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MONTHLY WEATHER REVIEW,

JANUARY, 1881. vol. IX,

(General Weather Service of the United States.)

"Desk Correspondence Division, Office in Charge Signal Office"

WAR DEPARTMENT,

Office of the Chief Signal Officer,

DIVISION OF

TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

INTRODUCTION.

In preparing this REVIEW the following data, received up to February 20th, have been used, viz: the regular tri-daily weather charts, containing the data of simultaneous observations taken at 136 Signal Service stations and 15 Canadian stations, as telegraphed to this office; 181 monthly journals and 171 monthly means from the former, and 14 monthly means from the latter; reports from 5 Sunset stations; 241 monthly registers from Voluntary Observers; 67 monthly registers from United States Army Post Surgeons; Marine Records; International Simultaneous Observations; monthly reports from Voluntary Observers in, and the local Weather Services of Iowa and Missouri and of the Central Pacific Railway Co.; reliable newspaper extracts; special reports.

BAROMETRIC PRESSURE.

The isobarometric lines in black on chart No. II show the mean pressure for the month of January, 1881. Compared with chart No. II of the preceding REVIEW it will be seen that the area of mean high barometer has advanced east towards the Atlantic coast, at least within the limits of the United States, while the area of mean low barometer remained central in the North Atlantic. This easterly movement has been more in the form of an extension of the high area of last month towards the east, as the centre of greatest pressure remains in the Mississippi valley, where the mean barometer for the month is slightly below that of the preceding month. The most marked change in the mean monthly pressure occurred on the Pacific coast. The area of mean low barometer, central in the North Pacific last month and including Washington Territory and Oregon in the southeastern quadrant with a pressure of 29.88, has been replaced by a mean pressure of 30.08 at Olympia and 30.14 at Portland and a general increase of pressure at all stations on the coast. Compared with the January of last year it will be observed that the distribution of pressure was strikingly different in the two months. The pressure during January, 1880, was greatest on the Atlantic coast, with an area of low pressure near the centre of the continent, and this was accompanied by the highest mean temperature observed for many years at northern stations, while the reverse obtains during the January of 1881, both as regards pressure and temperature.

Departures From Normal Values for the Month.—The pressure has generally averaged from 0.02 to 0.08 inch above the normal, except in the Gulf and South Atlantic States, where it has averaged from 0.02 to 0.05 inch below the mean for many years. The greatest departures are observed on the Pacific coast, being at Olympia, 0.16 inch above. At San Francisco and San Diego the pressure ranged from 0.02 to 0.04 inch above.

Barometric Ranges.—The barometric range during the month increases with the latitude on the Atlantic coast from 0.45 inch at Key West to 1.42 inch at New York. From New York northward the range decreases to 1.01 at Portland, and 1.04 at Eastport. Following the Mississippi

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valley, the range increases from 0.76 at New Orleans to 1.33 at Cairo, and thence northward it decreases to 1.14 at St. Paul; 1.13 at St. Vincent, and 1.05 at Duluth. The range increases with the latitude on the Pacific coast from 0.48 at San Diego, 0.63 at San Francisco, 1.45 at Olympia, and 1.56 at Umatilla. The greatest ranges reported are, 1.58 at North Platte, 1.56 at Fort Buford, 1.45 at Sandusky and 1.49 at Philadelphia. The smallest are, 0.36 at Tucson, 0.45 at Key West, 0.52 at La Mesilla, and 0.60 at Santa Fe.

Areas of High Barometer.—Eight of these areas have passed over the districts east of the Rocky Mountains during the month, and two extended periods of high pressure occurred on the Pacific coast; the first extending from the opening of the month until the storm of the 10th, and the other from the 16th until the 24th. High areas Nos. II, III and V. appear to have formed east of the Rocky Mountains, as a part of the permanent areas above referred to, previous to their advance as separate areas of high pressure. The course of these areas over the northern districts has caused a marked increase in the mean pressure for the month in these districts. Generally they were first observed in the extreme Northwest, or in the Saskatchewan region, and thence moved first to the southeast and then to the east, over latitudes north of the mean latitude of the centres of such areas.

No. I.—This area passed from the Northwest during the preceding month, and was central near Washington, D. C., on the morning of the 1st. The centre of greatest pressure continued near the coast during the remainder of the day, it having moved northward to near Albany, N. Y., by midnight. The depression which was central in the East Gulf on that day, moved rapidly to the northeast, and was followed by a general rise of the barometer in the Southern States on the 2nd. At the a. m. report of the 2nd the centre of greatest pressure had moved southwest to eastern Tennesssee, and during the day it disappeared to the eastward.

