with the stage of water in the river, such as the presence of floating ice, timber, &c.; formation and breaking-up of ice gorges and other obstructions; time of opening and closing navigation; accidents to gauge, &c.

PAPER 38.

WAR DEPARTMENT, OFFICE OF THE CHIEF SIGNAL-OFFICER,
DIVISION OF TELEGRAMS AND REPORTS FOR THE
BENEFIT OF COMMERCE AND AGRICULTURE.

Report of instruction received and progress made by assistant observers in the Signal-Service, U. S. A., at Philadelphia, Pa., during the week ending Saturday, November 18, 1876.

Name.	Rank.	Nature of instruction.			Remarks.
		Loomis's Meteorology.	Telegraphic-operating ability.	Telegraphy.	
Agey, W. H	Private	.....	Send 20; receive 15.	Page 50 to 55	Good.
Bokel, J. H	do	.....	Send 12; receive 8.	do	Good.
Brandenburg, E. M	do	.....	Send 3; receive 2.	do	Good.
Ray, C. A	do	.....	Send 25; receive 20.	do	Good.

F. M. M. BEALL,
Sergeant, Signal Service, U. S. A.

Station, Philadelphia, Pa.
Date, November 18, 1876.

PAPER 39.

WAR DEPARTMENT, OFFICE OF THE CHIEF SIGNAL-OFFICER,
DIVISION OF TELEGRAMS AND REPORTS FOR THE
BENEFIT OF COMMERCE AND AGRICULTURE.

Report of observations on temperature of water at Cincinnati, Ohio, for the week ending Saturday, November 18, 1876.

Day and date.	Time of observation.	Temperature—			Depth of water.	Remarks.
		Of air.	Of water at surface.	Of water at bottom.		
Sunday, November 12	3 p. m.	67	49	48	18 feet	Temperature of water taken at the foot of Vine street, from the U. S. Mail-Boat Company's wharf-boat.
Monday, November 13	3 p. m.	67	50	49.5	18 feet	
Tuesday, November 14	3 p. m.	53	50	50	18 feet	
Wednesday, November 15	3 p. m.	45	48.5	48.5	18 feet	
Thursday, November 16	3 p. m.	48	48	48	18 feet	
Friday, November 17	3 p. m.	49	48	47.5	18 feet	
Saturday, November 18	3 p. m.	52	48	47.5	18 feet	

S. S. BASSLER,
Sergeant, Signal-Service, U. S. A.

NOTE.—One copy of this form will be forwarded weekly to the Chief Signal-Officer, Washington, D. C.

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U.S. TELEGRAPH LINES
in
CALIFORNIA, ARIZONA,
NEW MEXICO AND TEXAS.
IN CHARGE OF THE CHIEF SIGNAL OFFICER U.S.A.
NEVADA
UTAH
COLORADO
KANSAS
INDIAN TERRITY
CALIFORNIA
ARIZONA
NEW MEXICO
TEXAS
MEXICO
Santa Fe
Albuquerque
Ft. McRae
Ft. Bayard
Ft. Seldon
Mesilla
Camp Verde
Prescott
Wickenburg
Phoenix
Maricopa Wells
Florence
Tucson
Camp Apache
Camp Goodwin
Camp Grant
Camp Bowie
Silver City
San Diego
Campo
Ft. Yuma
Stanwix
Ft. Sill
Cambridge
Denison
Pilot Point
Jacksboro
Graham
Ft. Griffin
Camp Colorado
Ft. Concho
Mason
Ft. McKavett
Fredericksburg
Camp Stockton
San Antonio
Castroville
Ft. Clark
Uvalde
Eagle Pass
Laredo
Roma
Rio Grande City
Edinburgh
Uncompleted line is shown thus:

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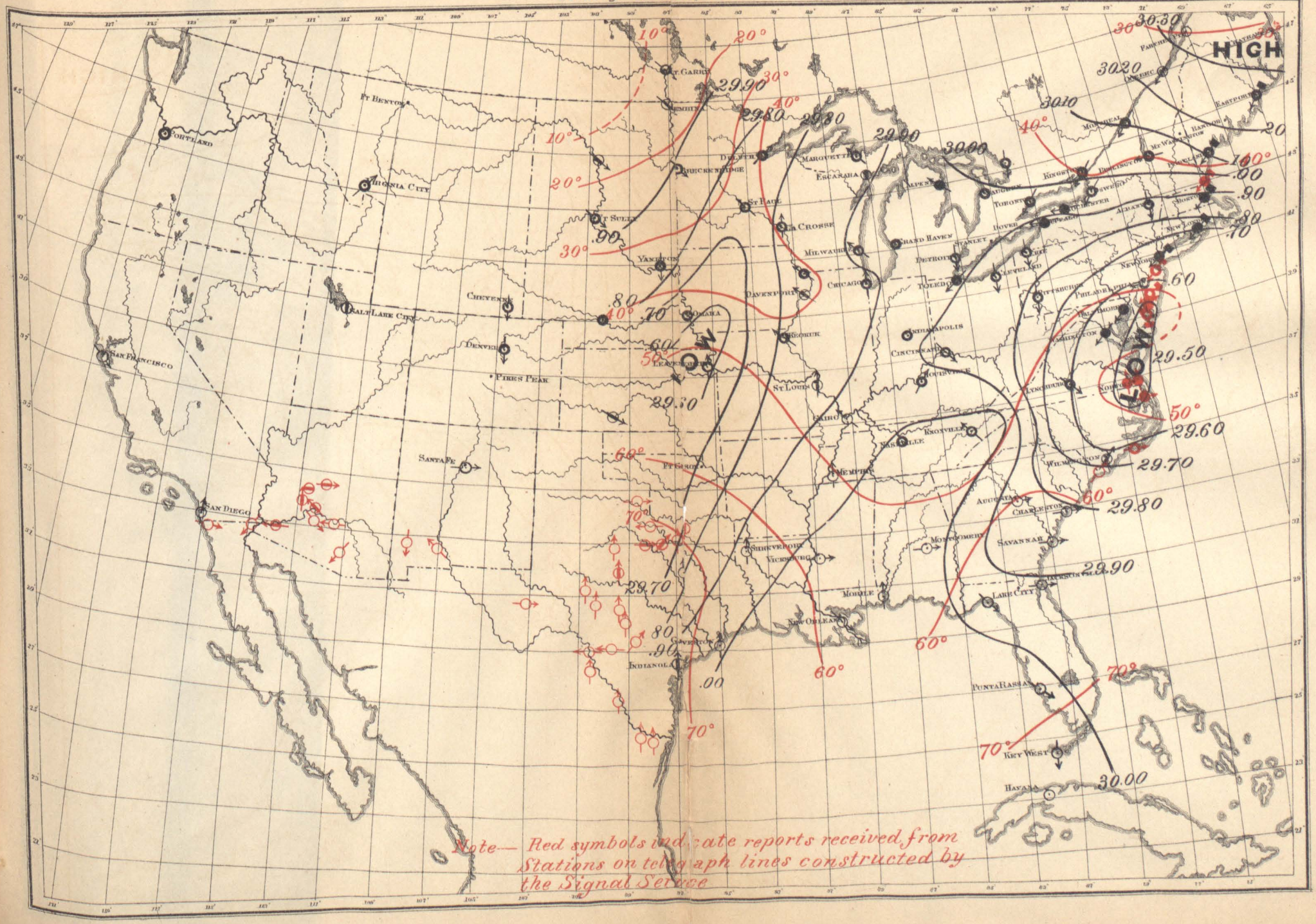
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

Monday Nov. 20, 1876 --- 4.35 P.M.

Paper XL.



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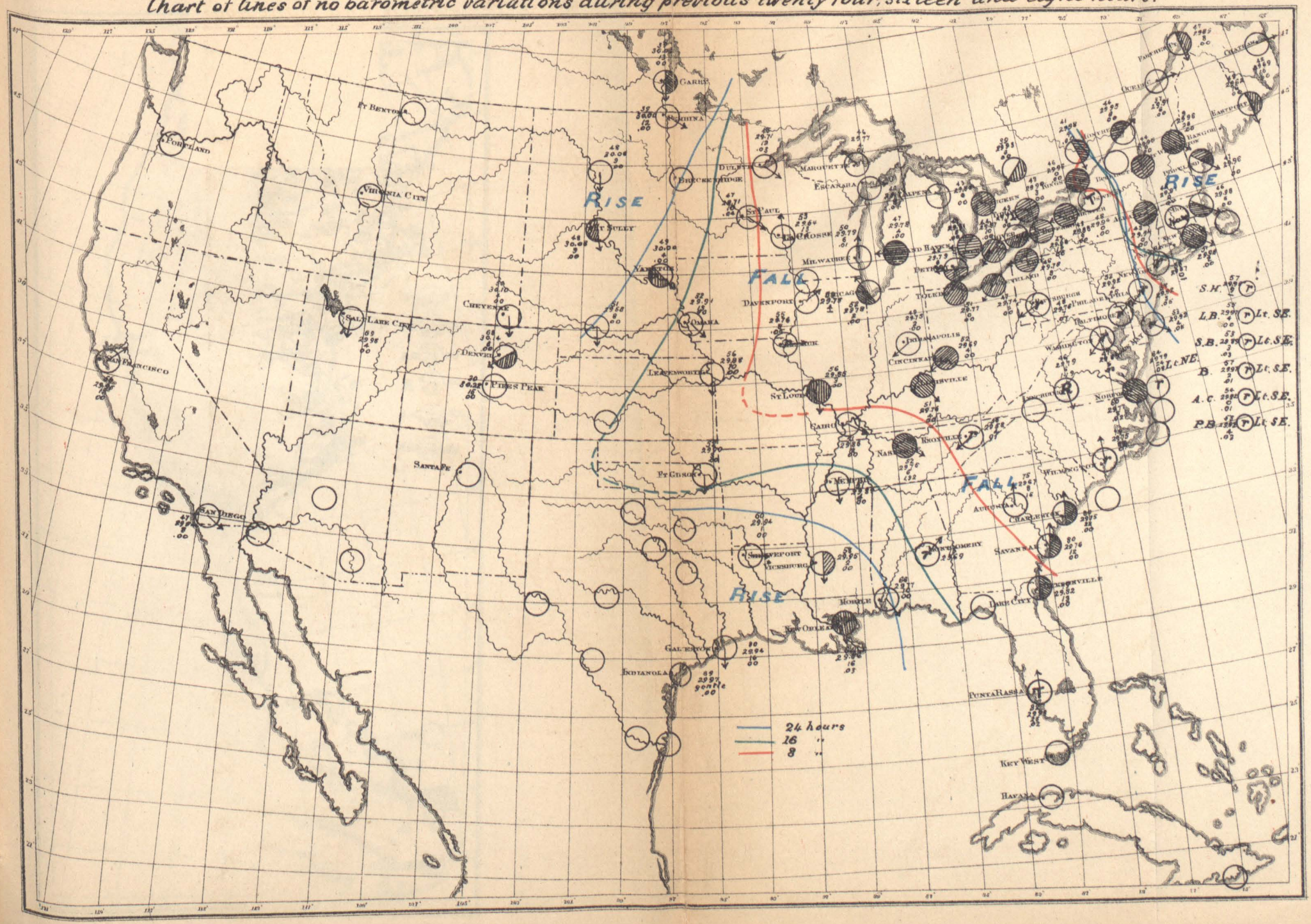
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

Washington, September 18th 1875 III Barometer.

Chart of lines of no barometric variations during previous twenty four, sixteen and eight hours.



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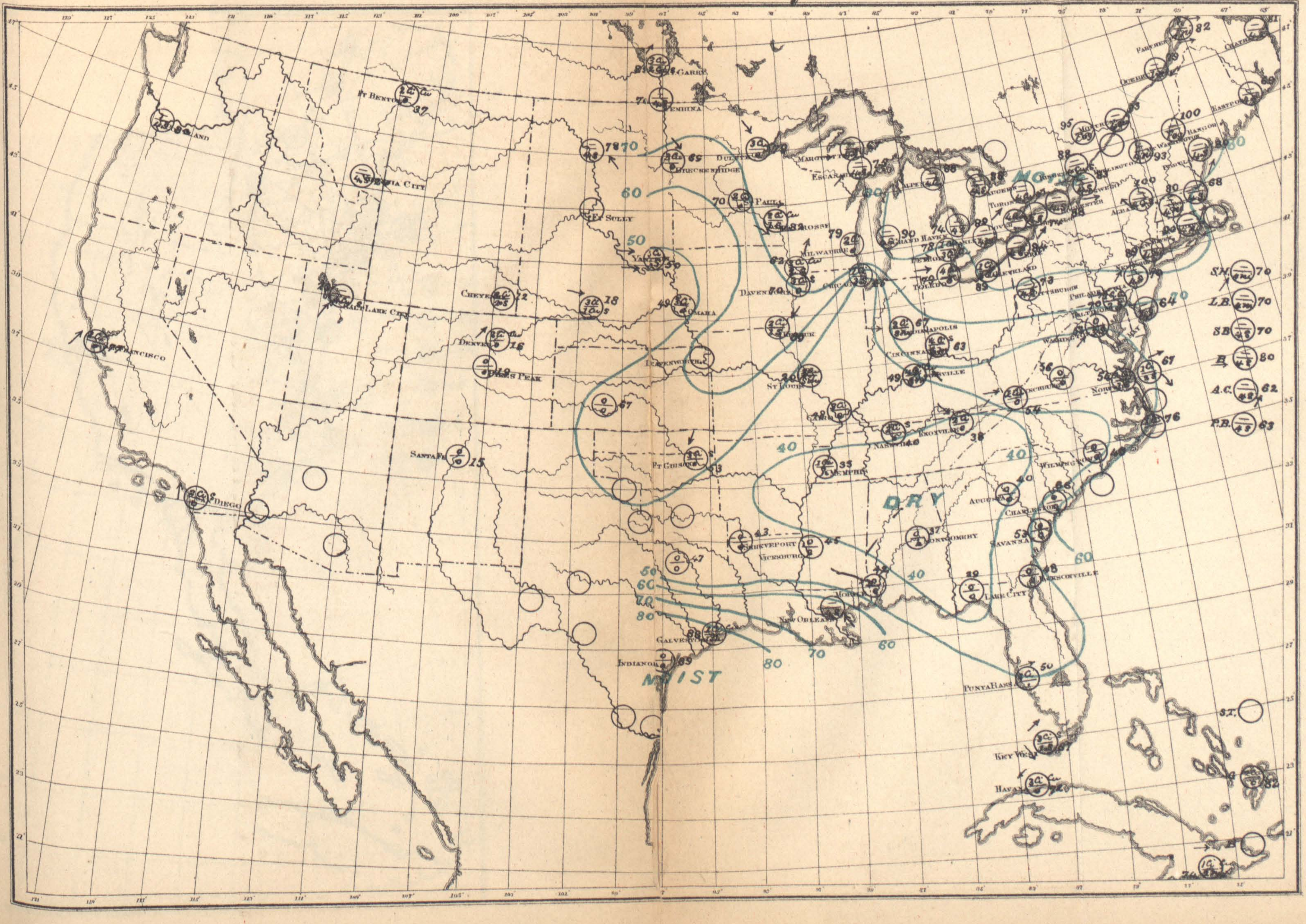
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

