

Galveston and Indianola, the wind reaching a maximum velocity of forty-four and forty-seven miles, and the temperature falling thirty degrees. Heavy local rains occurred in the Gulf states as the centre moved to the east, south of the Gulf coast, and apparently disappeared near the west coast of Florida. The norther continued in the west Gulf states until the fifteenth, and floods occurred in the Gulf states. At New Iberia, Louisiana, on the twelfth, high northwest winds occurred, destroying houses and crops. The following report has been received from that locality: There was a general destruction by a violent storm which came from the northwest on the night of the twelfth.

* * * Houses were torn to pieces, and fences, provisions, forage, furniture and everything previously saved from the floods were destroyed. In Iberia parish, Louisiana, at least fifteen hundred persons were left homeless and without means of support and shelter.

The situation is appalling. The height of the flood above tide-water was nearly seventeen feet. The east side of the Teche, from Lorainville to Pattersonville, one hundred miles in a straight line north and south, is a lake extending from west to east to the high ridges of Bayou Lafouche, fifty-miles wide."

Another report says: "The wind which on Wednesday, all day and night, blew strongly from the southeast along the coast of Louisiana, drove the waves from the gulf into Berwick's bay and the vast expanse of water covered the country for fifty miles east and west, from the ridge of Lafouche to the hills west of the Teche and for a hundred miles north and south. The water was thus piled up at Morgan City 4.6 inches above the flood of 1874, and very considerably above the highest flood-level ever attained before by the waters of the Atchafalaya. Houses were wrecked and damaged, and places never before inundated in the knowledge of the oldest inhabitant, were now covered with water."

VII.—This was central in Utah on the sixteenth, passing southward to the northern part of New Mexico, and northeastward over Colorado and Nebraska, with increasing energy, causing heavy rains, or snows in the Missouri valley and high southerly winds in Texas, Arkansas, Missouri, and Kansas. At four o'clock in the afternoon of the eighteenth, when the depression was central near Yankton, one of the most destructive tornadoes occurred at Brownsville, Missouri. An observer reports as follows: "A few moments before four o'clock a light wind began blowing, accompanied by light rain. Almost immediately the atmosphere became heavy and close. Two large blueish colored clouds appeared; one in the south and the other in the southwest; these clouds were apparently several miles distant, and seemed to be approaching each other with great velocity, when within about two miles of the town the two clouds united and, immediately after, a loud roaring noise was heard similar to the distant rumble of a locomotive. The noise increased as the storm approached the town. Before the clouds united each moved over an irregular and reeling course, but after they united, the cloud assumed the shape of a large funnel, the mouth hanging close to the ground. The storm-cloud moved forward in a zigzag motion with great velocity, and scarcely five minutes elapsed from the time the first cloud was seen until the town was destroyed"

Less destructive tornadoes occurred on the same date in Illinois and Iowa. After reaching northwestern Iowa, this depression inclined slightly to the southeast, and then moved to northeast over Michigan, Saint Lawrence valley, and New England, and then disappeared to the eastward of Nova Scotia on the twenty-first.

The following reports furnished through the co-operation of "The New York Herald Weather Service", probably indicate the presence of this storm over the ocean:

On the twenty-second, s. s. "Catalonia", lat. 46° 22' N., long. 40° 11' W., moderate gale, hazy. On same date, s. s. "Wyoming" lat. 45° 15' N., long. 41° 46' W., moderate gale and hail squalls. On the twenty-third, lat. 43° 43' N., long. 46° 32' W., fresh gale with head sea; on the twenty-second, s. s. "Nevada", lat. 41° 36' N., long., 62° 30' W., moderate

gale; on the twenty-fifth s. s. "Britannic", lat. 40° 08' N., long. 37° 84' W., strong westerly wind and high head sea.

This storm developed its greatest energy while passing over the lake region, the wind reaching a maximum velocity of 44 miles, s.w., at Sandusky; 44, n.w., at Grand Haven; 41, w., at Rochester; and 42, s.w., at Buffalo. There was a destructive tornado at Pennsville, Pa., occurring about four o'clock in the afternoon on Wednesday, the nineteenth.

VIII.—This depression developed in the upper Missouri valley on the night of the nineteenth and moved southward to western Kansas, where it was central at midnight of the following day. It moved slowly to the eastward during the twenty-first and twenty-second causing heavy rains in all districts south of the lake region, and dangerous northeasterly gales at stations on the lakes. When central near Cairo, severe local storms occurred in the Gulf states. This depression passed to the eastward over Kentucky and North Carolina on the twenty-third, and disappeared to the southeastward off the south Atlantic coast, attended by strong northeasterly gales at stations north of Charleston. On Saturday, the twenty-second, a violent tornado occurred in Pender and Brunswick counties, North Carolina. The storm moved in a northerly direction across the Cape Fear river, making a perfect lane through the woods and fields, the tract being about two hundred yards in width.

Tornadoes also occurred in Bibb county, Georgia, and Dallas county, Alabama, on the afternoon of the same date.

IX.—This storm was first observed in Colorado at midnight of the twenty-fourth, and moved directly eastward during the twenty-fifth and twenty-sixth, passing over the central part of the United States, and leaving the middle Atlantic coast on the twenty-seventh. When the course changed to the northeast, this storm followed the general direction of the coast line, developing considerable energy, and disappearing to the eastward of Nova Scotia on the twenty-eighth. On the twenty-eighth, s. s. "Britannic," lat. 41° 55' N., long. 60° 7' W., barometer 29.86, wind south, force seven.

X.—This was a slight depression which appeared off the New England coast on the thirtieth, apparently moving to the northeast, but the centre was at no time within the limits of the Signal Service stations.

XI.—Advanced from British America on the last day of the month and was central over lake Superior at the close of the month, as a slight barometric disturbance.

INTERNATIONAL METEOROLOGY.

International charts iv. and v. accompany the present number of this REVIEW. Chart iv. is published for February, 1880, and continues the series of that chart begun in January, 1877. Chart v. is prepared for May, 1880, and continues the series of that chart from November, 1877. In the preparation of these charts, which are based upon the daily charts accompanying the INTERNATIONAL BULLETIN of the Months of February and May, 1880, much valuable information has been obtained from the "Monatliche Uebersicht der Witterung" for February and May, published under the direction of Prof. Dr. G. Neumayer, director of the German Marine Observatory, and from the "Bulletin Mensuel," published by Mr. Marc Dechrevens, of Zi-Ka-Wei, China. Chart iv. exhibits the mean pressure, the mean temperature and the prevailing direction of the wind over the northern hemisphere for the month of February, 1880, as determined from one observation every day taken at 7.35 a. m., or 0.43 p. m., Greenwich mean time.