No. II. The high pressure on the Pacific coast on the 2nd extended eastward over the stations in the extreme Northwest, where this probably developed as a separate area leaving the barometer about 0.40 above the normal on the North Pacific coast. The pressure increased to 30.55 at Yankton on the 3rd, and the temperature ranged from +20° to —30° in the Northwest. During the 3rd this area moved to the central valleys, and separated the storms traced on Chart No. I, as Nos. II and III, the former being central near New Orleans and the latter near St. Vincent, Minn., on the morning of the 4th. The depression from the south and the cold northerly winds from this area of high pressure resulted in quite a severe "norther" in Texas, which continued during the 4th, with light snow, as far south as Indianola and temperature generally below 20° at interior stations. This area disappeared in the central Mississippi valley as storms Nos. II and III, developed within the limits of the stations.

No. III.—The very low temperature reported in the Northwest Territory and a general rise of barometer in the region between the Mississippi valley and the Rocky Mountains on the 5th, indicated the approach of this area. On the night of the 5th, the temperature fell to —45° at Edmondton, in the Saskatchewan valley, and snow, with cold northerly winds, prevailed on the eastern Rocky Mountain slope, from the northern boundary of the United States southward to Texas. During the 6th, the pressure continued to increase in the Western districts, and colder, clearing weather prevailed in the Northwest, the Southwest and the Mississippi valley, as the centre of greatest pressure moved southward to the central Missouri valley. On the morning of the 7th, the centre had advanced to the Lower Missouri valley and light snows were reported from the Lake region, where the barometer was rising, with a decided fall of temperature in the western portion of this region. Although the pressure had declined in the Upper Missouri valley and Manitoba, the centre of greatest cold remained in the region west of Lake Superior, the minimum temperature on the morning of the 7th, being —33° at Ft. Buford, —32° at St. Vincent, —31° at Ft. Garry and —29° at Prince Arthur's Landing on the north shore of Lake Superior. The pressure increased in the Lake region and in the districts on the Atlantic coast on the 7th, with colder, clearing weather as the area passed to the east, north of the Ohio valley. The a. m. reports of the 8th, showed a rapid increase of pressure in the Middle and New England States, and that this area had apparently divided into at least two areas, one central near Burlington, Vt., and the other central near Breckenridge in the Northwest. At this report, the pressure ranged from 30.40 to 30.60 from the St. Lawrence valley westward to the Pacific coast. The midnight report of this date exhibited three areas of high barometer, one central in New England, one in the Lower Missouri valley, the pressure being 30.75 at Yankton, and one central on the North Pacific coast, where the pressure was 0.40 above the normal for the month. The first area central in New England on the 9th, passed to the northeast over the Maritime Provinces and disappeared to the east, followed by north to east winds and heavy snow in the northeastern portions of the United States on the 10th. The second area, central in the Northwest on the 9th, moved slowly to the southeast, with decreasing pressure at the centre and, during the 11th, extended over the Southern States, attended by clear, cold weather. The temperature being generally below freezing in the western portion of the South Atlantic States on the night of the 11th. The winds shifted to east and south on the South Atlantic coast on the 12th, as the area passed east of the coast stations.

No. IV—followed the storm traced as No. VII on chart No. I and moved rapidly from British Columbia to the Eastern Rocky Mountain slope during the 13th. Unusually cold weather prevailed in Manitoba and Dakota on the morning of the 13th, when Forts Garry and Buford reported minima of —40°. The centre passed to the south of Nebraska during the night of the 14th, causing a severe "norther" on the Texas coast, the wind reaching a velocity of 48 miles from the Southwest and 44 miles from the north at Indianola, when a Cautionary Off-shore Signal was displayed. Had the high southerly winds been anticipated the usual Cautionary Signals would have been ordered in this case. Not only was warning give to the coast stations of the approach of this and other severe storms, but the citizens throughout Texas located on the military telegraph line under the supervision of an officer of this Service received special warnings of the approach, of "northers," and these warnings have proved valuable during the month, especially to the stock interests of the State. Heavy frosts were reported in the Southwest and temperature fell to 29° at Indianola on the 14th. The centre of this area moved east to the Central Mississippi valley, where its course changed to the northeast, and during the succeeding 24 hours it passed to the northeast over the St. Lawrence valley attended by freezing weather on the Atlantic coast as far souch as Atlanta, Ga., and Wilmington, N. C.