Tuesday December 1st 1874 4.35 P M

Clouds and Humidity



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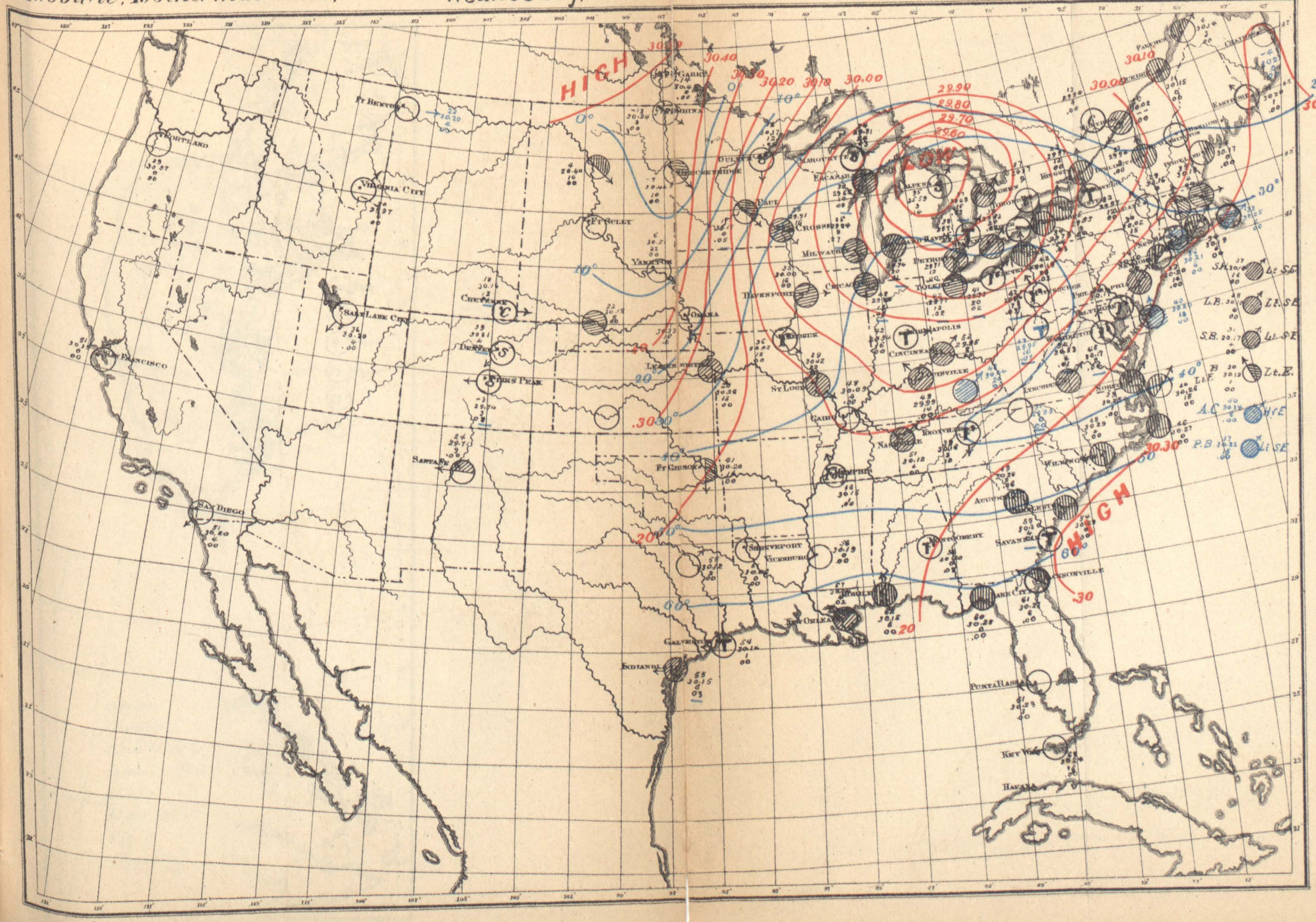
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

Isobaric, Isothermal lines, Wednesday, December 16th 1874. 11 P.M. *and state of weather.*



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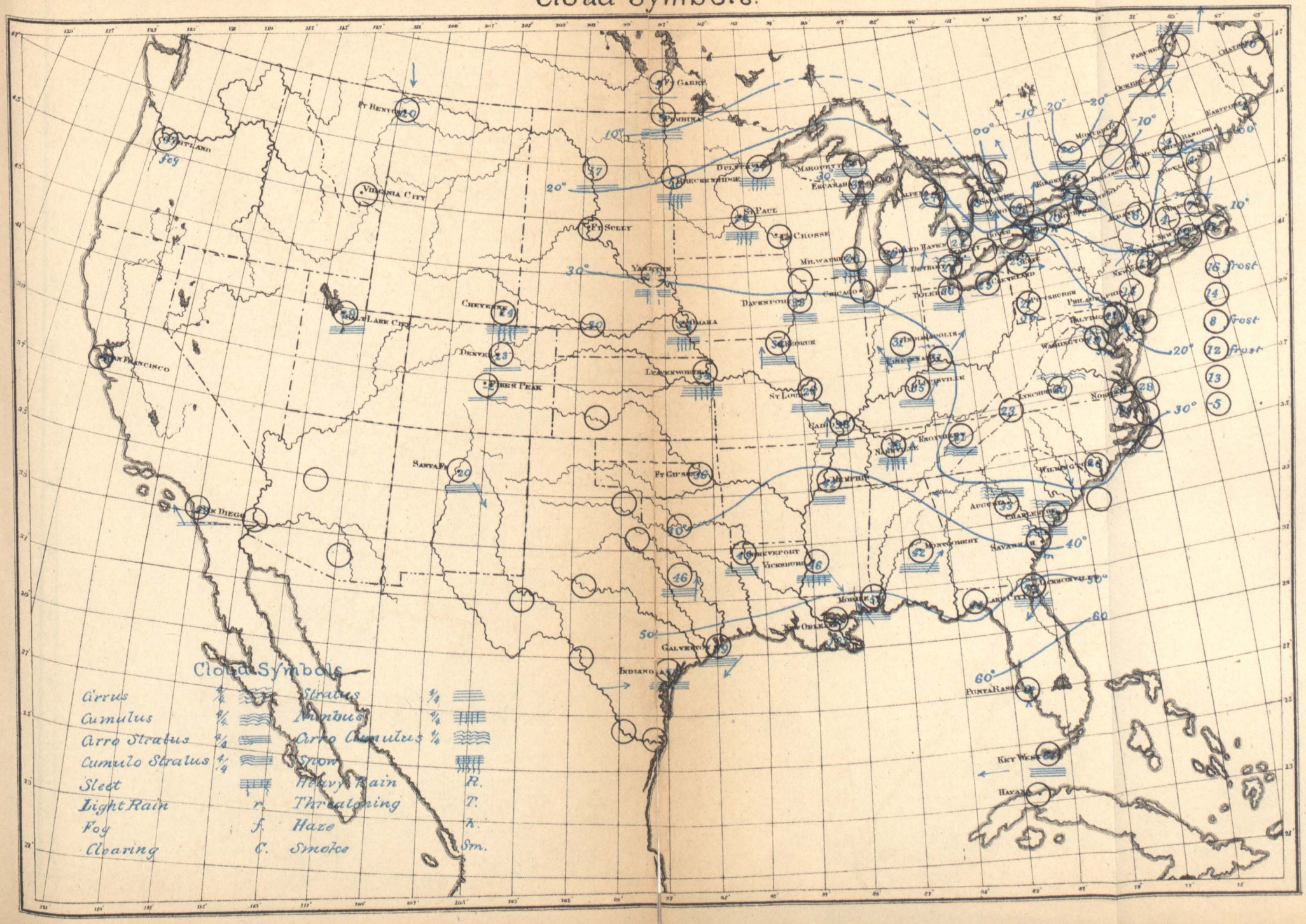
WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U.S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE

Wednesday, December 16th 1874 7.35 AM.

Cloud Symbols.



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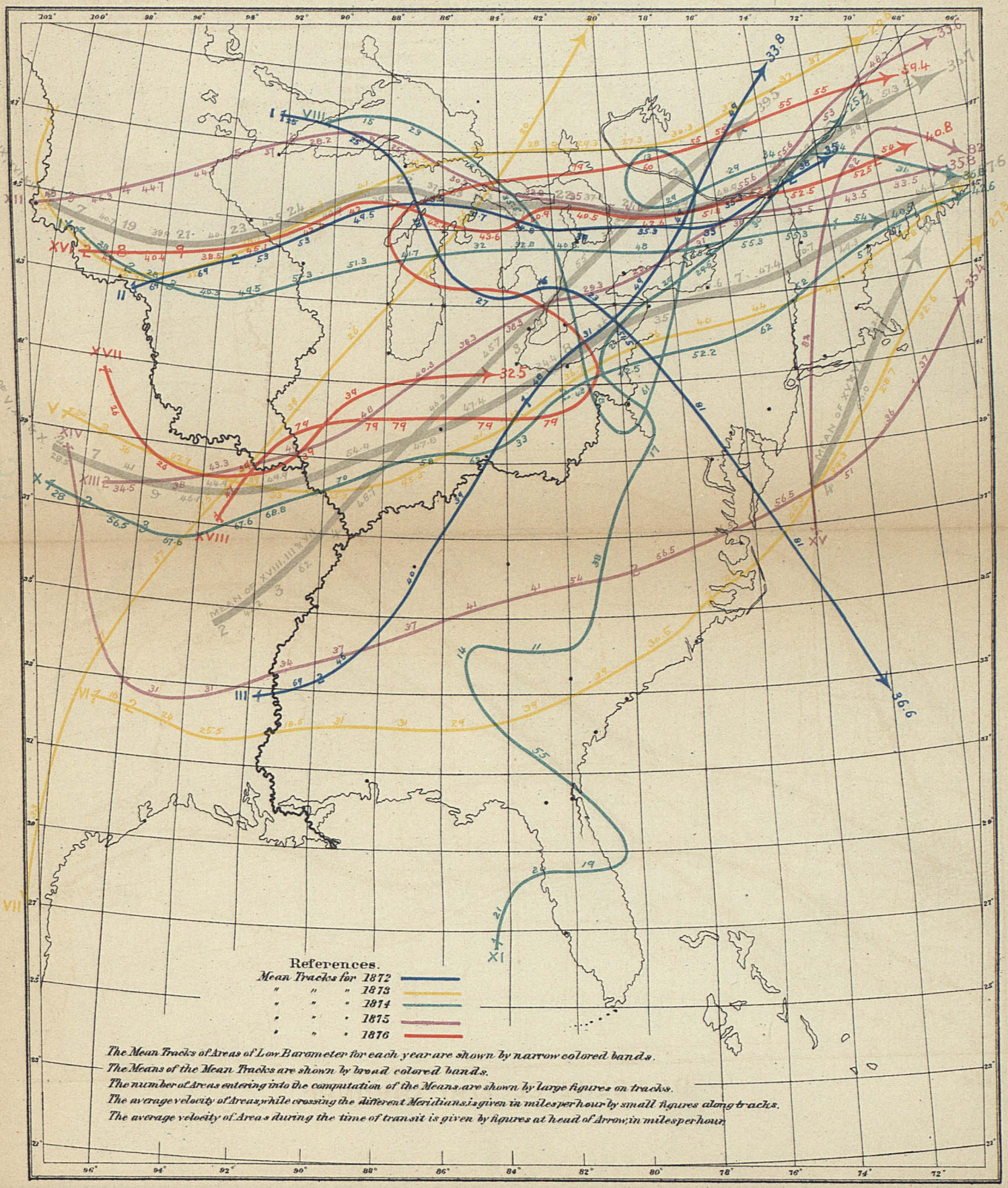
JANUARY 1872. 73. 74. 75 & 76.

Nº I.



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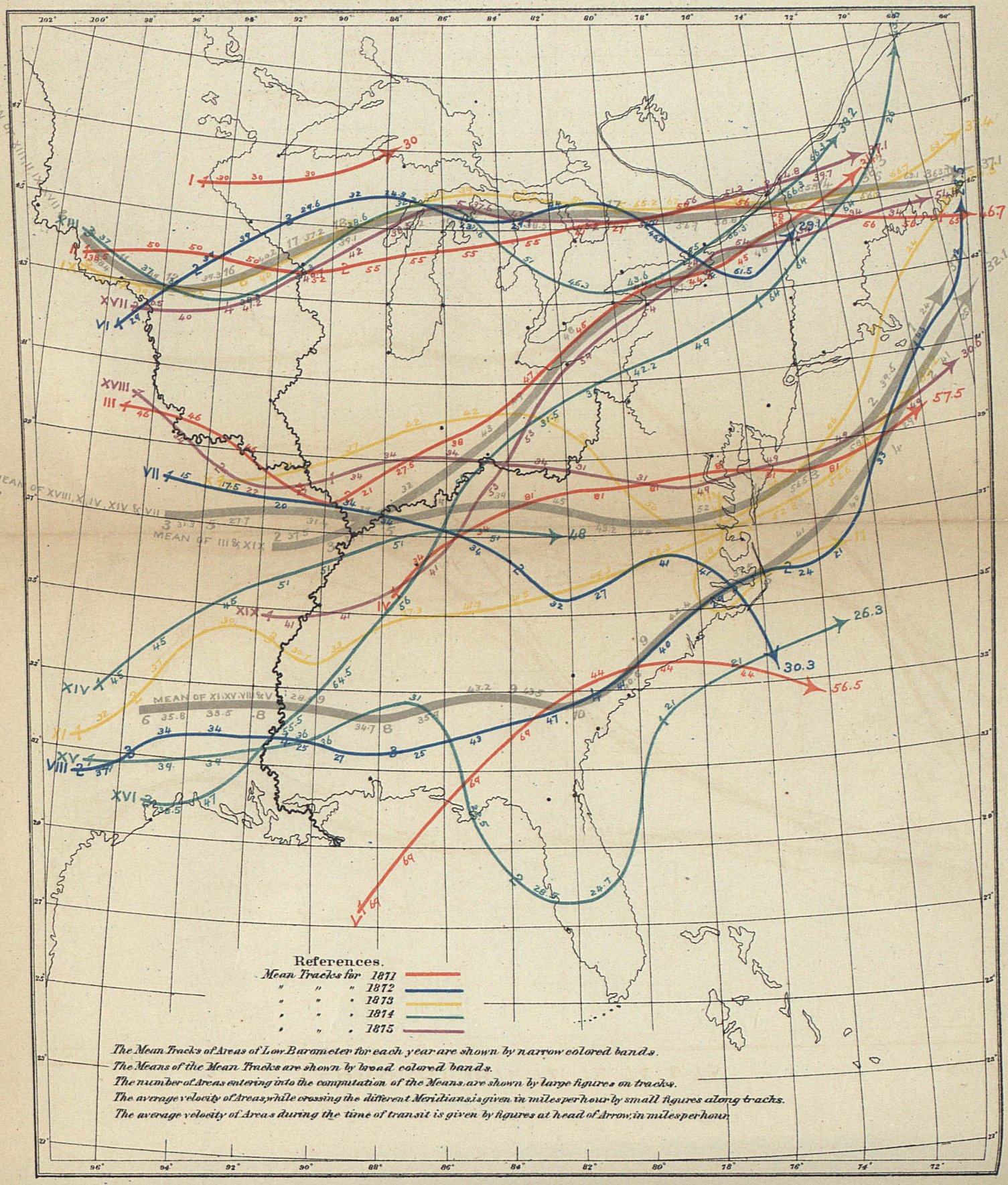
FEBRUARY 1871. 72. 73. 74. & 75