The most marked area of low barometer extends over the north Atlantic ocean between the British Isles and Greenland, and is central near Stykkisholm, where the mean pressure for the month was 29.28, and the prevailing wind was southwest, force 5.

The barometric gradient increases rapidly to the southeast and west, and very slowly in a northeasterly direction, indicating an extension of low area over the Arctic regions.

The second area of mean low barometer is central over British India, where, in the southern part of Hindostan, the mean pressure for the month was below 29.90.

Four areas of barometric maxima appear upon the chart, the most marked of which extends over eastern Siberia, where the greatest mean pressure was (30.68). This area included within its limit the eastern half of Asia. Passing to the westward, a second area enclosed by an isobar of 30.20, is marked as extending over southern Russia, from the Black to the Caspian seas. In this region, the pressure diminishes rapidly toward the Arctic ocean, and at the northern stations of Europe, ranges from 29.50 to 29.80.

The third area of high barometer is central in British America near York Factory, where the average pressure for the month is 30.22. The area of high barometer usually extending over the Atlantic has moved to the westward, and includes within its limits the eastern Gulf states, the isobar of 30.20 being closed and extending from the 68th to the 88th meridian. The high area of the Pacific extends over the north Pacific coast, where the pressure ranges from 30.15 to 30.27 and increases with the latitude.

Compared with the preceding month the area of low barometer in the Arctic region, central west of Iceland has moved apparently to the eastward, the region of least pressure being now near, but northeast of Iceland, where the barometer is .3 of an inch below the mean of the previous month. The pressure has also diminished in the western part of this low area, the mean at Godthaab being 29.42 or .17 of an inch below the mean of January.

In the eastern part of Asia, the region of greatest pressure, the barometer has averaged .1 of an inch below the mean for the previous month.

In North America the pressure has increased .2 of an inch near the center of the continent. The area of 30.20, which extended over the southern portion of the middle states, has moved to the southward over the eastern Gulf states, and the isobar of 30.10 has moved westward to Texas and southward from New England to Pennsylvania. The pressure has changed slightly in the lake region. In the region between the upper Mississippi and Missouri rivers, the barometer is .1 of an inch below the mean, while at the Rocky mountain stations it remains near the normal.

The most marked change in the distribution of pressure occurred on the Pacific coast. The high area which was apparently to the west of the coast line during January, having moved to the northeast over Oregon, replacing the low area of 29.90 by a general increase of pressure along the coast as far south as San Diego.

Compared with the corresponding months of previous years, the pressure was above the normal on the Atlantic, Pacific and Gulf coasts, and slightly below in the central part of the United States. In the central part of British America the pressure has averaged .24 of an inch above the mean.

The following table exhibits the mean pressure and the mean temperature for the month of February, 1880, in the several countries of Europe and Asia, compared with the means as determined from observations taken during February in the years 1877, 1878, and 1879:

Countries.	Barometer.		Temperature.	
	Mean, February, 1877, 1878 and 1879.	Mean, February, 1880.	Mean, February, 1877, 1878 and 1879.	Mean, February, 1880.
Algiers.....	30.16	30.11	58.6	59.5
Austria.....	30.04	30.11	50.6	53.1
British Isles.....	29.83	29.65	41.4	46.0
Denmark.....	29.78	29.79	53.5	53.5
France.....	30.05	30.01	47.0	49.1
Germany.....	29.89	29.95	57.6	56.1
India.....	29.96	29.93	74.9	71.3
Italy.....	30.00	30.06	51.4	50.5
Norway.....	29.83	30.17	50.5	56.5
Portugal.....	30.22	30.14	54.8	54.7
Russia.....	29.95	30.01	27.7	22.2
Spain.....	30.11	30.09	54.7	55.3
Sweden.....	29.70	30.74	23.0	29.3
Turkey.....	30.04	30.10	62.4	59.3

The accompanying table shows the deviations in tempera-

ture and pressure at isolated stations for the month of February, 1880, as compared with the means of three years:

Comparative Thermometric and Barometric Means, with corresponding Departures.

STATION.	Mean Temperature.			Mean Barometer.		
	February, 1877-78-79.	February, 1880.	Departure.	February, 1877-78-79.	February, 1880.	Departure.
York Factory.....	0	0	0	30.28	30.22	+0.24
Godthaab.....	19.2	28.8	-9.6	29.52	29.42	+0.10
Stykkisholm.....	16.3	7.0	9.3	29.61	29.78	-0.23
Tomso.....	22.6	29.0	-6.7	29.46	29.43	+0.03
Thorshavn.....	32.0	30.5	+1.5	29.80	29.38	+0.24
Archangel.....	39.0	41.0	-2.0	29.72	29.75	-0.03
Ekaterinburg.....	8.1	15.8	-7.7	30.04	29.98	+0.11
Barnaul.....	11.0	8.1	+2.9	30.37	30.17	+0.20
Yeniseisk.....	1.2	1.0	+0.2	30.29	30.25	+0.04
Nikolaievsk on the Amoor.....	-4.7	-11.7	7.0	30.33	30.30	+0.03
Zi-Ka-Wei.....	37.7	39.2	-1.5	30.33	30.30	+0.03
Pekin.....	28.2	28.8	-0.6	30.33	30.42	-0.09
Beirut.....	61.5	59.9	+1.6	30.07	30.02	+0.05
Mauritius.....	81.7	80.2	+1.5	29.86	29.97	-0.08
Fort Napier.....	78.8	73.2	+5.6	29.84	29.80	+0.04
Paramaribo.....	50.3	77.8	-2.5	30.03	30.03	-0.03
Funchal.....	63.8	64.9	-1.1	30.28	30.12	+0.16
Ponta Delgado.....	61.0	59.2	+1.8	30.23	30.11	+0.12
Bridgetown.....	50.4	77.5	-2.9	30.00	30.00	Normal
Navassa.....	78.1	75.2	+2.9	30.01	30.03	-0.02
Melbourne.....	64.1	68.4	-4.3	30.34	30.03	+0.10
Hobart Town.....	63.6	67.8	-4.2	30.08	30.25	-0.10
Astrakhan.....	29.4	17.6	+11.8	30.08	30.25	-0.10
Athens.....	55.0	53.3	+1.7	30.02	30.10	-0.08
Tiflis.....	45.2	39.0	+6.2	30.07	30.20	-0.13
Laghout.....	58.3	59.4	-1.1	30.19	30.16	+0.03
Fort de France.....	70.9	74.5	-3.6	29.92	30.06	-0.14
Lisbon.....	55.2	55.8	-0.6	30.23	30.14	+0.09
Sandwich Manse.....	40.0	42.5	-2.5	29.60	29.40	+0.20
Malta.....	58.4	60.0	-1.6	30.05	29.99	+0.06
Madrid.....	49.5	50.5	-1.0	30.19	30.08	+0.11
Gibraltar.....	60.4	58.5	+1.9	30.34	30.35	-0.01
Tashkend.....	40.3	24.6	+15.7	30.02	29.98	+0.04
Cape Town.....	78.5	78.2	+0.3	29.85	29.86	-0.01
Free Town.....	87.2	56.4	+30.8	30.17	30.10	+0.07
Angra.....	38.2	53.0	-1.3	30.00	30.01	+0.01
Cagliari.....	56.3	57.0	-0.7	30.00	30.01	+0.01

