

lowered. At midnight the centre was near Cape Breton, Sydney barometer 28.73, or 1.16 below the normal. Fresh to brisk westerly winds and clear weather then prevailed in New England and the Middle Atlantic States. During the 28th the passage of this area was attended by a series of remarkably severe gales in Nova Scotia, and from that section eastward over the Atlantic and along the Banks of Newfoundland. An immense amount of damage was done to property in Nova Scotia, and the storm was considered the worst for years. At Port Hastings, Cape Jack, Caribou Cove, Port Richmond, Antigonish, and Guysboro, N. S., many houses were destroyed. Probably a hundred vessels suffered more or less injury during the 28th and 29th, and with scarcely an exception they report the gales encountered as most violent. On the morning of the 30th the central area had passed eastward beyond the Canadian maritime stations.

No. IX.—This area appeared in Manitoba on the 28th, and moving southeastward at midnight was central in Minnesota, Pembina barometer, 0.57 below the normal. The barometric pressure of the whole country was below the normal except in the Plateau District and the Northern Pacific Coast region, the Lake region being covered by an abnormal pressure ranging from 0.19 to 0.60 below the normal. It caused this area to move eastward with great rapidity. On the morning of the 29th it was central with diminished pressure north of Lake Michigan, Marquette barometer 0.65 below the normal. Brisk to high westerly winds prevailed in the Upper Lake region, and brisk southerly in the Lower Lake region, with a velocity of .9 miles NW., reported from Milwaukee. Cautionary Signals were then ordered for all stations on the Upper Lakes. The afternoon report showed the central area to be east of Lake Huron. Westerly winds ranging from high to a gale were then reported in the Upper Lake region and Lake Erie, with maximum velocities ranging from 28 at Duluth, Marquette and Sandusky to 40 at Milwaukee and Saugeen. Cautionary Signals were then ordered for Detroit and for all stations on the Lower Lakes. During the day one steamer was wrecked and three schooners driven ashore on Lake Michigan. The storm was reported as being particularly violent over Lakes Michigan and Erie, being the heaviest northeast gale of the season at Cleveland. By midnight of the 29th the centre had reached northern New York, Burlington barometer 0.62 below the normal; the isobar of 30.50 at that time extended through New England, the St. Lawrence valley, and part of Ontario and New York, while the pressure of 0.74 below the normal yet prevailed over Nova Scotia in connection with area No. VIII. The morning report of the 30th showed that the area had moved rapidly northeastward and that it was central in the Lower St. Lawrence valley, Father Point barometer 0.65 below the normal. Brisk to high westerly winds then prevailed in the Lower Lake region, where maximum velocities changing from 26 to 37 miles were reported. Off-shore signals were then displayed on the New Jersey coast, and the Cautionary signals at Eastport and Portland were then changed to Off-shore, while the Off-shore signals from New Haven to Boston displayed in connection with low area No. VIII remained. All signals on the Upper Lakes were then lowered, having been justified by winds ranging from NW. 38 at Marquette, Escanaba and Duluth to W. 40 at Milwaukee. During the afternoon of the 30th the storm was central over the Gulf of St. Lawrence, and Cautionary signals in the Lower Lake region were then lowered, justified by velocities ranging from W. 30 at Rochester to W. 37 at Cleveland. At midnight all Off-shore signals from Eastport southward to Cape May were then lowered, having been fully justified. These signals were lowered somewhat soon as brisk to high northerly winds continued on the Atlantic coast until midnight of the 31st, with maximum velocities ranging from 28 at Cape Lookout and Portland to 33 at Boston and 42 at Cape May.

## INTERNATIONAL METEOROLOGY.

Three International Charts, Nos. IV, V and VI, accompany the present *Review*. No. IV indicates the probable course of low-pressure areas over the North Atlantic Ocean and neighboring waters and continents during the month of September, 1879, and is based upon data received at this office up to October 31st, 1879. Nos. V and VI are charts for the month of March, 1878, and are based upon International Simultaneous Observations, as described in the *Review* for July, 1879, supplemented by such other observations as have been considered specially applicable and trustworthy.

On Chart No. IV the tracks of eight areas of low pressure are traced, which, during a portion of their existence, were located over the North Atlantic Ocean. Areas I, III, IV and VI are prolonged tracks, portions of which have already appeared on Charts I and IV of the *September Review*. No. I was probably central on the morning of September 1st about 60° N., 40° W. On this day southerly winds prevailed over the Atlantic, between 45° and 55° N., veering to SW. and W. westward of 30° W.; strong SW. gales, squally and rainy weather and confused or high westerly seas were reported between 30° to 45° W., and 46° to 53° N. On the 2nd a sudden fall of the barometer occurred over the northern portions of the British Isles and the depression moved eastwardly to the coast of Norway. A "heavy" gale prevailed along the north coast of Ireland and a "violent" gale was experienced in the northeast of Scotland, doing about \$2,000 damage to boats engaged in the herring fisheries; "captains of river steamers arriving at Glasgow reported the weather down the frith of Clyde as fearful." The winds over the Atlantic between 45° and 54° N. changed to SW. eastward of 30° W., and to northerly westward of that meridian. No. II appeared about mid-ocean in 45° N. on the 4th, on which day easterly winds generally prevailed from 10° to 33° W. in about 50° N. with thick weather and rain near centre of depression; on the 5th it had moved northward, followed by rapidly rising and high barometer from the 30th meridian westward, as the "anti-cyclone" or area of high barometer, which had covered the British Isles since the passage of preceding low area, moved slowly away in an easterly direction; on the 6th the barometer fell over the British Isles, with southerly winds and rising tempera-