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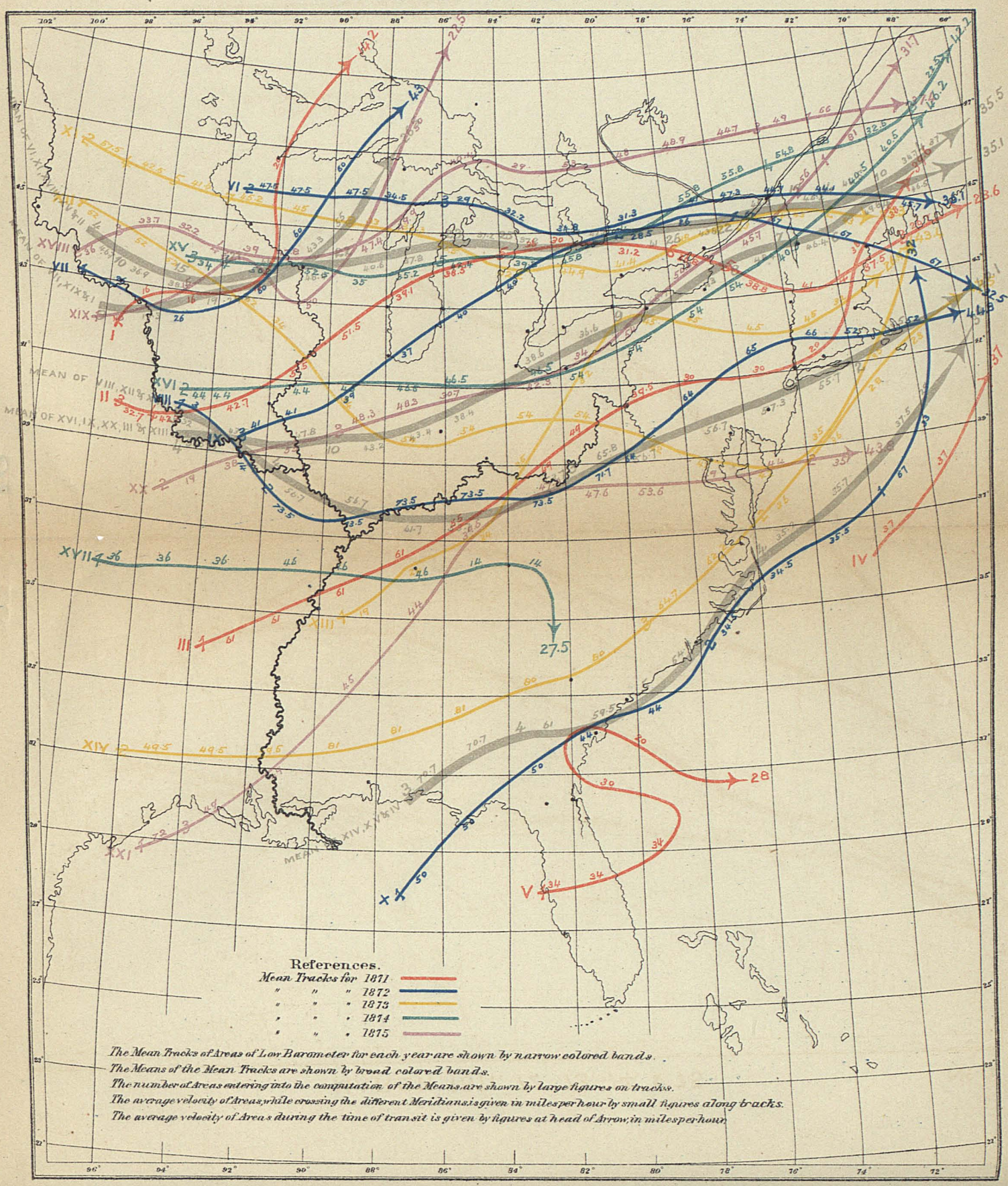
MARCH 1871. 72. 73. 74. & 75



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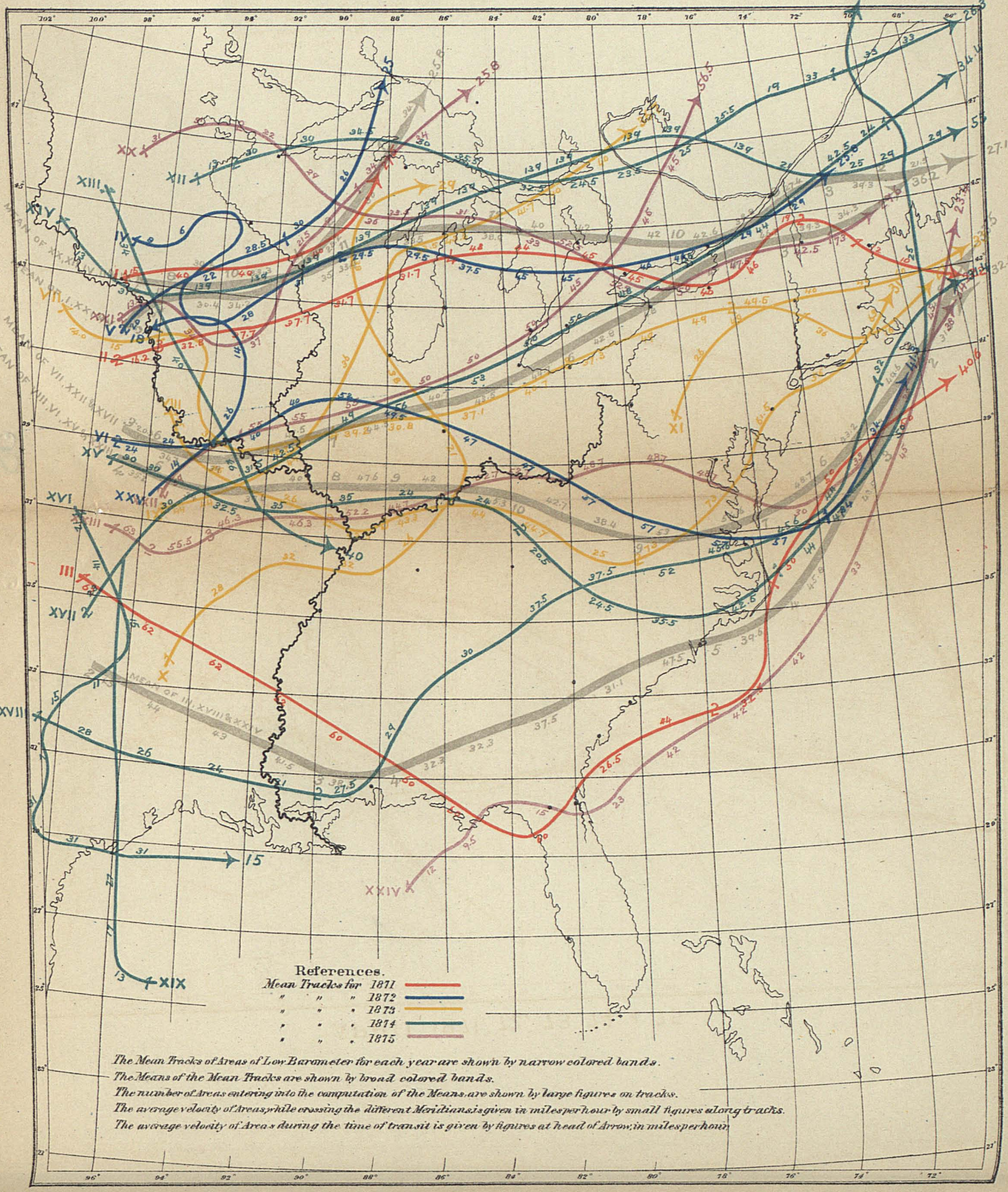
APRIL 1871. 72. 73. 74. & 75

Nº 4.



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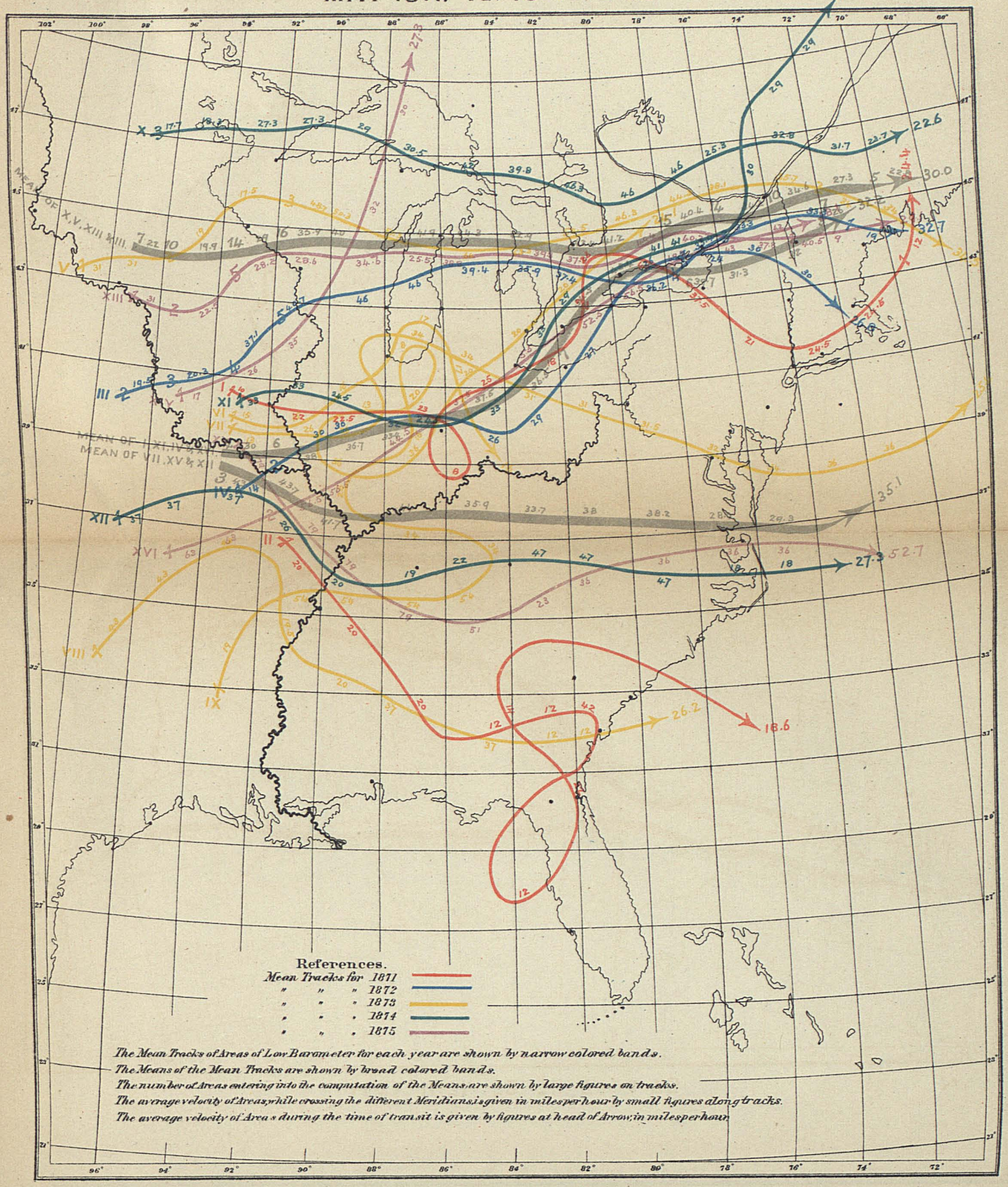
MAY 1871. 72. 73. 74. & 75

Nº 5.



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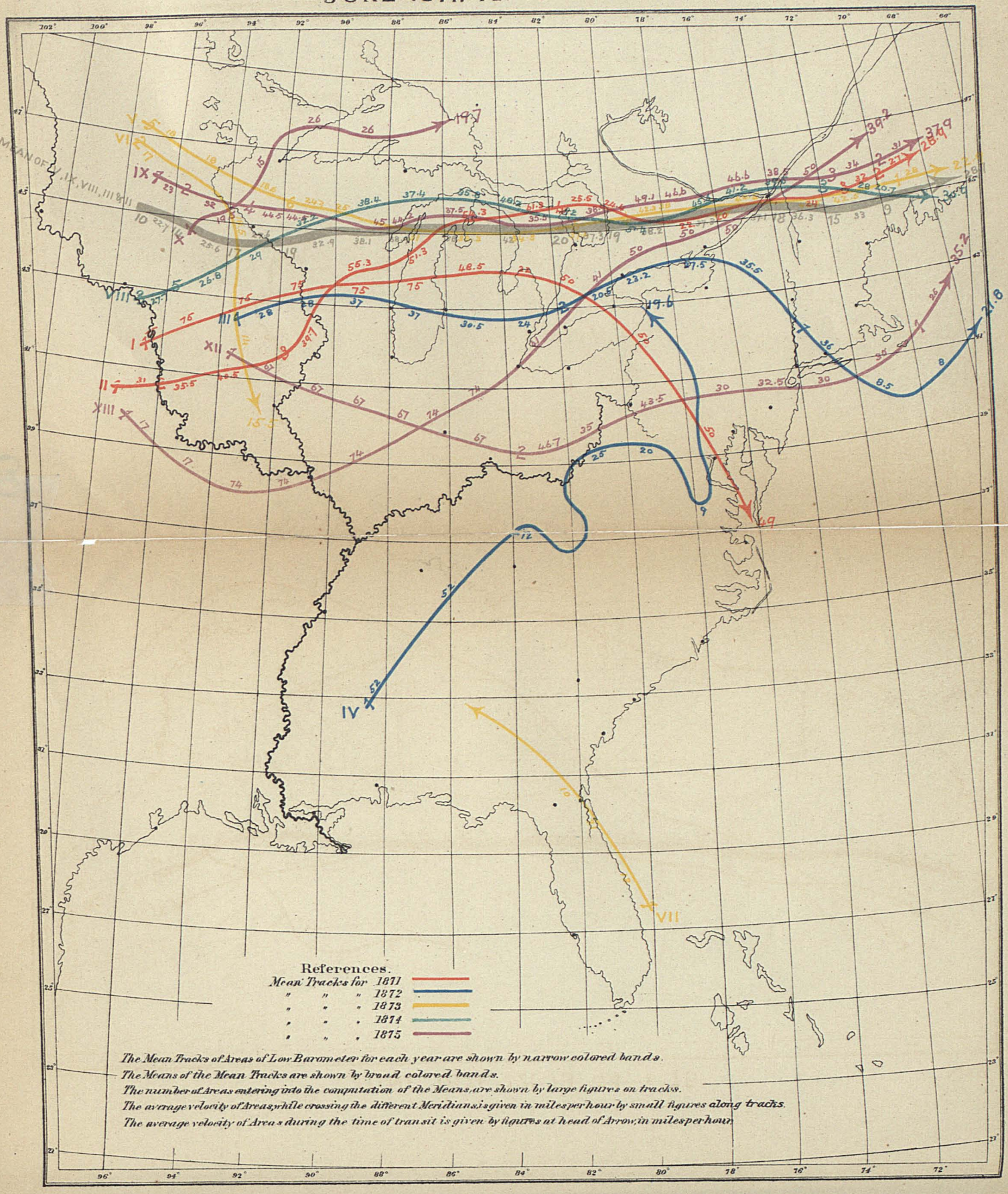
JUNE 1871. 72. 73. 74. & 75