The temperature continued above the normal in the eastern part of North America. The reports show that this was the warmest February that has occurred in many years, especially in the United States east of the 100th meridian. At the Rocky mountain stations the temperature remained about stationary, and on the Pacific coast it ranged from 2° to 6° below the normal. It averaged more than 6° above the mean of February from Virginia northward to the Saint Lawrence valley, and from New York westward to Michigan.

The following are some of the extreme monthly mean temperatures reported at isolated stations: Lowest—York Factory, -28°.8; Nikolaievsk on the Amoor, -11°.7; Yeniseisk, +1°.9; Barnaul, 5°.9; Godthaab, 7°.0. Highest—Freetown, 86°.4; Mauritius, 82°.0; Cape Town, 78°.2; Bridgetown, 77°.5; Paramaribo, 77°.8.

The prevailing direction of the wind over North America was northeasterly on the east coast of the Gulf of Mexico and in southern California; southerly in the Mississippi and Ohio valleys, the lake region, north Pacific coast and over the plateau regions; northwesterly at stations on the eastern slope of the Rocky mountains and in the Missouri valley; westerly in Canada and the maritime provinces; variable in the central part of Mexico. Over the Atlantic, south of latitude 30°, northeasterly; north of latitude 30° and east of longitude 30°, southwesterly, and west of longitude 30°, northwesterly.

In Europe, north of the 45th parallel of latitude, the prevailing winds were from south to west; south of that parallel, at stations on the Mediterranean, they were from northeast to northwest. Westerly winds prevailed in Algiers and in Hindostan, and northerly winds are reported generally from China and Japan.

The following notes and extracts, descriptive of the meteorological conditions over Europe and the north Atlantic for February, 1880, are taken from the "Monatliche Uebersicht der Witterung": In a meteorological sense, February was

more eventful than the two preceding months; for the better description of the weather conditions the month is divided into three periods, viz.: from the first to the eighth, eighth to nineteenth, nineteenth to twenty-eighth.

The first period may be considered as a continuation of the last decade of January. In the southeastern part of central Europe, from eastern Germany to the Black sea, an area of high barometer (30.32 to 30.71) prevailed, while to the north of this region four barometric depressions occurred, moving in a direction west to east. The atmospheric disturbances in central Europe were very slight, there was almost a total absence of precipitation, and heavy frosts continued uninterruptedly. In Bavaria and Wurtemberg the frost reached its greatest intensity, minimum temperatures of $+5^{\circ}$ to $-0^{\circ}.4$ (Fahr.) being reported from these sections.

The following notes are of interest: "Carlsruhe, February 8.—The duration of cold of the present winter surpasses that of 1829–30." A dispatch from Rorschach, dated February 7th, stated that Lake Constance froze over the night before; temperature $+1^{\circ}$ (Fahr.). In the year 1830, on the 2d of February, the lake froze over and navigation was interrupted. In Italy the winter was very severe: in Venice water froze in cisterns, causing a scarcity of drinking-water; in Naples frost and snow prevailed. About the end of the period under consideration, two depressions appeared in northwestern Europe and extended far southward. During the second period the region of barometric depressions was transferred from the north to the west of Europe. The area of high pressure continued until the tenth northwest of the Black sea. It then moved slowly to the north, and about the eighteenth was central as an area of unusually high pressure (30.71 to 30.91) in northeastern Russia.

Several slight depressions occurred in southern Europe, causing changes in wind, and accompanied by rain, and in some cases snow. The severe frosts which occurred in southern and western Europe during the two previous months were followed by warmer weather, and the region of greatest cold was transferred to central and northern Russia during the second period of February.

In the greater part of Germany, from the sixteenth to the nineteenth, the temperature rose with southeasterly winds, while at Memel with east and southeast winds, quite the contrary took place. At Memel, during the eighteenth and nineteenth, the minimum temperature occurred, while in western Germany, the maximum was reached on the nineteenth.

During the third period (twentieth to end of month) several depressions of great energy passed over northwestern Europe moving eastward. On the twenty-fourth the area of high barometer extended from the British Isles to central Russia, so that in the whole of middle and southern Europe, as far south as the Mediterranean, fresh easterly and northerly winds prevailed, by which the temperature of this region was considerably lowered. This area of high barometer was subsequently driven first to the south, then to the southwest of the continent, where it remained until the end of the month. Over the north Atlantic, west of the 50th meridian, during the first decade of the month the barometer was high and fair weather with northwesterly winds prevailed with few interruptions of falling barometer and southwesterly winds, heavy rains occurring when the direction of the wind changed.

3d, in 42° N., 65° W., s.w. wind, force 10, torrents of rain, followed by clear weather.

9th, in 39° N., 66° W., n.n.w. wind, force 10.

10th, in 43° N., 53° W., w.s.w. to n.w. wind, force 8–10.

From the tenth to the twentieth in this part of the Atlantic the winds were variable, chiefly from s.w. to n.w., and the barometer ranged from 29.50 to 30.32.

11th, in 41° N., 61° W., n.w., force 10.

13th, in 40° N., 56° W., w.s.w., force 10.

14th, in 41° N., 51° W., w.s.w., force 9.

16th, in 41° N., 59° W., n.w., force 8, rain and hail squalls.

From the twentieth to the end of the month calm and fair

weather, moderately high barometer and easterly winds prevailed.

The following vessel reports indicate the occurrence of storms on the middle Atlantic, on the dates named:

1st, in 47° N. 37° W., s.w., force 8.

5th, in 48° N. 30° W., s.w., force 10.

6th, in 47° N. 35° W., w.n.w., force 10.

7th, in 41° N. 38° W., n.w., force 10.

8th, in 43° N. 34° W., w. force 9.

10th, in 48° N. 33° W., w.n.w., force 10, thunder, rain, and hail squalls.