ture generally, and heavy rains at some of the western ports; on the 7th and 8th it passed in an irregular course centrally over Ireland and Scotland accompanied by southerly to westerly gales and heavy rains, followed over the eastern half of the Atlantic between 45° and 55° N. by northerly squalls and gales, which on the 9th spread eastward over the British Isles. No. III moved eastward north of Newfoundland on the 9th; on the morning of the 10th the weather was still unsettled at St. Johns but cleared during the day with slowly rising pressure. On the 11th the pressure increased rapidly off the coast of Newfoundland with easterly winds at St. Johns, and the area of low barometer was probably transferred to the eastern half of the ocean north of 50° N. On the 11th the barometer fell rapidly, and on the morning of the 12th a very extensive depression covered the British Isles, but with its centre at some distance to the northwest of Scotland; dull, rainy and squally weather prevailed over the British Isles, and on the coast of Norway the wind rose to a southerly gale. No. IV passed northeastward over Labrador on the 18th. No. V appeared as a large depression off the northwest coast of Ireland and Scotland on the 20th, moving toward the northeast; westerly gales were experienced westward to 15° W. No. VII probably formed in the southwest quadrant of area No. V on the 21st; on the 22nd it developed into quite a severe storm, and was encountered off the north of Ireland by steamer Corinthian which reported a severe gale from NE and high seas; and ship Spartan, when three miles northwest of Inishtrahull Light, which vessel reported "cyclone from SW. to SSE., and later from WNW.," lost entire suit of sails. S. S. Cybele, at Quebec, October 3rd from G'asgow, reported loss of captain "who was supposed to have been washed overboard during a violent gale on the morning of the 23rd." On this day (23rd) severe northwest gales and very high confused seas prevailed from 15° to 25° W. and from 46° N. northwards. At 7 a. m. the barometer at Stornoway read 28.37, wind SSW. light. Very heavy gales were experienced during the night of 23rd-24th along the east coast of Northumberland. No. VI moved eastward over Newfoundland on the 25th, followed by cold NW. winds, clear weather and rapidly increasing pressure on the 26th, on which day rainy and squally weather prevailed over the ocean in lat. 50° N., from 45° to 20° W. On the 27th and 28th it passed northeastward north of the British Isles, producing strong southeast to southwest gales on the British and Norwegian coasts; in England heavy rains caused much damage to crops. From the 25th to the end of the month an area of high barometer existed over Newfoundland which probably extended over the western portion of the ocean, but on the 30th an area of quite low pressure appeared over the eastern half, central in the morning probably near 20° W. 55° N., and which after having being preceded by a southerly gale on the east coast of Scotland during the night of the 30th, passed slowly eastward from Oct. 1st to 3rd, with its centre to the north of Scotland, producing westerly winds and heavy rains over the British Isles. *Pacific Ocean.*—During the months of May and June, 1879., areas of quite low pressure were observed along the China coast on the following dates:—May 17th, 23rd and 24th, 29th, June 4th and 5th, 11th to 13th, 17th to 19th and on the 30th. The probable positions of the centre of the area observed from the 17th to the 19th of June are indicated on Chart IV, but in regard to the other areas the data as yet to hand is insufficient to enable us to locate the centers. *Indian Ocean.*—On August 19th, 1879, Ship Dunalister, in 39° 30'S, 50° E, experienced a hurricane which lasted two days, and threw vessel on her beamends, wind WSW veering to SW, and ending S, lowest reading of barometer 29.50. *South Pacific Ocean.*—Ship Edderside at San Francisco, Oct. 1st, 1879 from Sydney, NSW. reports: off the coast of Australia encountered a violent hurricane, commencing at WSW. and ending at ENE., accompanied with very heavy sea, decks constantly filled with water, gale lasted eight hours. At Brisbane, NSW. a terrific hurricane uprooting large trees &c., occurred on the night of June 23rd, 1879.

## TEMPERATURE OF THE AIR.

The isothermal lines upon Chart No. II show the general distribution of the temperature for the month of October, 1879, accompanying which is a table of comparative temperatures. In strong contrast with the month of September, the mean temperature of the present month over the eastern section of the country is decidedly above the average of the past eight years, ranging from 3 to 4 degrees in the Gulf States, 5 to 6.5 degrees in the Atlantic States and from 8 to 9.5 degrees in the Ohio valley, Lake region and Upper Mississippi valley. Westward of the latter the excess rapidly diminishes, being 7 degrees in the Missouri valley, and 3.3 over the middle Eastern Rocky Mountain slope. West of the Rocky Mountains it is below the normal, the deficiency ranging from 1 to 4 degrees. On the summit of Pike's Peak, Col., at an elevation of 14,150 feet, the mean temperature was 26.3, or 4.9 above the mean of the five preceding Octobers, and on the summit of Mt. Washington, at an elevation of 6,285 feet, 29.8, or 5.6 degrees above the mean of the eight preceding Octobers. The following table shows the established mean temperature of the month of October for 40 places, included within the area of high temperature, as accurately as the same can be computed from material at present in the possession of this office, with the number of years covered by the observations from which they are deduced. On comparing these means with those for the present month it is found that only four show an excess of less than 4 degrees, namely, Key West, Mobile, Norfolk and West Point. Those having an excess of 10 degrees or more occur in Ohio, Illinois, Michigan, Iowa and Minnesota. In the sixth column is given the highest maximum October temperature at each place yet published and of which this office possesses a record. On comparing these with the maxima of the present month it is seen that higher temperatures have been recorded at most stations in New England and New York during the present October than ever before, while in the other districts the previous maxima have not been exceeded, excepting at Ft. Brady and Dubuque.