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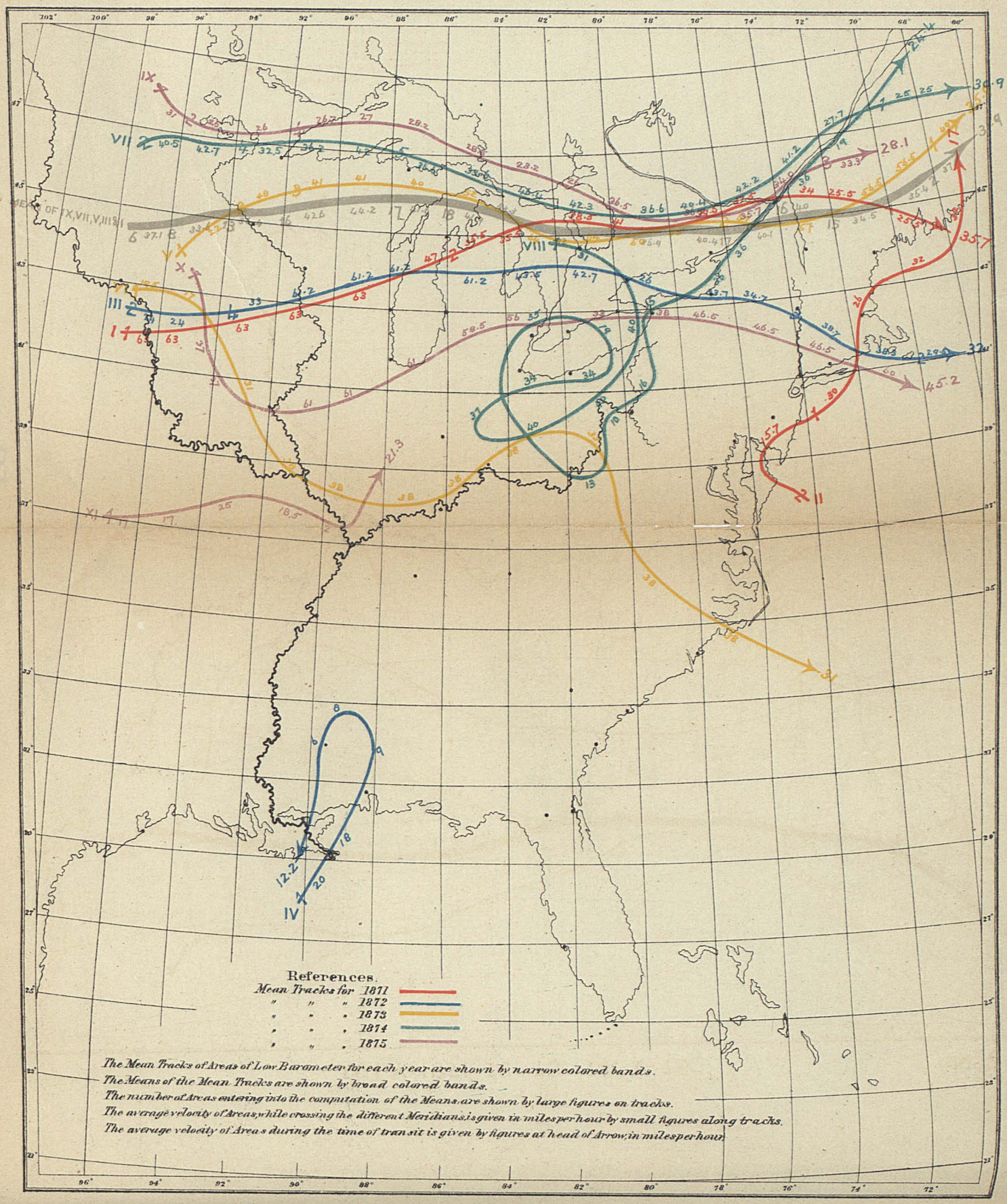
JULY 1871. 72. 73. 74. & 75

No. 7.



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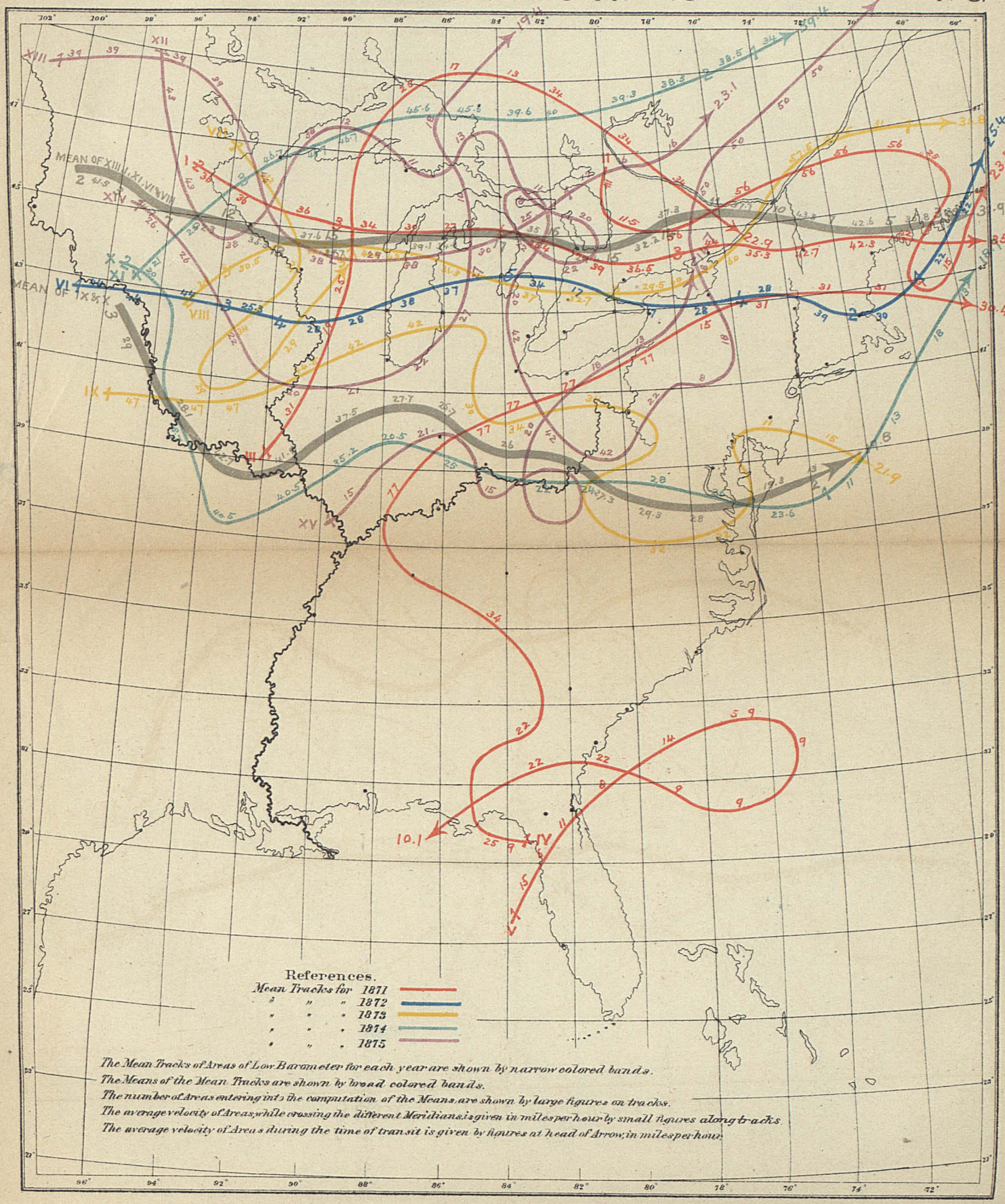
AUGUST 1871. 72. 73. 74. & 75

Nº 8.



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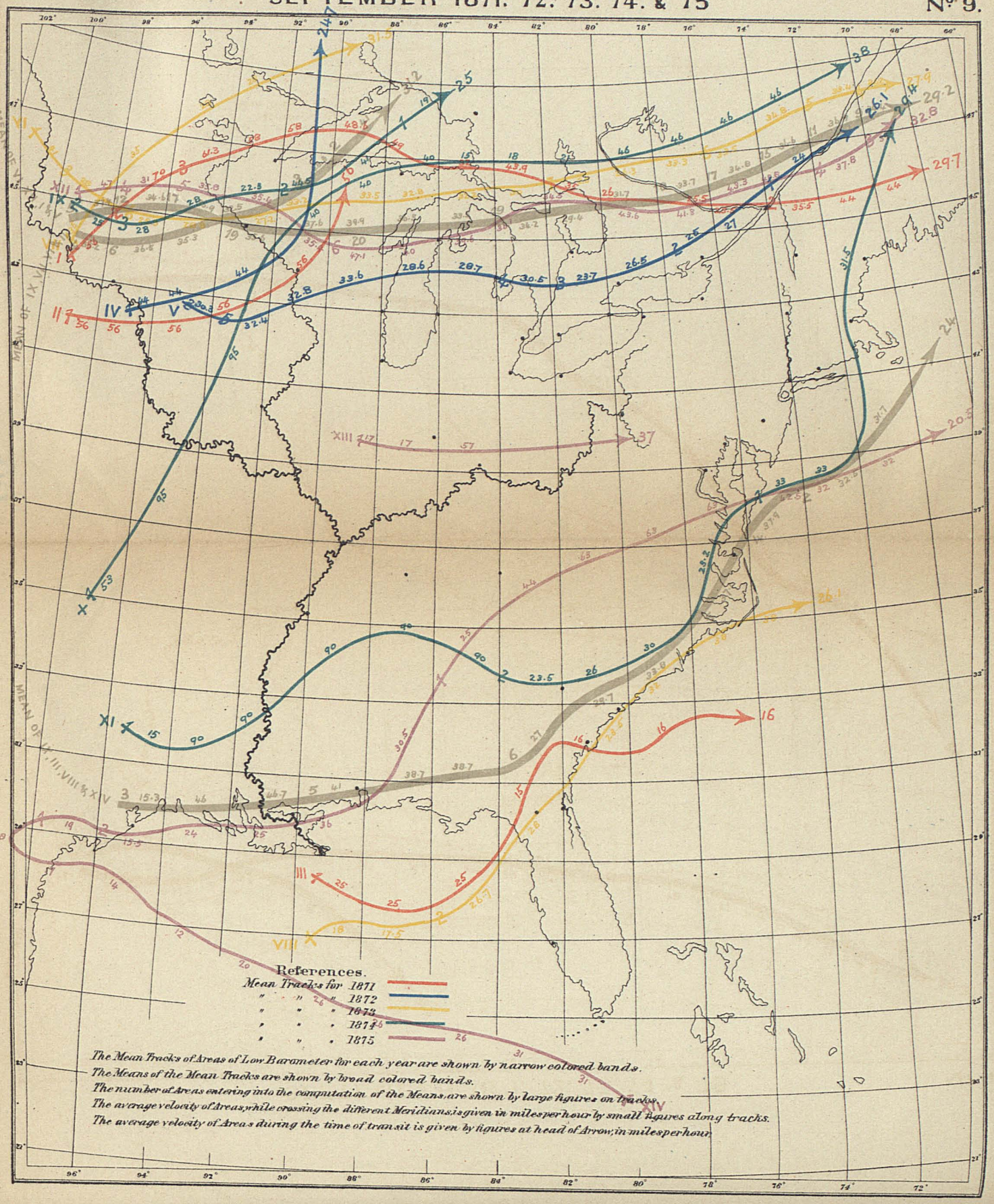
SEPTEMBER 1871. 72. 73. 74. & 75



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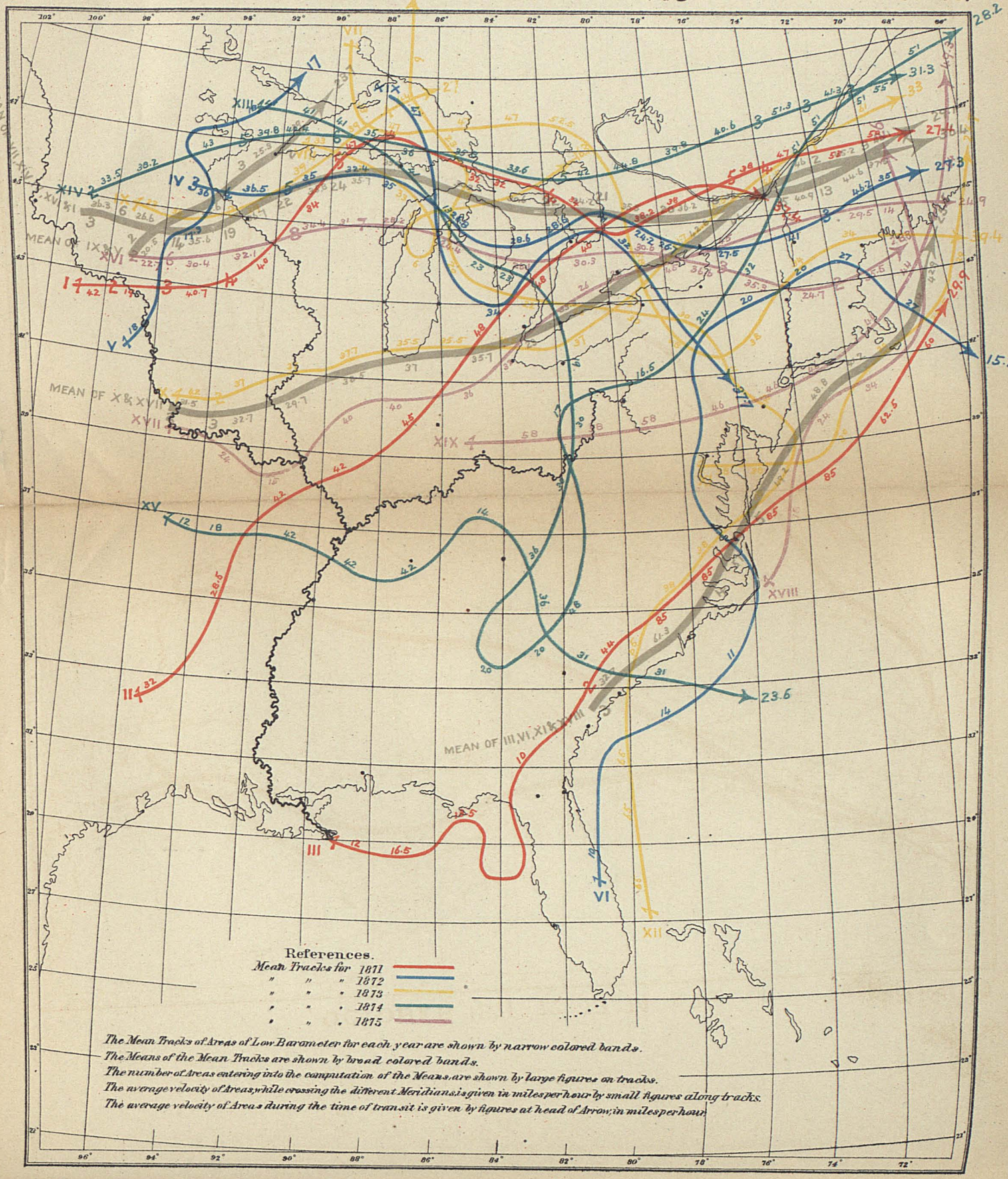
OCTOBER 1871. 72. 73. 74. & 75