Same date in 46° N. 45° W., w., force 11–12, hail and snow.

16th, in 46° N. 46° W., hurricane-like s.e. storm, and torrent of rain, barometer 28.62.

16th to 18th, in 43° N. 40° W., S.S.W., 10 by W. 11 to N. 10, hurricane squalls with rain, hail and lightning.

23rd, in 44° N. 45° W., s.s.e., force 8.

The following vessel reports indicate the occurrence of storms over the ocean east of the thirtieth meridian, or west of the European coast, during the month:

6th, in 46° N., 28° W., n.w., force 8, squally.

8th, in 50° N., 12° W., s. to n.e., force 8.

9th, in 49° N., 8° W., w., force 11, squally, barometer 28.54.

10th, in 43° N., 26° W., n.w., force 10.

13th, in 47° N., 28° W., w.n.w., force 12, hurricane, hail and rain, lightning all around, high sea.

16th, 48° N., 6° W., w.s.w., force 11, hard squalls, heavy rain, barometer 28.78.

Chart v. exhibits the tracks of barometric depressions which have been traced from the daily international charts for the month of May, 1880, supplemented by vessel reports from the north Atlantic and north Pacific. The data received is charted for each day of the month on the charts accompanying *The International Bulletin* for each day, and from these charts and additional reports, the movements of the centers of barometric minima are traced.

Twenty-five of the principal storm-areas occurring in the northern hemisphere have thus been traced on the daily charts.

Concerning the general distribution of these barometric disturbances, the following is given.

Nine passed over parts of the United States and Canada. Three of these were first observed on the Pacific coast west of Oregon. One approached the stations of observation from the Gulf of Mexico, south of 25th parallel.

The general movement of the storms occurring in North America was to the northeast. Four of these depressions have been traced over the Atlantic, but in only two cases were sufficient vessel-reports received to warrant the tracing of a continuous storm from North America across the Atlantic.

Two regions of barometric disturbance are exhibited over Europe, one extending from east to west from the North sea to northern Russia; the other extending along the north coast of the Mediterranean.

The region of barometric disturbance in eastern Asia extends from the coast of China northeastward to the island of Yesso, the mean track of the low-areas passing to the west of Japan and south of Corea.

The following brief description is given of the storms first appearing within the limits of the Signal Service stations.

I. On the second and third of the month, the barometer was high on the Atlantic coast and a depression was central on the eastern slope of the Rocky mountains. The circulation of the winds in the southern sections of the United States and the gradual fall of the barometer along the coast of the Gulf of Mexico indicated the advance of a disturbance from the south or southwest. On the third, this area apparently moved in an easterly direction over the Gulf of Mexico, passing over Florida, between Punta Rassa and Cedar Keys during the night. On the fourth, the course changed to the northeast and the centre of disturbance passed to the east of, and parallel to, the south Atlantic coast. The morning report of the fifth, showed the centre to be near Cape Hatteras, moving to the northeast, and later re-

ports received from vessels enable us to trace the centre to the southern point of Nova Scotia, where it was central on the sixth as a storm of great energy. The following maximum velocities of wind at stations near the centre of disturbance indicate the severity of this storm: Charleston, n.e., 25 miles; Macon, North Carolina, s.e., 32 miles; Cape Lookout, s.e., 40 miles; Hatteras, s.e., 47 miles; Kittyhawk, n.e., 38 miles; Chincoteague, n.e., 39 miles; Eastport, n., 27 miles. The following marine reports were of service in determining the track. Brig "Sisters" at New York, May 9th, reports heavy s.e. gale on May 4th, lasting ten hours. Ship "Niagara", May 5th, off Hatteras, stove bulwarks, etc., during n.e. gale. Barque "Windermere" at New York, May 7th, from Colombo, January 31st, reports, on May 5th, had revolving hurricane, lasting seven hours. Brig "Edith Hall" at New York, May 10th, from Bahia, reports, May 5th, terrific s.e. gale and tremendous sea. Bark "Elinor" in 37° N., 70° W., May 6th, hurricane from n.e. to s.w., lasting twenty-four hours, during which the vessel lost her top-mast.

A slight depression developed in British America on the fourth and passed southeastward over the Saint Lawrence valley on the fifth, apparently uniting with this storm, when the centre of disturbance was near Yarmouth on the morning of the sixth. The chart of the seventh showed a fall of .55 of an inch in the barometer at Saint John's, and the following report, from the same station, showed a rise of .16 of an inch, with west wind. The following reports from vessels in the north Atlantic are interesting, in connection with the study of this storm: May 5th, lat. 42° 10' N., long. 56° 35' W., s. s. "Crown" s.w. gale with heavy sea for twelve hours. May 7th, lat. 41° 34' N., long. 58° 48' W., s. s. "Baltic," ssw., force 8 to 9, violent gale, high south-westerly sea. In 41° N., 66° W., sw., w. and nw., strong gale, high sea. May 8th, s. s. "Nederland," passed through this storm in lat. 43° N., long. 42° W., barometer 29.86, sw., force 4, high south-southwest sea; on the ninth, the same vessel reports in 41° N., 47° W., barometer 30.19, temperature 46°, a fall of 16°, wind nnw, showing the advance of an area of high pressure to the westward of this storm. The indications are that this storm passed to the eastward over the Atlantic, but the reports are not sufficient to warrant the charting of its continuous course. It disappeared to the east of Nova Scotia on the eighth, followed by a rapid increase of pressure at stations on the Atlantic coast.

II.—This storm approached the Pacific coast from the west on the fourth, where a sudden fall in the barometer was reported from stations in Washington territory and Oregon. The pressure at Roseburg and Portland, being .42 of an inch below the mean pressure for the month. On the fifth, the area moved rapidly to the eastward, crossing the Rocky mountains a little to the north of the boundary line, the pressure ranging from .63 to .65 of an inch below the mean at Forts Stevenson and Buford. On the sixth the course changed to the southeast, and the centre of the depression passed over Iowa, with loss of energy and increasing pressure at the centre. On the sixth, the barometer was 29.41 at Omaha and on the following morning the centre was near Des Moines, after which its course changed to the northeast, the storm passing over Wisconsin, Lake Superior, and thence towards the southern portion of Hudson's Bay. South to southeast gales occurred on Lakes Michigan, Erie and Huron, as the depression passed to the northeast, maximum velocities of wind ranged from thirty to thirty-six miles per hour. Several disasters occurred on the north Pacific coast when this disturbance was central near Portland. This disturbance appeared to the northeast of the coast of Labrador on the 8th, and was followed by a second depression, which extended from British America southward to Texas, this last separating two areas of high barometer, one central in the Saint Lawrence valley and the other over the Pacific coast, west of California.

III.—This developed in the Rocky mountain regions on the eighth and passed over Minnesota and Lake Superior on the

ninth, attended by heavy rains as far south as the Ohio valley. The course changed to the north near Duluth, and on the morning of the tenth the centre was near Moose Factory, where the pressure was 29.58, wind s.w. Gales occurred on the ninth, the storm-centre becoming unusually well-defined, enclosed by an isobar of 29.40 as it passed over this region. After reaching the 56th parallel of latitude, the course changed to the east and then to the southeast, the centre passing over the Gulf of Saint Lawrence on the morning of the twelfth, attended by violent gales in the Canadian maritime provinces. On the thirteenth it was central in lat. 49° N., long. 59° W., where the barometer fell to 29.58, with high n. to n.e. winds; high north winds were also reported on the same date on the Atlantic coast between Halifax and Hatteras; northwest gales were also reported on the 14th in 41° N., 68° W. In 37° 30' N., 56° 00' W. hurricane, very heavy sea; lost topmasts. In 36° N., 68° W., May 15th, ship "Wattikka," severe gale from s.e. In 36° N., 64° W., schooner "Eider," May 15th, severe gale. On the same date, in 30° N., 60° 30' W., schooner "Lewis" 29.85, s.s.w., high; heavy sea and threatening. On the sixteenth, in 50° N., 40° W., "Altmore," s.s.w. gale for twenty-four hours; decks swept. In 56° 23' N., 28° 55' W., s.w. hurricane; tremendous sea. In 40° N., 44° W., "Castelar," s.s.w. hurricane for six hours; in 42° 20' N., 48° 00' W., "Kroenen," severe gale, s.s.w. On the 17th, in 44° N., 45° W., s. s. "Celtic," w., strong gale; in 42° N., 48° W., s. s. "Vaderland," w.s.w., moderate gale, cloudy, high sea. The above reports, considered in connection with the regular simultaneous reports, enable us to trace this depression over the north Atlantic ocean to Iceland, and thence eastward to the northern coast of Norway.

IV.—The barometer fell rapidly at stations on the Pacific coast on the tenth as this depression approached from the west, accompanied by heavy rains as far south as San Francisco, and light rains to San Diego. On the eleventh, when the centre of disturbance was near the coast line, the pressure was .53 of an inch below the mean at Portland. This storm, although severe when first observed, passed rapidly over the Rocky mountains on the thirteenth and fourteenth, losing much of its energy and finally disappearing before reaching the Mississippi valley.

V.—This storm developed in the upper Missouri valley on the sixteenth and passed slowly over Dakota on the seventeenth, the barometer falling to 29.40 at Breckenridge. On the 18th it moved eastward over Lake Superior and continued its easterly course during the nineteenth and twentieth, losing much of its energy and finally disappearing northeast of Quebec.

VI.—This developed in Texas on the twentieth, and moved slowly over Indian Territory and the lower Ohio valley, causing rains in the southern states. On the 21st this storm was central near Cairo, from which point it moved to the north, developing energy as the centre of disturbance passed over Lake Huron. On the morning of the twenty-third the disturbance had reached the southern part of Hudson's Bay, the barometer at Moose Factory reading 29.68, a fall of .42 of an inch in twenty-four hours.

VII.—This was first observed on the Pacific coast on the twenty-third, central west of Victoria. The barometer fell rapidly at stations on the north Pacific coast on that date, as the centre passed rapidly over the coast range and thence eastward to Manitoba, where it was central on the twenty-fourth, the barometer being .62 of an inch below the mean for the month. This depression probably united with VIII, which developed on the eastern slope of the Rocky mountains.

VIII.—This storm was central in Nebraska on the twenty-fourth, where the pressure was .34 of an inch below the normal. On the twenty-sixth, the centre of disturbance had passed eastward over Lake Superior and beyond the stations of observation. Heavy rains occurred in the northern quadrants of this storm, but the most noticeable feature was the high temperature attending the south winds in the

Mississippi and Ohio valleys. This warm wave gradually extended over states east of the Mississippi, causing unusually warm weather for May; rains were light in the southern quadrants of the storm, until the wind shifted to the west and northwest.

IX.—On the 29th, the barometer fell in Texas and the adjoining states, accompanied by light rains northward to Missouri. On the 30th, the storm, thus developed, increased in energy as it advanced to the northeast over Lakes Michigan and Huron. The pressure was .5 of an inch below the mean at stations near the centre of disturbance, and the rain area included that portion of the United States east of the Mississippi. The following maximum wind velocities occurred on the northern lakes: Michigan, 28 miles, n.w.; Ontario, 26 miles, w. On the 31st, this storm moved beyond the limits of the stations of observation. Dangerous, s.e. to s.w., winds occurred on the Atlantic coast, maximum velocities being thirty-six miles s.e. at Chincoteague, Delaware Breakwater, thirty-four miles s. and Wood's Holl, forty miles s.w.

Of the storms occurring on the European coasts the following brief description is given:

X.—On the morning of the fifth the pressure was high over the British Isles, accompanied by high northerly winds, and a second area of high pressure extended over southeastern Russia. This depression apparently passed to the southward from the Arctic ocean during the night of the fifth and was central on the morning of the sixth near Hernosand, where the barometer had fallen .36 of an inch in the past twenty-four hours, the isobar 29.60 enclosing the stations in the northern and central portions of Sweden and Norway, where the winds were light and variable. The pressure increased rapidly in a south-westerly direction and violent northerly gales occurred at stations on the northeast coast of Scotland, in the North sea and in the English channel on the sixth. The morning report of the seventh placed the centre of disturbance near Saint Petersburg with northerly winds prevailing over western Europe, the force of wind being increased by a second depression which was moving to the east over Italy.

During the eighth and ninth this storm moved to the northeast and passed beyond the stations of observation. The area of high barometer which was then south of it, apparently following its general course with increasing pressure.

XI. apparently developed off the coast of Portugal on the fourth, and moved slowly over the Mediterranean on the fifth, sixth, seventh and eighth, inclining to the southward during the seventh, after which the course changed slightly to the north of east, passing over the northern portion of Italy and thence eastward to the region of the Black sea, enclosed by an isobar of 29.60. It was last observed as central near Lemberg, and disappeared over western Asia, probably uniting with an extensive area of low barometer then central in India.