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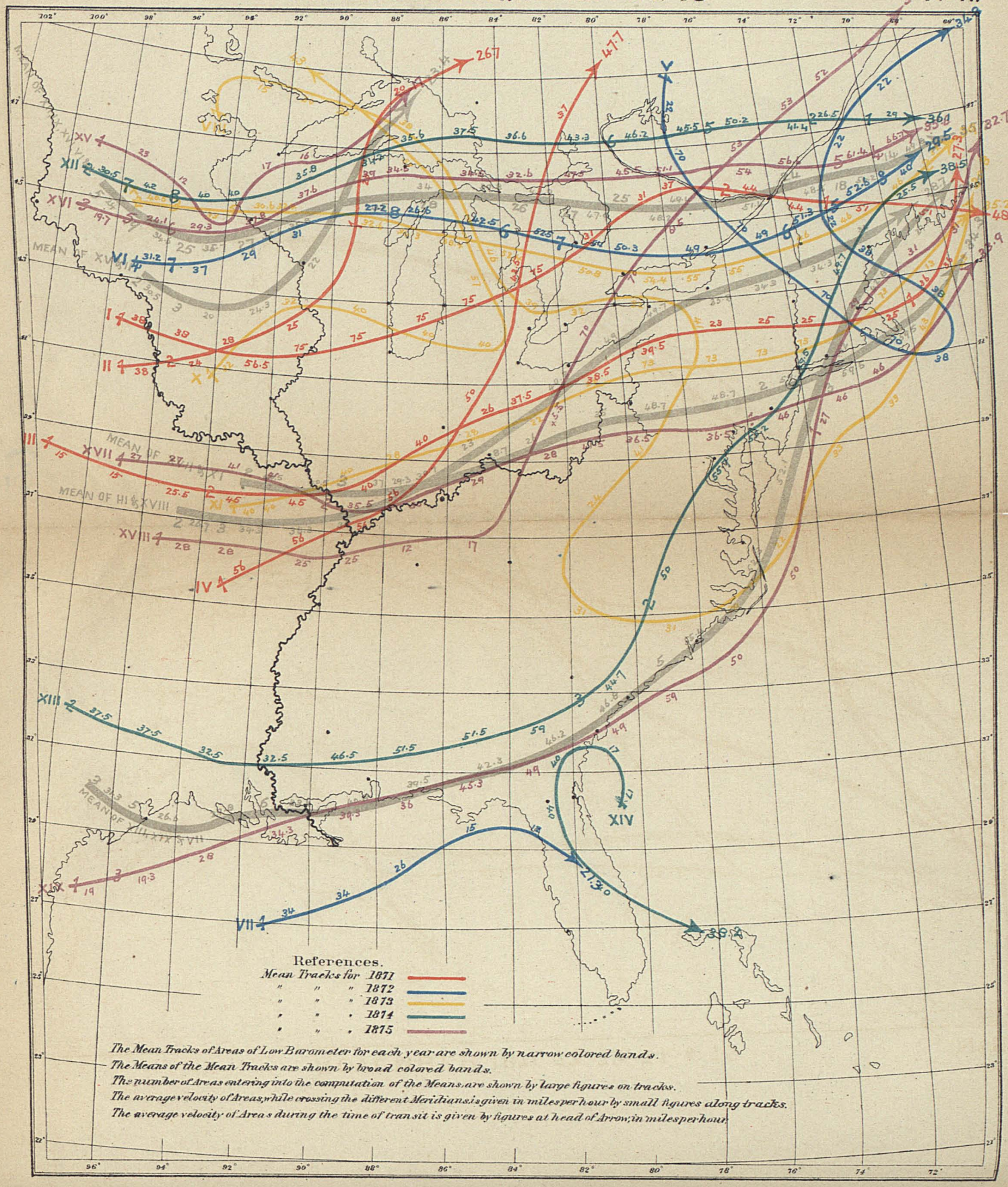
NOVEMBER 1871. 72. 73. 74. & 75

Nº 11.



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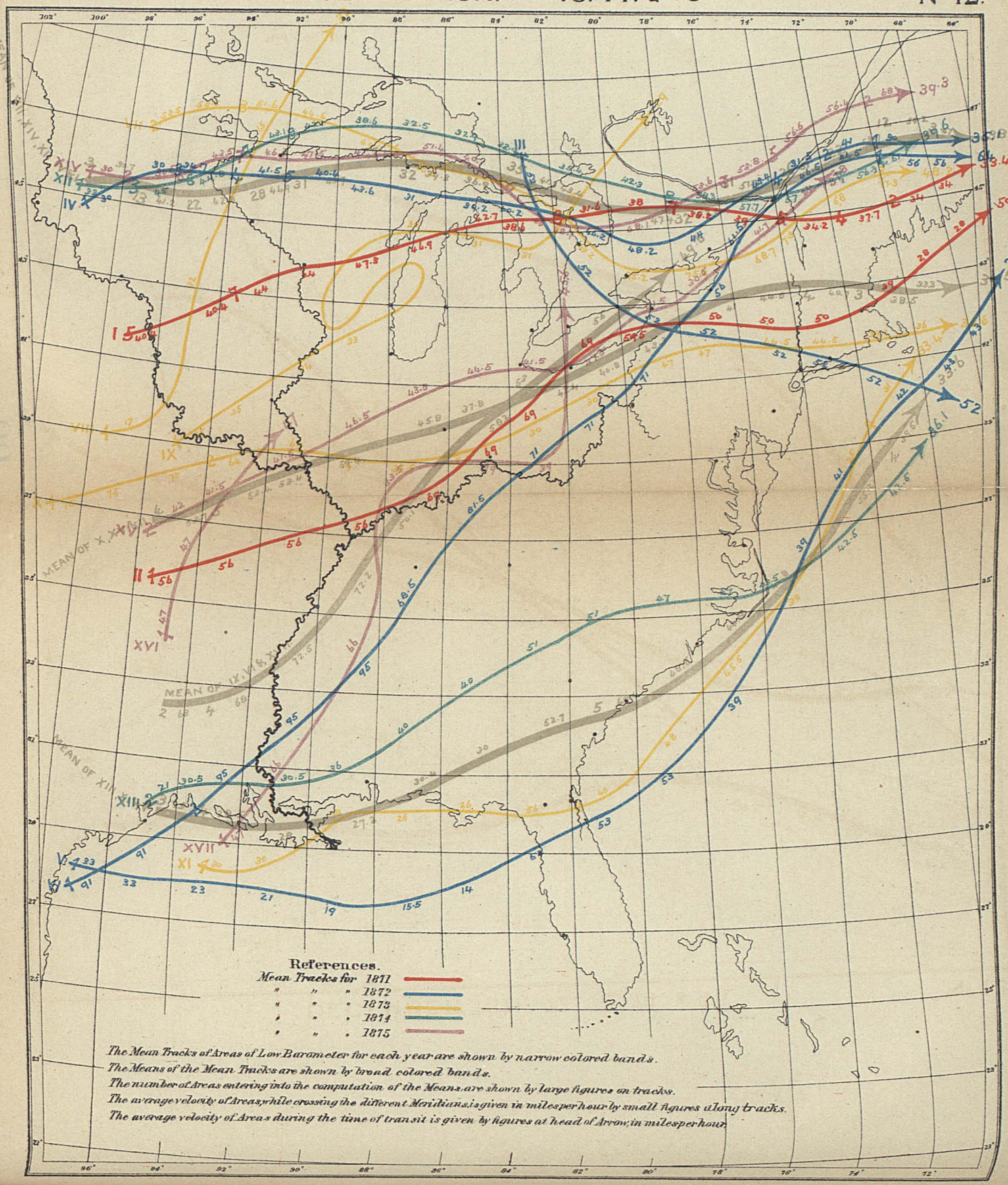
DECEMBER 1871. 72. 73. 74. & 75



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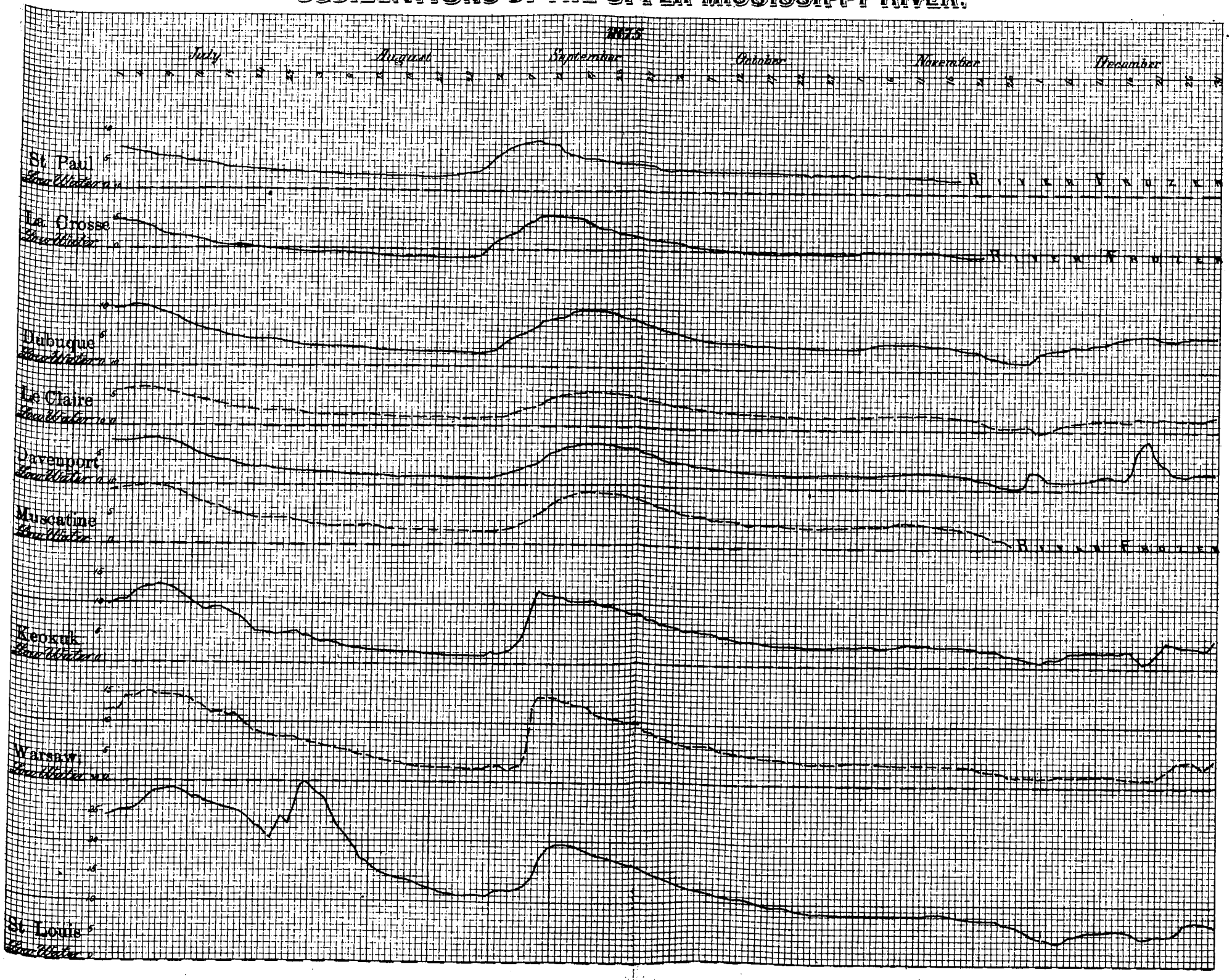
OSCILLATIONS OF THE UPPER MISSISSIPPI RIVER.



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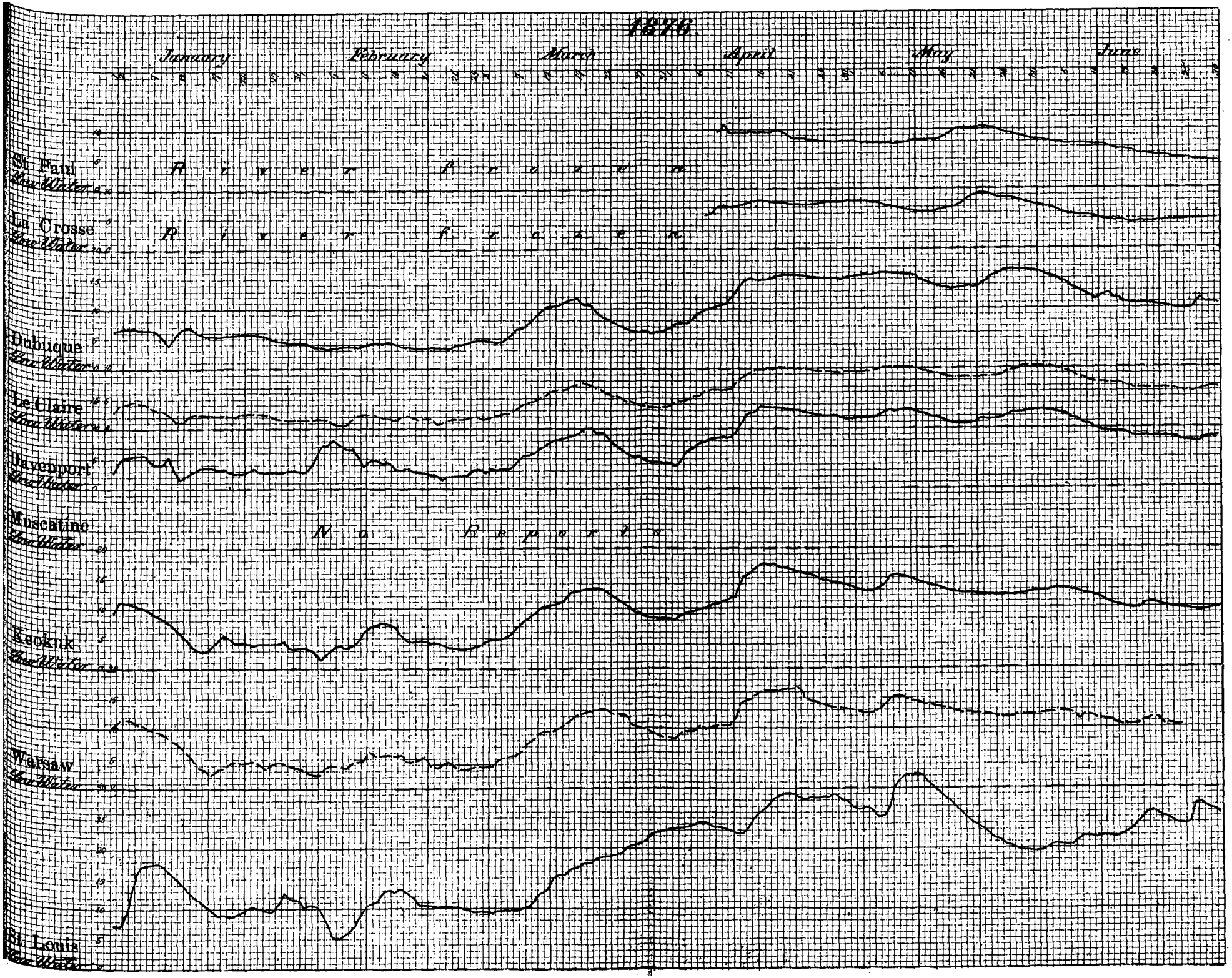
OSCILLATIONS OF THE UPPER MISSISSIPPI RIVER.