XII. was central southwest of Ireland on the eighth, and moved to the southeastward over the bay of Biscay and southern France, from the ninth to the twelfth; ship "Hypolyta" reported on the eighth in 49° N., 15° W., 8 p. m., strong n.e. gale, force 11, high cross sea; midnight, eighth and ninth, gale moderating. This depression continued its easterly course over Europe until the morning of the fourteenth, when its course changed to the northeast, and during the sixteenth, seventeenth and eighteenth, it passed over central Russia and finally disappeared near longitude 50° E.

XIII. Vessel reports from mid-ocean on the twelfth and thirteenth, indicate the presence of this storm in that locality. U. S. Ship "Saratoga" near the Azores, recorded the following low pressures:

12th, in 39° N., 24° W., 29.43, heavy rain, squally.

13th, in 39° N., 20° W., 29.49, w.s.w., force 7.

On the fourteenth, easterly winds on the northern margin of this storm increased in force. S.S. "Indiana," in 51° N., 15° W., reports s.s.e., force 8, barometer 29.83. On the sixteenth the barometer at Madeira read 29.61. On the seventeenth, bark "Lizzie Wright," in 49° N., 14° W., reports s. gale, last-

ing twenty hours. From the seventeenth to the twentieth this area increased in energy as it passed to the eastward over the north coasts of the Mediterranean, disappearing near the Black sea on the twentieth.

XIV.—This storm probably developed in the Atlantic west of Algeria, and passed northeastward as a slight depression, reaching northern Italy on the eighteenth, where the pressure was 29.69 on the morning of that date; strong northwesterly winds prevailed in the western part of the Mediterranean on the eighteenth, and brisk to high southwest winds were reported on the same date at stations on the south coasts of the Mediterranean. An area of high barometer extended over the British isles and thence eastward to Russia, with northerly winds prevailing in Europe from the coast of France eastward to the low area, which was then central in western Siberia. This area passed to the eastward over Turkey on the nineteenth, and was central in southern Russia on the twentieth, as a slight disturbance, and on the morning of the twenty-first it had moved to the region of the Caspian sea enclosed by an isobar of 29.60. The chart of the following day indicated that a small but well-defined depression was central northeast of the Caspian sea, and reports from that region indicate that this was a continuation of xiv.

XV. and XVI. were low-areas which apparently developed in the North sea on the twentieth and twenty-second, respectively, and each passed to the northeast over the Baltic region and disappeared on the day following.

During the transit of this minor depression, an extensive area of low barometer existed in the Arctic region, north of Europe; the pressure being below 29.40 at northern stations on the twenty-second, below 29.30 on the twenty-third, and below 29.00 on the twenty-fourth, accompanied by violent s.w. gales.

XVII.—This storm was probably central as a severe storm south of Iceland on the twenty-third s. s. "Britannic" in 51° N., 23° W., reported barometer 29.87, wind w., force 7, rain and heavy west northwest swell. Other vessel-reports from this locality indicate the presence of a severe storm to the northeast of or near the coast of Ireland.

On the twenty-fourth, this storm had reached the coast of Norway, enclosed by an isobar of 29.00. The following reports from stations within the influence of this storm, show the gradient in southern portions of the depression: Brono, 28.94; Christiana, 29.13; Copenhagen, 29.60; Hamburg, 29.81. After reaching the continent the course changed to the south of east and so continued during its transit over Europe on the twenty-fifth, 26th and 27th, with rising barometer at the centre of the depression. It was last observed in eastern Russia as an extended area of 29.80.

XVIII. this depression was apparently a secondary disturbance, attending a decided depression which extended over the Arctic regions north of the British Isles, on the twenty-seventh and 28th. The general direction and force of wind on the north coast of Europe indicated the presence of a depression of great energy in the higher latitude, and the chart of the 28th exhibits a low-area to the northeast of Europe, and a well-defined area of high pressure advancing from the Atlantic, thus increasing the gradient and causing high n.w. winds at stations in western and northern Europe. This depression moved to the northeast over northern Russia on the 29th and was followed by the high-area from the Atlantic, which may be traced on the daily charts, from the Azores on the twenty-sixth to northern Europe, where it appeared immediately to the west of this depression.

The following general description of the barometric depressions traced along the coasts of China and Japan during the month of May, 1880, is taken from the "Bulletin Mensuel," published by Mr. Marc Dechreves, of the Zi-Ka-Wei Observatory:

The storm-tracks are so traced as to indicate the approximate location of the centre of each disturbance at the hour corresponding to 7.35 a. m., Washington mean time.

XIX. This depression advanced from the interior of China on the fifth, passing a little to the south of Shanghai and after leaving the coast, curved to the northeast, following the south coast of Japan, and disappeared to the northeast of the island of Nipon, about latitude 40°.

This storm was central over Wuhu, China, at ten a. m. of the fifth, and on the evening of the seventh was north of Nipon, having advanced with an average velocity of thirty-eight miles per hour. This storm was immediately followed by a second depression which moved to the eastward over the ocean, and was felt as far south as Hong-Kong. Light rains are reported in China, and abundant rains in Japan near the centre of disturbance. The barometer fell .5 of an inch at Tomangasima light house (lat. 34° 18' N., long. 135° 0' E.) where the wind blew violently from the west. At Tokio, the rainfall during the sixth and seventh was 3.26 inches.

XX. This depression crossed the Gulf of Pe-Chi-Li on the eighth, moving from west to east, it passed over Corea on the ninth, and over Japan on the tenth and eleventh. Lowest barometer was observed at Tien-siu, at noon of the eighth, and at Tokio at eight p. m. of the tenth. Heavy rains occurred near the coast on the ninth. The storm was severe near the centre of depression, but the disturbance did not extend to the southern stations.

XXI.—This storm moved to the eastward over China from the w.s.w. to e.n.e., passing over Hankow (wind s. to n.e.) at noon of the eleventh. It passed over Wuhu about five p. m. of the eleventh, winds s.e. to w. and n.w. At Zi-Ka-Wei (wind s.s.e. to w.n.w. and n.) from five p. m. to midnight, barometer low and stationary. At one a. m., on the twelfth the storm increased in force and continued with great violence until five a. m., barometer rising rapidly, the wind remained s.s.e. until midnight, when it veered to the s.s.w. and then to the n.e. during the day. At nine p. m. the winds to the north of China and Japan indicated clearly the presence of a cyclonic disturbance in the straits of Corea, which soon disappeared. The lowest barometer was observed at Tokio at five p. m. on the thirteenth, when the centre of disturbance was over the sea of Japan.

XXII.—The storm approached from the southwest of China, passing over Hankow, Wei-hu, Nankin and to the north of Zi-Ka-Wei. The depression was slight and of irregular form, although violent northerly winds were reported from Hankow on the twentieth, light rain occurred at Zi-Ka-Wei on the evening of the twentieth.

The depression reached Japan on the evening of the twentieth. On the twenty-first, about noon, it passed to northwest of the light-house of Tsurisima, and on the twenty-third to the northwest of the light-house of Kinkasan. The lowest barometer at Tokio, 29.71, occurred at 3.30 p. m., on the 22d, with a moderate wind from the s.s.e. Light rains only occurred during the passage of this depression.

XXIII. this depression followed xxii, advancing from channel of Formosa, where it was central on the twentieth, and passing to the northward, it reached the straits of Corea on the twenty-third, and was over the sea of Japan on the twenty-fourth. At Tokao, on the west coast of Formosa, 5.70 inches of rain fell on the twentieth. This storm was central over the island of Yesso on the twenty-fifth.

XXIV.—Violent whirlwinds were reported from the northern provinces of China on the twenty-fifth and twenty-sixth, while this depression was central near Pekin, toward the southwest. The Pekin Gazette gives an interesting detail in its issue of the ninth of July, relative to the hail-storms of the twenty-sixth of May, which were very destructive in the districts of Honau-fau (lat. 34° 30' N., long 112° 30' E.). The reports show that the hail commenced at 4 p. m., and was of only short duration; the crops in several of the cereal districts were cut to pieces and destroyed.

XXV.—This was the most severe storm occurring during the month in the central parts of China. In addition to the regular reports from meteorological stations on the coasts of

China and Japan, a number of marine reports have been received from vessels which encountered this storm after it left the coast. It first appeared as central southwest of Hankow on May twenty-ninth, passing to the south of that city about four p. m. (winds se.-n.) it moved along between Hankow and Wu-hu, passing the latter station at four a. m. on the morning of the thirtieth. At Zi-Ka-Wei the lowest barometer was 29.47 at 2.10 p. m., the wind veering suddenly from s.s.e. to w., reaching a maximum velocity of 29 miles at noon of the thirty-first. The central area was almost circular in form and inclosed by the isobars of 29.37, 29.53, 29.69 and 29.84 on the evening of the thirtieth, and by the isobars of 29.45, 29.61, 29.69 on the evening of the thirty-first. The United States man-of-war "Monocacy," in lat. 34° 4' N., long. 122° 45' E., furnishes the following report: "The wind suddenly increased in force from the southeast, the barometer reading 29.45, and subsequently fell to 29.24, and the wind ranged from 6 to 9 in force, from s.w." The centre of disturbance passed near the southern point of Corea, and then turned to the east, passing over Japan near the 35th parallel, having advanced from Hankow, China, to Yedo, Japan, where it was central on June first, in seventy hours.

OCEAN ICE.

March nineteenth, 1882, in 46° 30' N., 47° 30' W., s. s. "Limosa," passed through heavy field ice, had starboard bow stove.

31st, schooner "Promise" forty-five miles s.w. of Cape Pine, was struck by large ice-floe and sank.

April third, fourth and fifth, s. s. "Averill" passed several large icebergs between 45° 55' N., 45° 50' W., and 43° 49' N., 52° 56' W.

10th, s. s. "Donau" in 46° 05' N., 41° 36' W., passed an iceberg.

12th, s. s. "Alaska" in 43° 13' N., 46° 40' W., passed field ice. On the same date, in 42° 29' N., 55° 37' W., s. s. "Donau," passed three large icebergs.

20th, s. s. "Alhambra," during the passage from Saint John's, Newfoundland to Halifax, Nova Scotia, passed hundreds of icebergs, some being of enormous size.

18th, s. s. "Australia," in 43° 21' N., 48° 07' W., passed several large icebergs and some loose ice.

16th, s. s. "Braunschweig," in 43° 07' N., 46° 24' W., passed two large icebergs.

11th, s. s. "Cornwall," in 46° 19' N., 45° 00' W., encountered ice, which continued for twenty-four hours.

13th, s. s. "Italy," between 43° 02' N., 46° 50' W., and 42° 44' N., 49° 00' W., passed several icebergs.

15th, s. s. "Lydian Monarch," in 43° 25' N., 46° 52' W., passed an iceberg seventy or eighty feet high.

19th and twentieth, s. s. "Nevada," between 45° N., 46° W., and 43° N., 51° W., passed several large icebergs and great quantities of field ice.

5th, s. s. "Denmark," in 43° 23' N., 46° 36' W., passed an iceberg.

9th, s. s. "Donau," in 46° 05' N., 44° 36' W., passed an iceberg.

11th, in 43° N., 48° 40' W., passed three large icebergs.

8th, s. s. "Gloucester," in 40° 51' N., 52° 25' W., passed an iceberg, from one hundred and twenty to one hundred and fifty feet high.

13th, "Salier," in 44° 42' N., 45° 46' W., passed a large number of icebergs and large quantities of field ice.

14th, in 43° 47' N., 52° 20' W., passed a large iceberg.

13th, s. s. "Surrey," in 42° 30' N., 49° 05' W., passed several icebergs.

S. S. "Hermod," reports that on the eighth, in 45° 20' N., 48° 00' W., the vessel was surrounded by ice. During a strong n.e. gale and heavy swell, the ice began to move, crushing heavily against the side of the vessel. It finally stove in the bows, filling the fore compartment with water. Heavy icebergs were seen all round us. Some were apparently thousand feet long, and five to six hundred feet high.

On the 11th, in lat. $44^{\circ} 00' N.$, $49^{\circ} 20' W.$, found open water to the south, while to the n.e. and n.w. we had close ice. These fields of ice seem to end in $44^{\circ} 00' N.$, as south of that, no field ice could be discovered, even from the top gallant yards in clear weather, and a few icebergs only were seen.

28th, s. s. "Arizona," in $42^{\circ} 37' N.$, $49^{\circ} 26' W.$, passed a small iceberg and same day in $42^{\circ} 37' N.$, $50^{\circ} 30' W.$, passed a large iceberg.

18th, s. s. "Brantford City," in $42^{\circ} 57' N.$, $45^{\circ} 52' W.$, passed a small iceberg.

27th, s. s. "Britannic," in $42^{\circ} 42' N.$, $51^{\circ} 55' W.$, passed a small iceberg.

23d, s. s. "Devonia," in $44^{\circ} 06' N.$, $48^{\circ} 41' W.$, passed a large iceberg; same day, in $43^{\circ} 41' N.$, $49^{\circ} 20' W.$, passed another large one.

25th, s. s. "Glamorgan," in $46^{\circ} 20' N.$, $42^{\circ} 30' W.$, passed an iceberg fully five hundred feet high.