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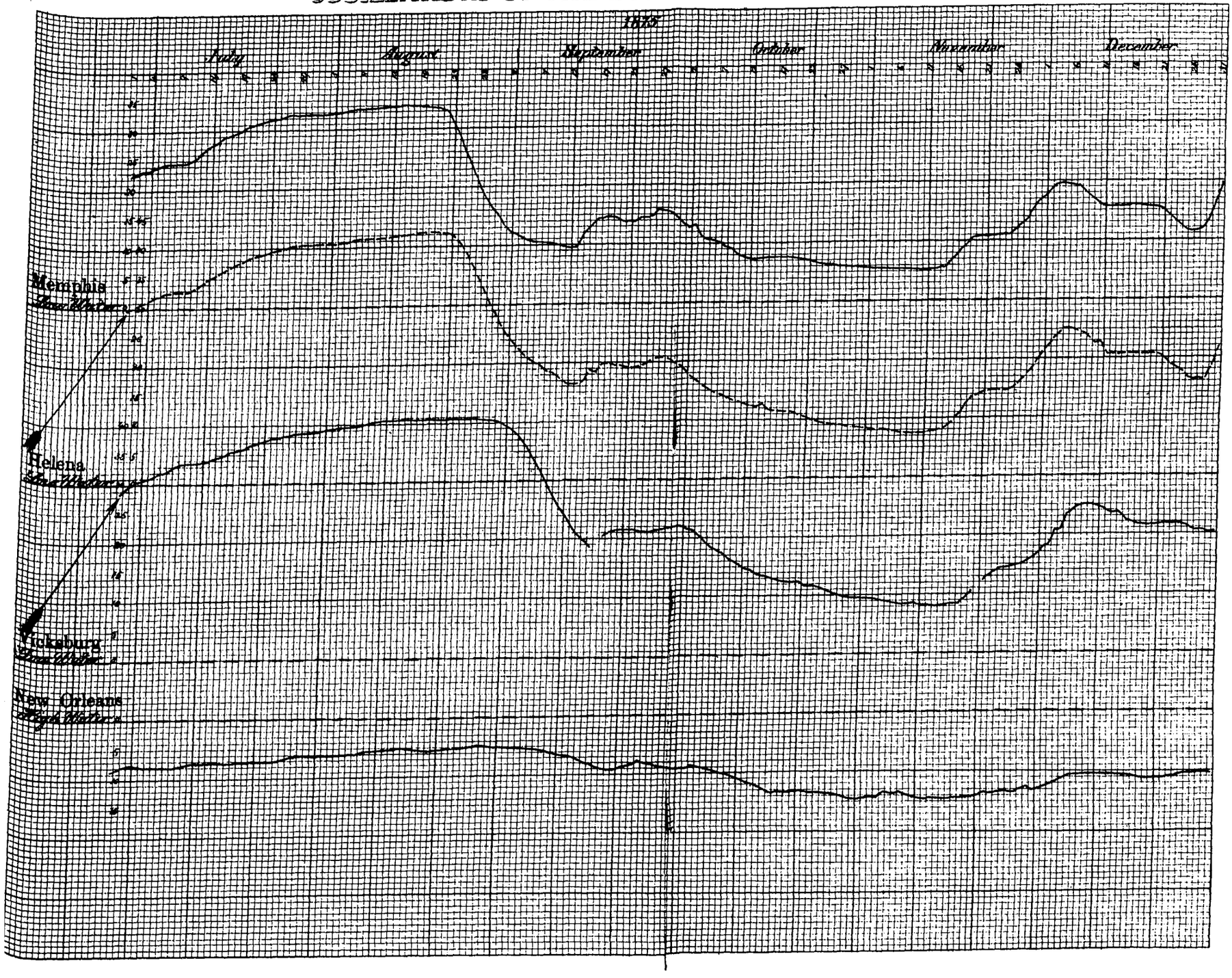
OSCILLATIONS OF THE LOWER MISSISSIPPI RIVER.



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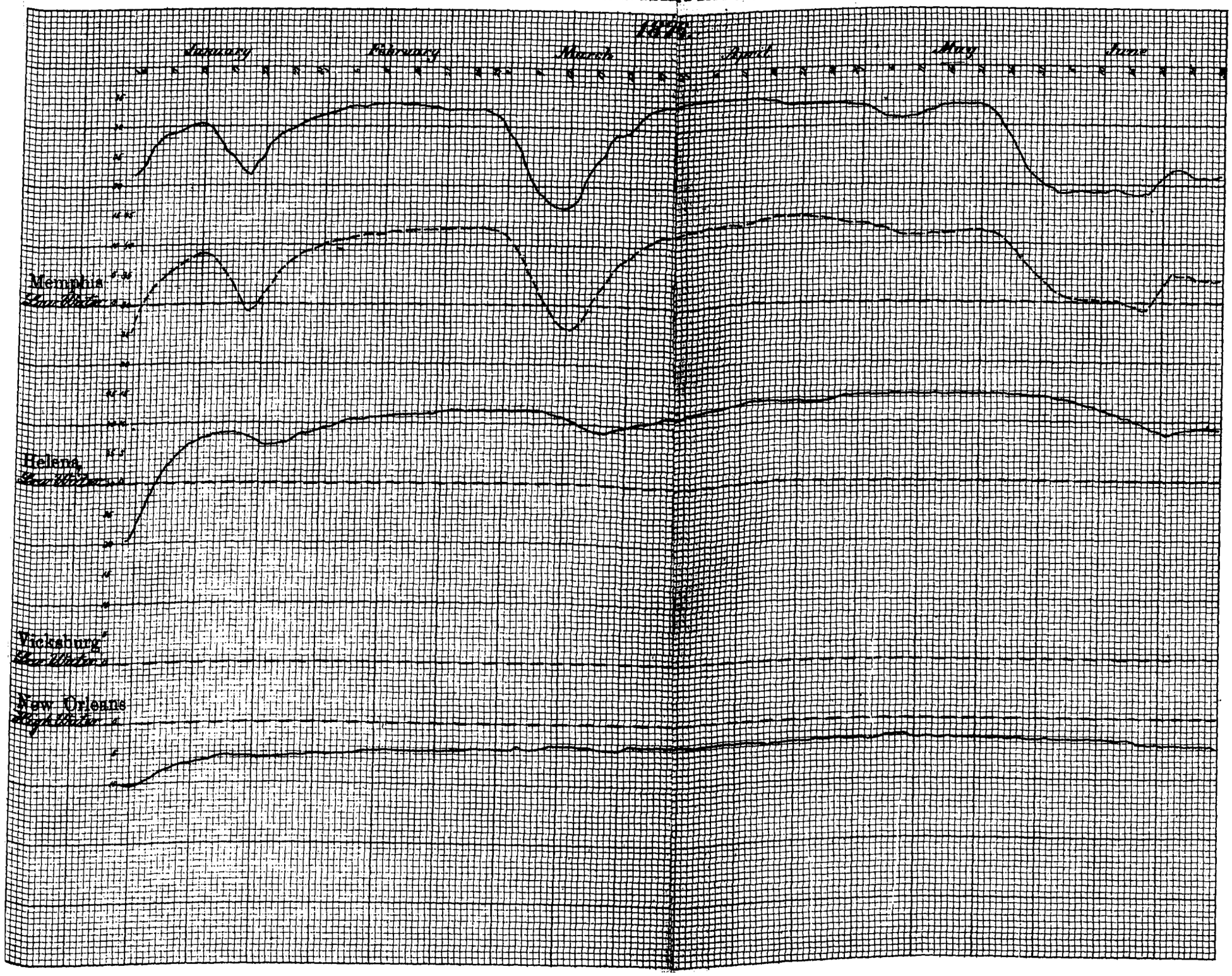
OSCILLATIONS OF THE LOWER MISSISSIPPI RIVER.



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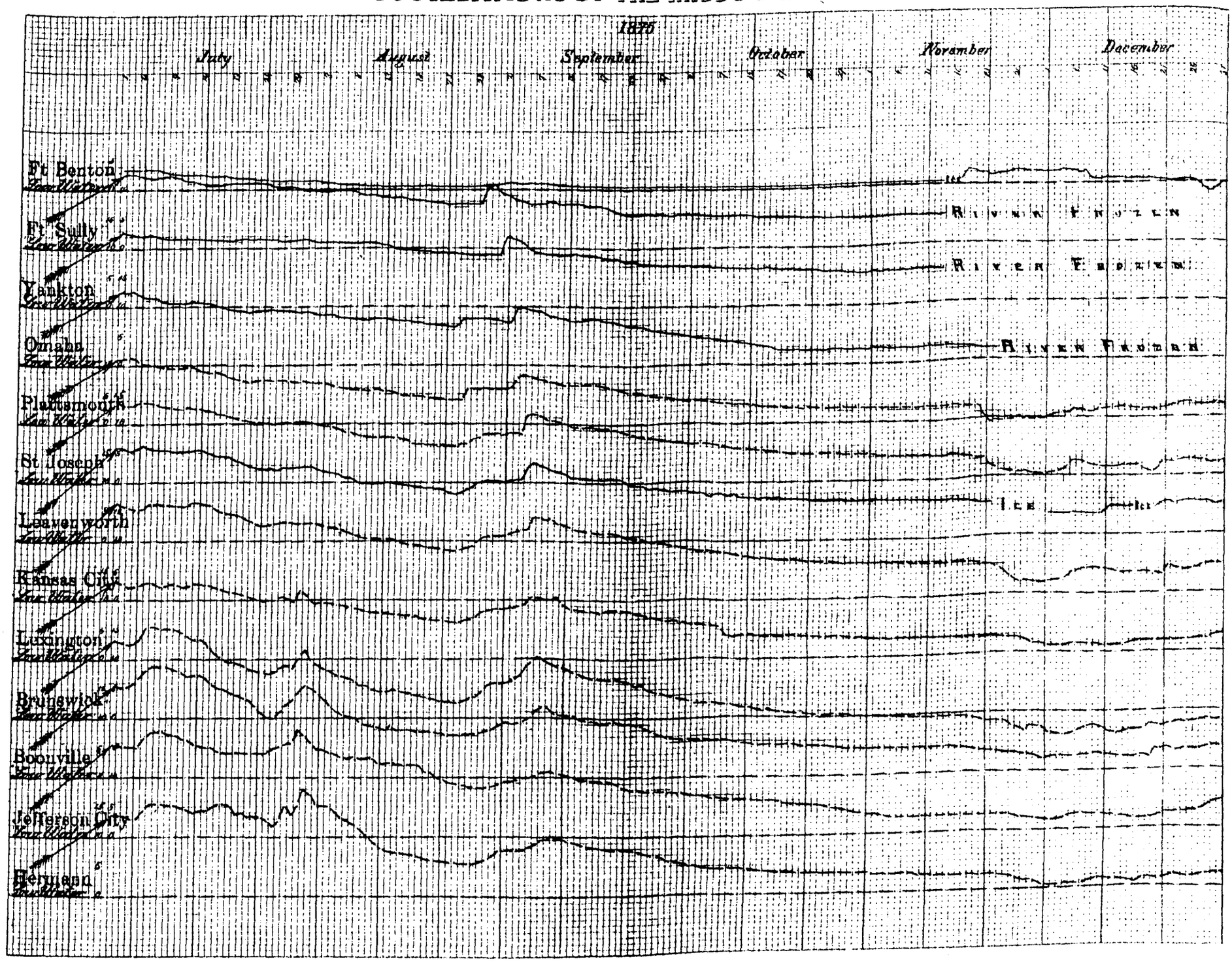
OSCILLATIONS OF THE MISSOURI RIVER.



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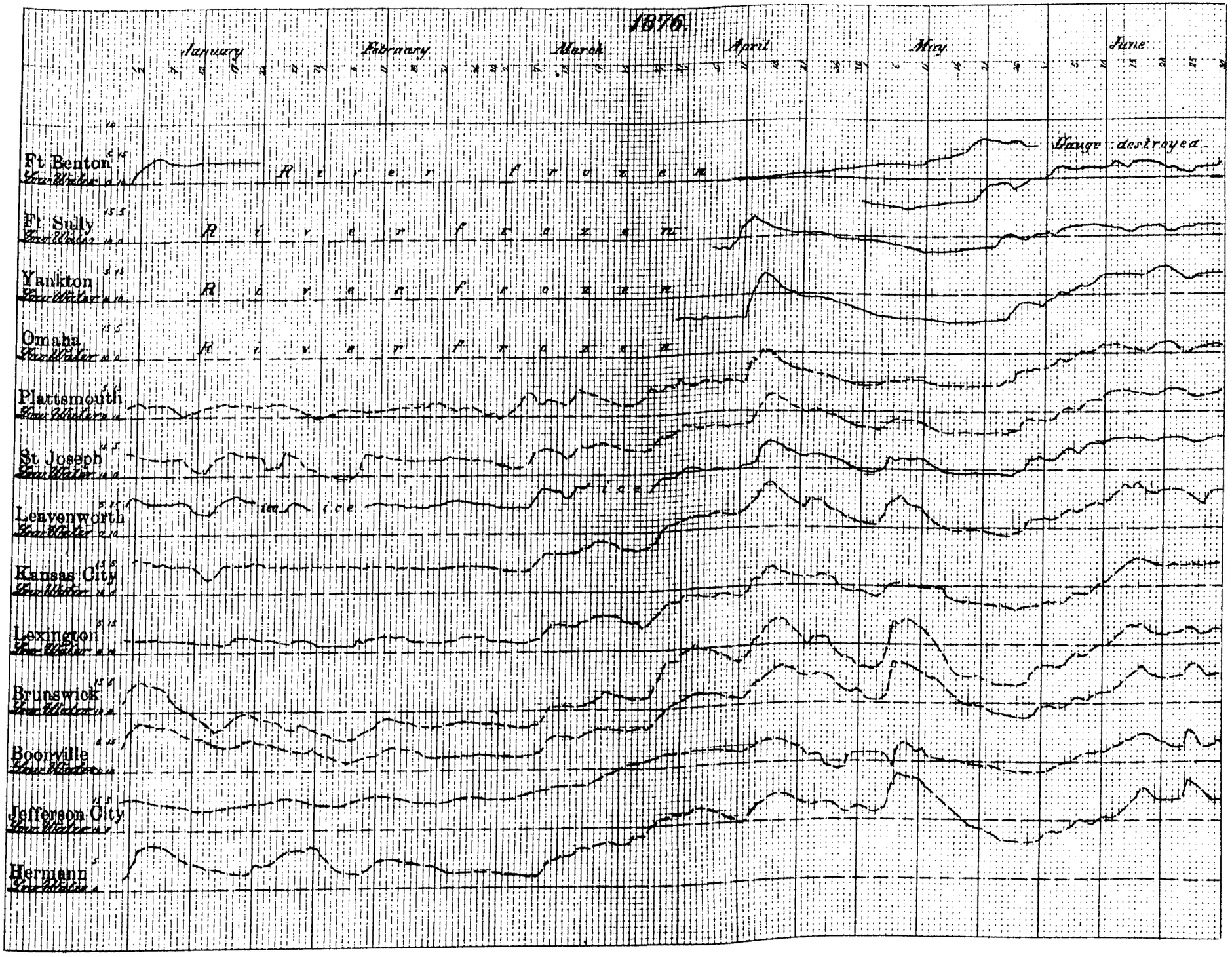
OSCILLATIONS OF THE MISSOURI RIVER.