25th, s. s. "Kronprinz Friedrich Wilhelm," in $43^{\circ} 51' N.$, $47^{\circ} 59' W.$, passed two large icebergs.

24th, s. s. "Persian Monarch," in $43^{\circ} N.$, $48^{\circ} W.$, passed an iceberg.

S. S. "State of Nebraska," reports, from lat. $44^{\circ} 38' N.$, long. $44^{\circ} 48' W.$, to lat. $42^{\circ} 26' N.$, long. $50^{\circ} 15' W.$, passed several icebergs and a quantity of small ice.

24th, s. s. "Thingvalla," in $43^{\circ} 30' N.$, $47^{\circ} 45' W.$, saw a great many icebergs. S. s. "Valetta," arrived at Saint John's, Newfoundland, from Boston, April twenty-seventh, and reports having met ice one hundred and twenty miles se. of Louisburg, Nova Scotia, and numerous icebergs scattered along the course to Cape Race.

14th, bark "Norge" met ice in $46^{\circ} 30' N.$, $47^{\circ} 10' W.$, and got clear of it in $43^{\circ} N.$, $48^{\circ} W.$, passed a large number of icebergs.

April tenth, bark "Seriah," in $47^{\circ} 30' N.$, $47^{\circ} 00' W.$, encountered heavy ice-fields and was surrounded for five days. Brig "Jersey," at Saint John's, May fourth, reports, got clear of ice in lat. $43^{\circ} N.$

The following interesting notes respecting the opening of navigation in European ice-bound harbors are given:

Soderham, April fourth, navigation open to Ljume.

Elsinore, April seventh, navigation at Ekenaes is declared open.

Travemunde, March seventeenth, the navigation of the Azof up to Taganrog was opened March sixteenth.

Stettin, March seventeenth, the summer marks were laid out off the Kaiserfahrt yesterday.

St. Petersburg, April sixth, large quantities of ice are coming down the river; eleventh, the river and fairway are nearly free of ice.*

Abo, April fifth, navigation is now open for steamers.

Narva, March thirtieth, the river is free of ice. Pernau, April eighth, navigation opened.

Bjorneborg, April fifteenth, harbor nearly free of ice, navigation opened; the ports of Fredricksham, Kotka, Borga and Nystad are open.

Pillau, the navigation at Carlstad re-opened April seventh.

The average date of the opening of the Neva at Saint Petersburg, as given by Woeikof, from data for nearly one hundred and twenty years, is about April twenty-second. It was opened this year ten days earlier than the mean date of opening.

The comparison extended to other ports where the opening of navigation is noticed, would probably show that the past winter has been generally mild in northwestern Europe, and the present spring moderate.

The "Sandusky Register" of April twenty-first, 1882, gives the following:

"A large iceberg which formed at Niagara Falls, has floated out into lake Ontario and is to be seen about one mile and a-half northeast of the harbor. It has been there several days and is attracting much attention, as it is said to be the first iceberg seen in that vicinity for the past twenty-eight years."

TEMPERATURE OF THE AIR.

The distribution of the mean temperature over the United States, for the month of April, 1882, is exhibited on chart ii by the dotted isothermal lines. The table of mean comparative temperatures in the lower left-hand corner of the chart, shows the average temperature for the month in the several districts, as determined from observations taken at the Signal Service stations during the month of April, for previous years; the second column shows the mean temperature for the current month; the third column shows the departures of the mean temperature of the current month from the mean of several years.

The temperature has ranged from one to three degrees above the mean along the Atlantic coast from New York southward to Florida, and from two to three degrees above in the Missouri and Mississippi valleys. In New England it has been slightly above the mean, except at the station on the summit of Mount Washington, where it averaged 4.1 degrees below. On the Pacific coast and at the Rocky mountain stations, the temperature ranges from two to four degrees below the mean, the greatest deviation being in the middle plateau region, where it was 4.7 degrees below the mean. At the station on the summit of Pike's Peak, the mean temperature was .4 of a degree above the mean for the month of April.

DEVIATIONS FROM MEAN TEMPERATURE.

Under this heading departures exhibited by reports from the regular Signal Service stations are shown in the table of comparative temperatures on the left-hand side of chart ii. The following items of importance, in connection with this subject, are reported by voluntary observers:

Connecticut: Southington, mean temperature $43^{\circ}.3$ or about 2° below the average of the past twelve years.

Illinois: Riley, mean temperature $43^{\circ}.7$ or $0^{\circ}.4$ below the average of the past twenty-one years.

Kansas: Wellington, mean temperature $55^{\circ}.6$ or $1^{\circ}.9$ below the average of the past three years. The maximum temperature, 88° , occurred on the twenty-fifth, and is the lowest maximum temperature for the three years; the minimum, 32° , occurring on the sixteenth, is the highest for the same period. Lawrence, mean temperature $58^{\circ}.83$ or $3^{\circ}.02$ above the average April temperature of the fourteen preceding years. During that period the highest April mean, $58^{\circ}.60$, occurred in 1878; the lowest, $48^{\circ}.85$ and $48^{\circ}.77$ occurred in 1873 and 1874, respectively; the highest maximum, 93° , occurred in 1880, and the lowest minimum, 13° , occurred in 1881.

Maine: Gardiner, mean temperature $36^{\circ}.96$ or $4^{\circ}.38$ below the average of the past forty-six years. During that period there were only two Aprils whose mean temperature are lower than that of the current year, viz: $35^{\circ}.88$ in 1854, and $34^{\circ}.97$ in 1874. The maximum temperature for April 1882, 57° , has been exceeded in every year during the above-mentioned period, with the exception of 1874, when the temperature did not rise above 52° . The minimum temperature for April, 1882, 7° , is the lowest April minimum recorded during the last forty-six years, with the exception of April, 1842, when the temperature fell to 5° .

Maryland: Fallston, mean temperature $47^{\circ}.7$ or $2^{\circ}.27$ below the average of the last eleven years. During that period the highest April means, $55^{\circ}.76$ and $55^{\circ}.47$, occurred in 1871 and 1878, respectively; the lowest, 43.91 , occurred in 1874.

Michigan: Thornville, mean temperature $44^{\circ}.1$, which is slightly below the April average.

Missouri: Saint Louis, Missouri weather service reports mean temperature $58^{\circ}.7$ or nearly 3° above the average of the last forty-five years.

New Hampshire.—Contoocookville, mean temperature $41^{\circ}.3$, or $2^{\circ}.5$ below the average of the past eleven years.

New York.—North Volney, mean temperature, $39^{\circ}.24$ or $2^{\circ}.13$ below the average of the past fourteen years. During that period the highest monthly mean, $50^{\circ}.92$ occurred in 1878;