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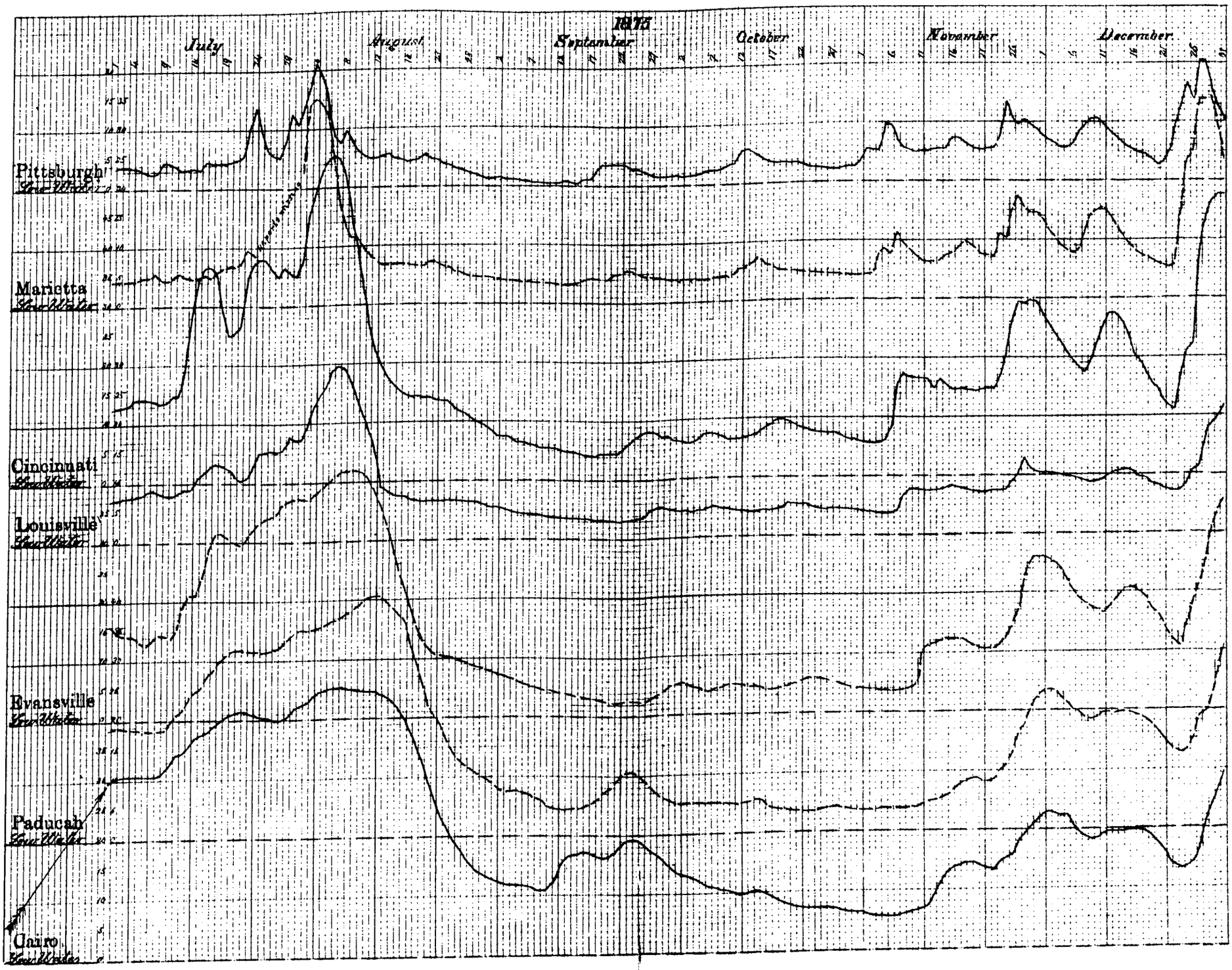
Oscillations of the Ohio River



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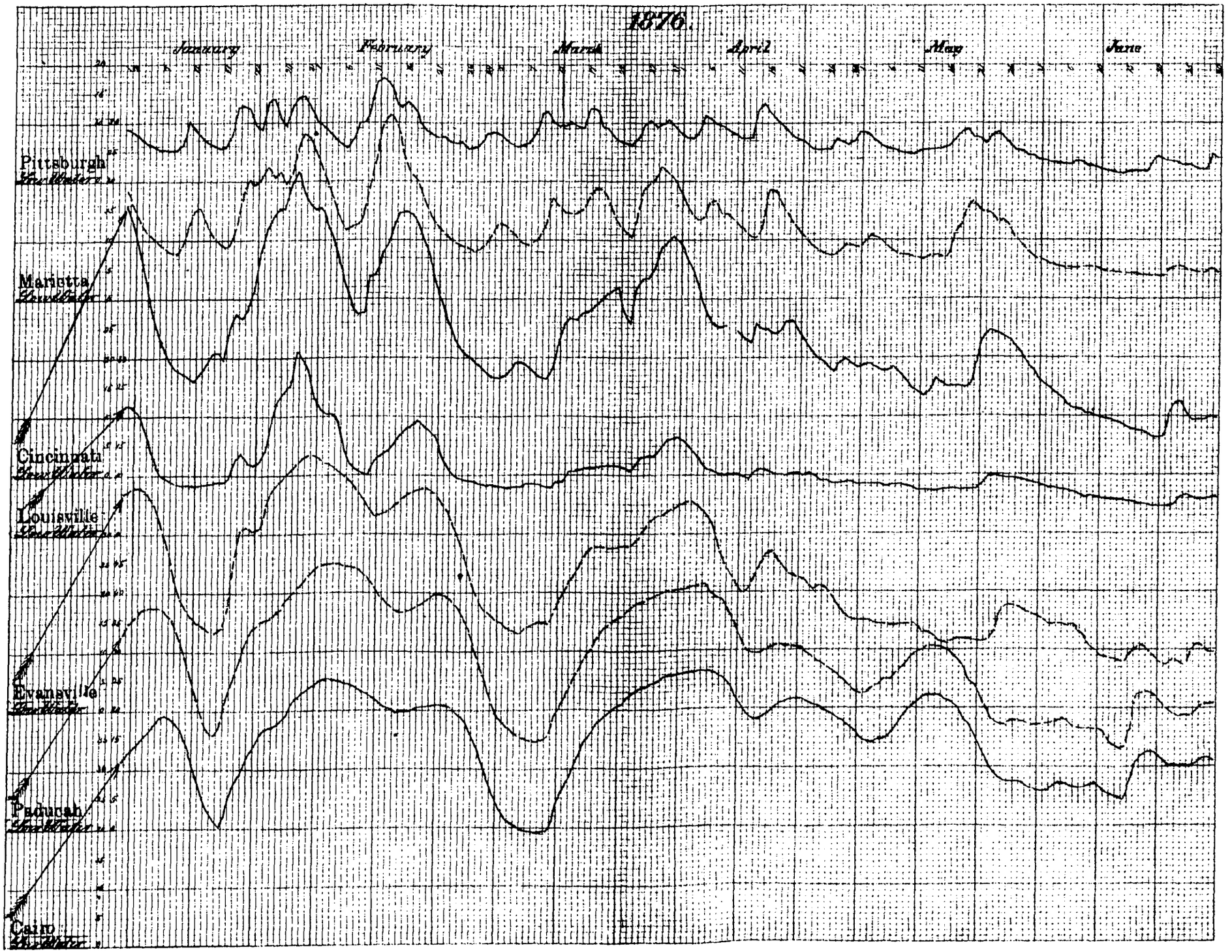
OSCILLATIONS OF THE OHIO RIVER.



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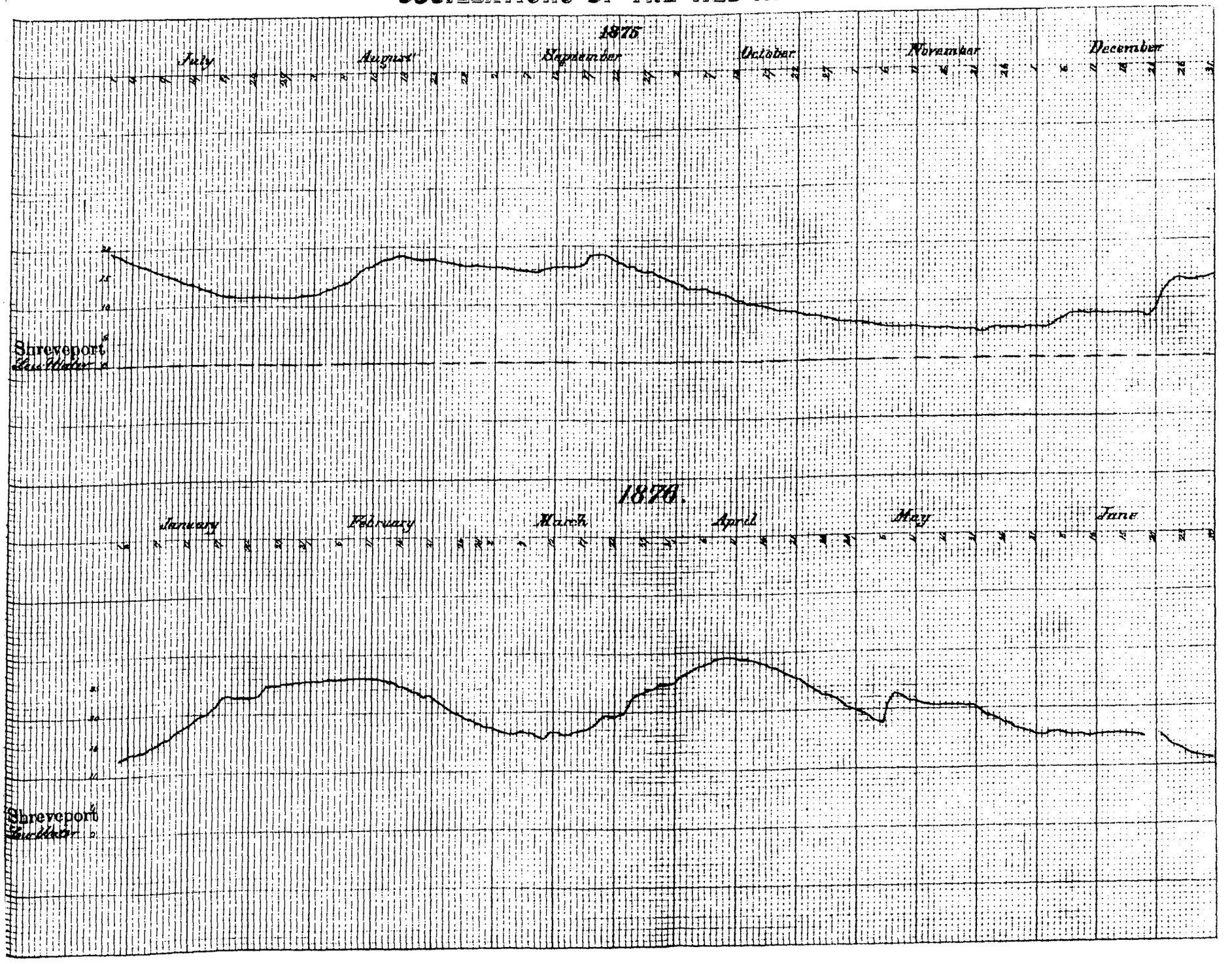
OSCILLATIONS OF THE RED RIVER.



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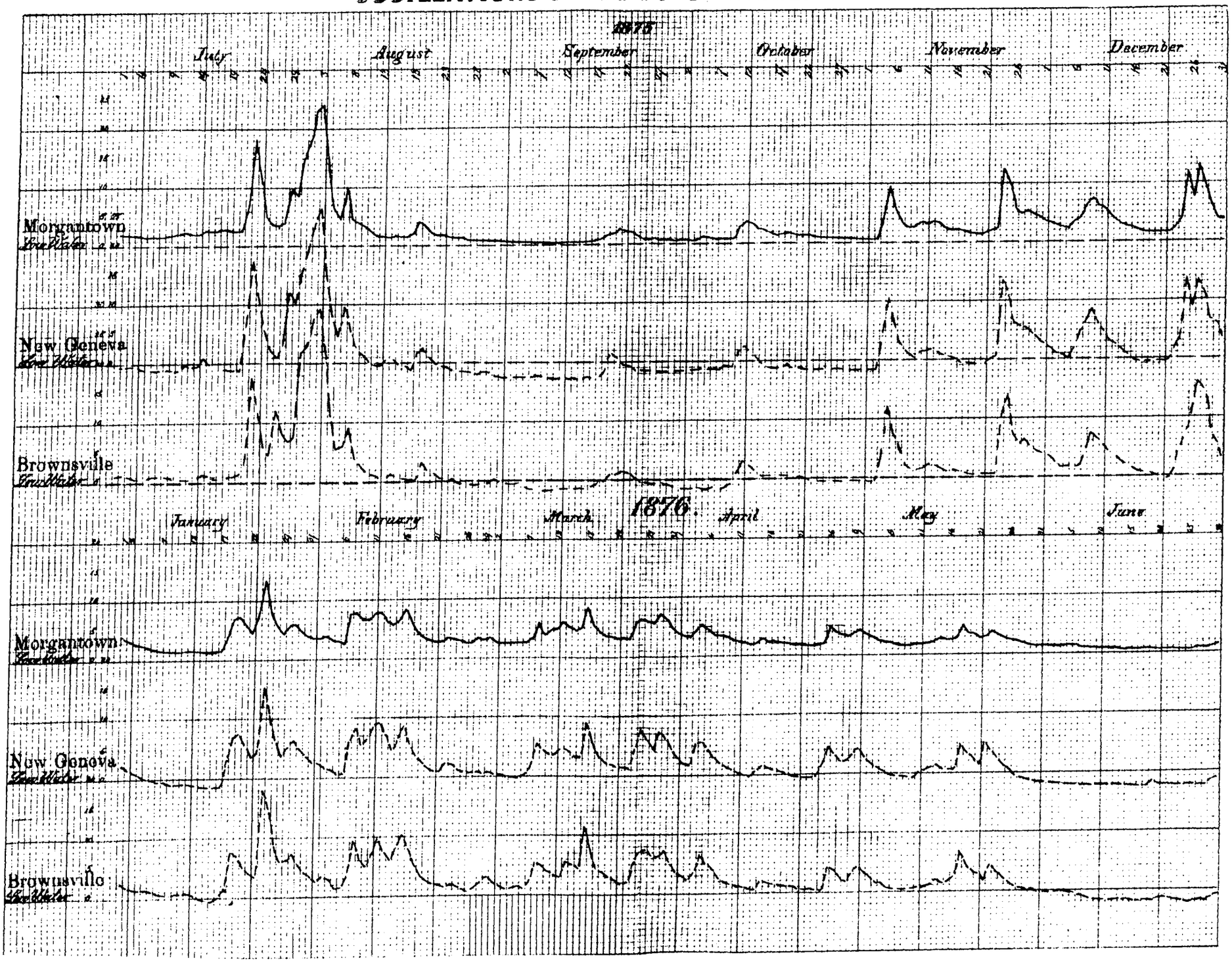
OSCILLATIONS OF THE MONONGAHELA RIVER.



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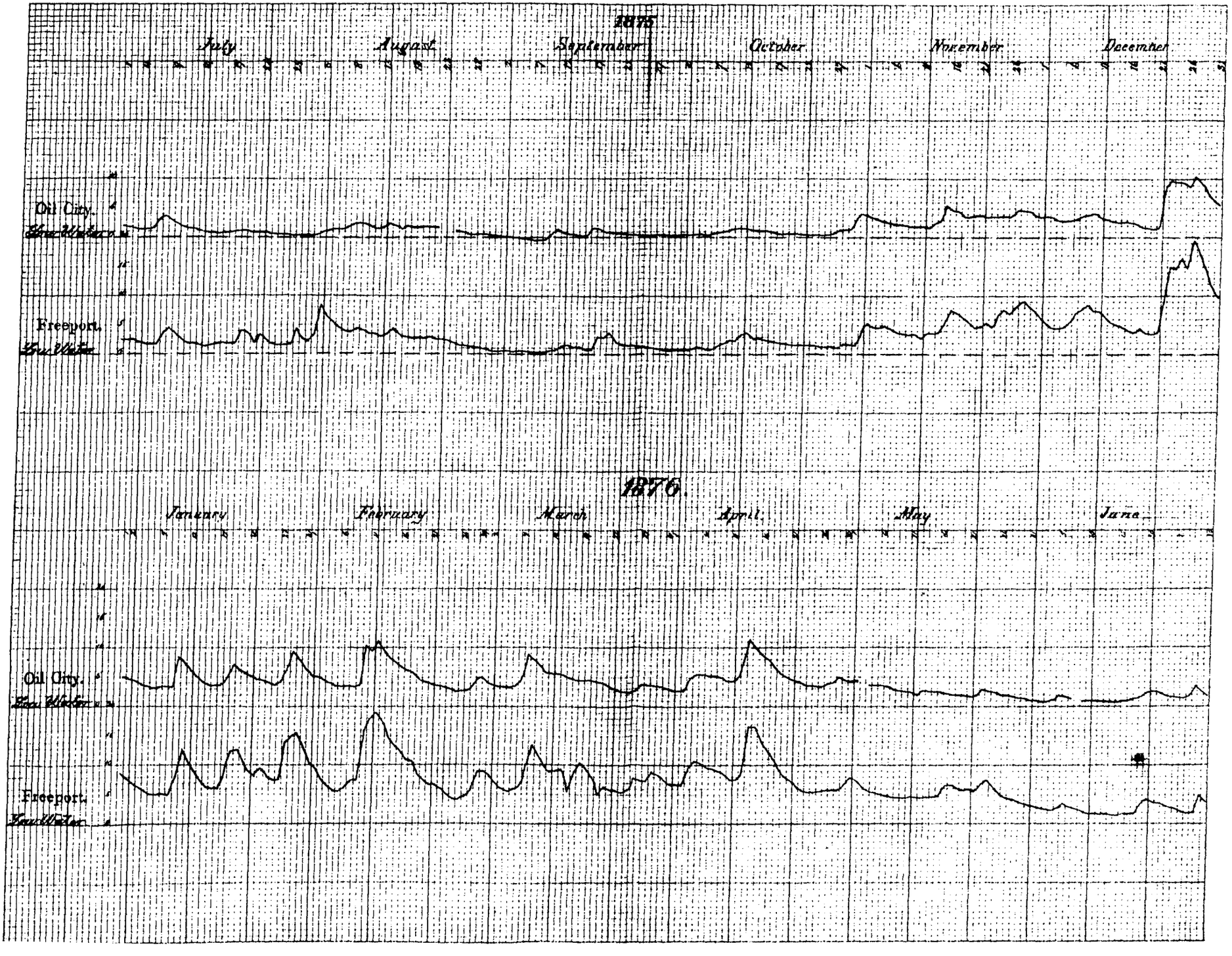
Oscillations of the Allegheny River.



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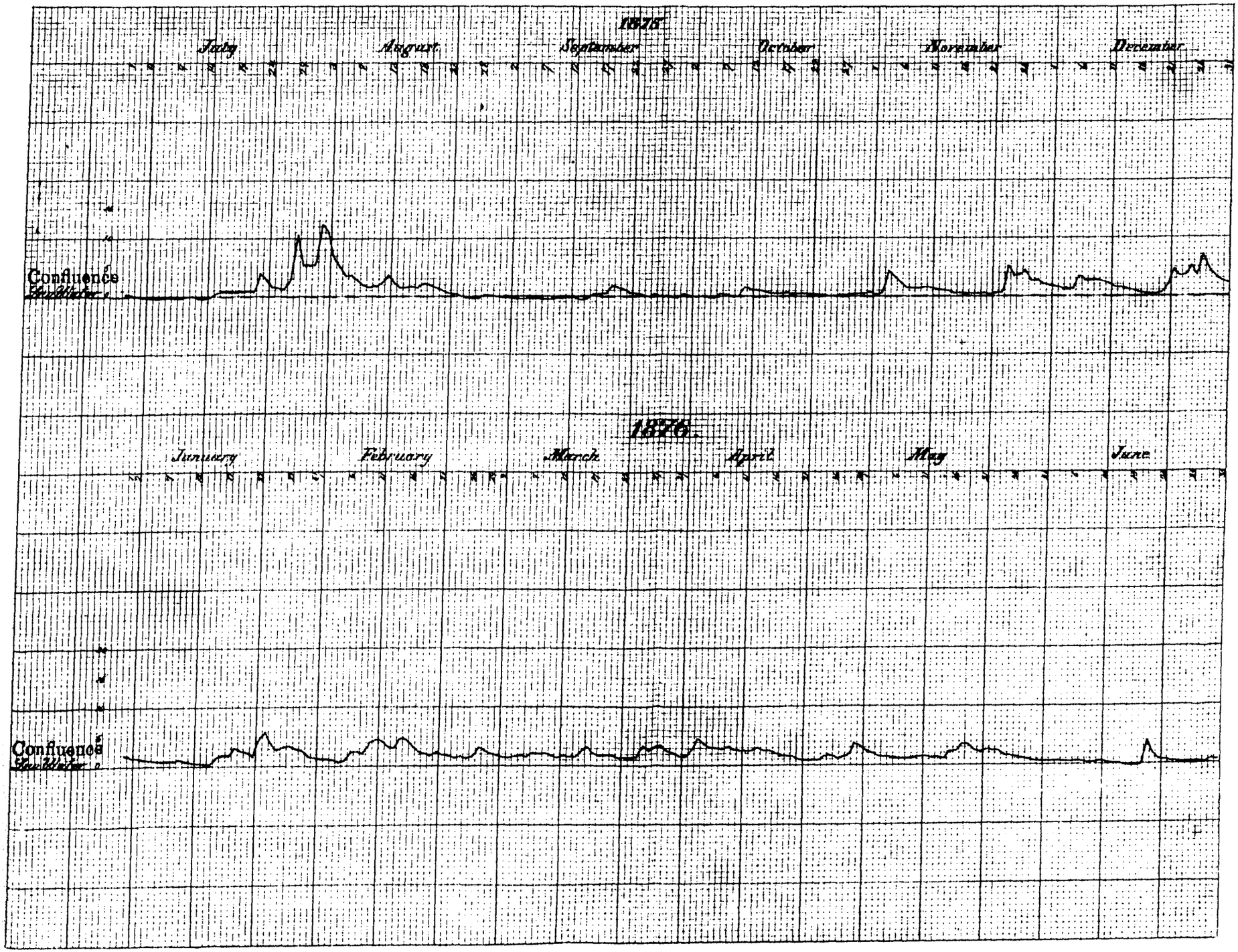
OSCILLATIONS OF THE YOUGHIOGHENY RIVER.



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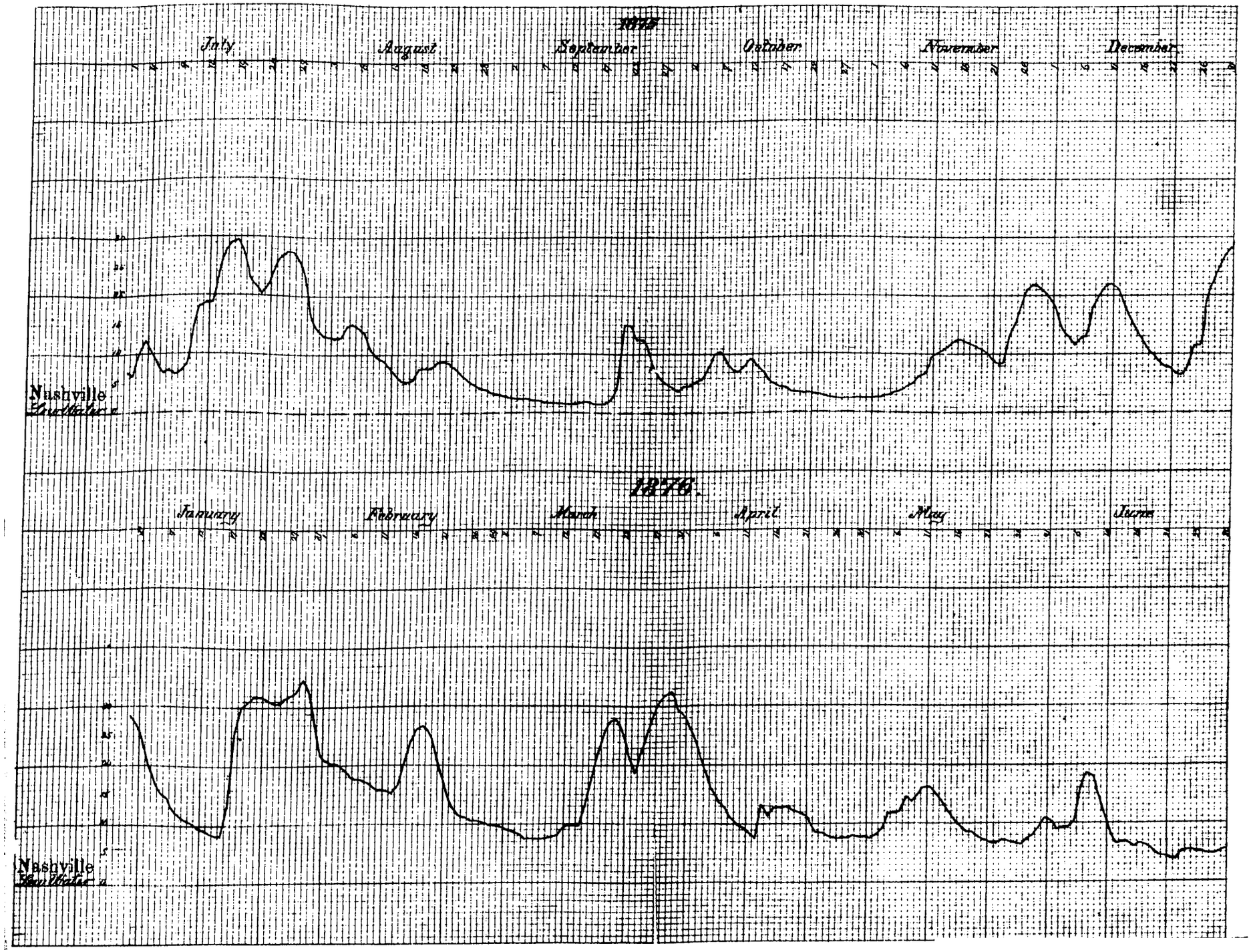
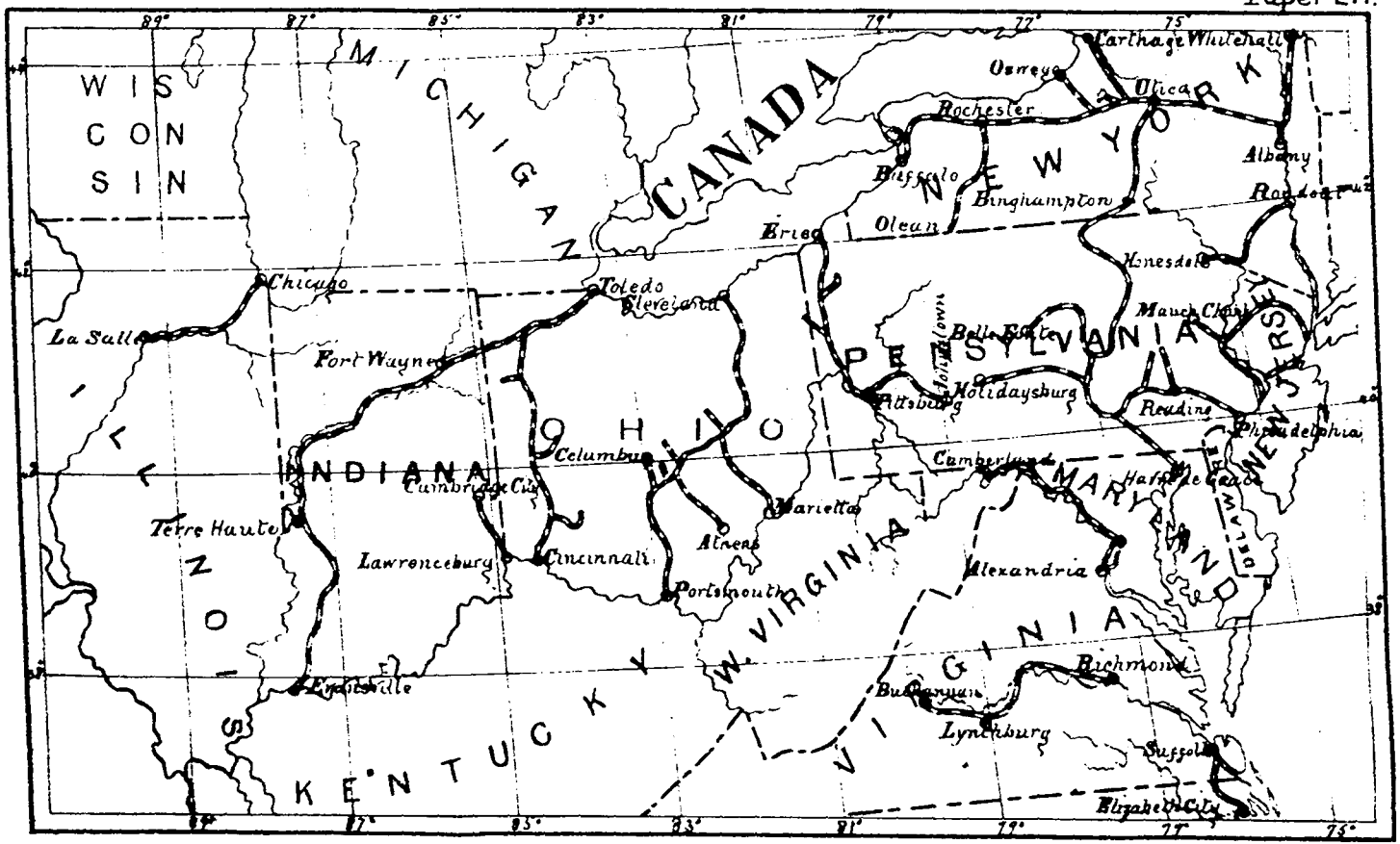
OSCILLATIONS OF THE CUMBERLAND RIVER.



CANAL REGIONS OF THE UNITED STATES

Paper LVI.



Canals, marked thus. —