No. V.—This area apparently developed south of the Upper Missouri valley and east of the Rocky Mountains on the 15th and 16th, while heavy rains prevailed on the Pacific coast. It advanced slowly over the Northwest, and by midnight on the 16th was central near Yankton, where the barometer read 30.57 and the temperature was —15°. Light snow and cold northerly winds preceded this area as it advanced over the Lake region on the 17th, with increasing pressure at the centre. On the morning of the 18th the isobar of 30.70 included the Middle States, Lower Lake region and a portion of New England, and near the centre of the greatest pressure the temperature was below zero. The pressure continued high on the Atlantic coast during the 19th as the area disappeared to the northeast. During the transit of this area over the northern districts of the United States the barometric changes, although decided, occurred gradually, attended by generally fair weather.

No. VI.—The pressure increased rapidly in the region west of the Mississippi after the severe storm of the 20th and 21st. The reports of the 22nd showed an area of high pressure extending from Manitoba to the Pacific coast, within which the pressure ranged from four to six tenths above the normal for the month. The barometer rose gradually over the districts east of the Mississippi on the 24th and 25th, the centre of greatest pressure passing to the lower Mississippi valley with freezing weather throughout the Southern States. The pressure continued to increase in the Southern districts on the 25th and during the 26th the area was included within the limits of No. VII, which was more marked and central in the Northwest.

No. VII.—This was the most marked area of high pressure of the month; at midnight of the 25th it was central in Wyoming Territory and during the 26th the pressure ranged from 0.20 to 0.50 above the normal over the eastern slope of the Rocky Mountains. A light "norther," without rain, occurred in Texas, but the temperature did not fall decidedly in the Southwest. On the morning of the 28th, the isobar of 30.50 inclosed the Southern States and the Lake region, while the central pressure of 30.70 extended over the Ohio valley and Tennessee. The pressure decreased gradually during the 29th, as this area disappeared to the east immediately in advance of the storm traced as No. VIII on the storm-chart,

No. VIII—extended over British America north of the Lake region on the 31st, attended by very cold weather from the St. Lawrence valley westward to the Saskatchewan region, where the temperature was —30° at the 11 p. m. report of the 30th. This was probably the most extended area of high pressure of the month, but as its centre passed to the Atlantic northeast of the United States only the northeastern districts experienced the severe cold accompanying it.

Areas of Low Barometer.—Nine areas of low barometer appeared within the limits of the stations of the Signal Service, during the month, three of which (Nos. I, III and V) originated south of the 30th parallel of latitude. Three probably originated in the north Pacific and three (Nos. II, IV and IX) were first observed on the eastern slope of the Rocky Mountains. No. IX was preceded by violent storms and heavy rains on the Pacific coast, and reports from mountain stations indicate that a slight depression crossed the Rocky Mountains south of Salt Lake on the 30th.

No. I.—This storm was central in the Eastern Gulf near Punta Rassa on the morning of the 1st, where it apparently developed during the preceding night. The centre of disturbance, although slight, remained near the west coast of Florida until the p. m. report of the 1st and by midnight it had passed to the South Atlantic in a northeast direction attended by severe northeasterly gales on the North Carolina coast. The temperature was below freezing generally at stations in the Gulf and South Atlantic States on the 1st and light snow occurred at Pensacola, Fla. and Mobile, Ala., and very heavy rains prevailed in Florida before the centre of disturbance passed to the Atlantic. Cautionary Signals were displayed at stations on the coast from Pensacola to Sandy Hook, and were generally verified at stations north of Wilmington. The high wind at Hatteras and the general course of the storm indicate that dangerous winds prevailed off the South Atlantic coast

during the display of signals at stations south of Hatteras. This storm passed rapidly to the east of the coast on the night of the 1st with apparent increase of force.

No. II.—This depression probably developed west of the Rocky Mountains, near the northern boundary of the United States, on the last day of the preceding month. On the 1st of January the centre of lowest pressure, although slight, moved rapidly to the east over the parallel of 45°, attended by snow and followed by cold northerly winds in the district west of the Mississippi. The course of the depression changed from east to northeast on the 2nd as it moved rapidly east of the Upper Lake region, causing but a slight disturbance in the northern districts. Light snows were reported in the Lake region, the New England and Middle States and St. Lawrence valley. As this area passed toward the Atlantic, and after the wind shifted to the northwest, the temperature ell to —20° at interior stations in Canada. The winds increased in force as the depression approached the coast, and marine reports show dangerous westerly winds, with hail and snow, off the coast of Newfoundland on the 2nd.

No. III.—This storm developed in the West Gulf during the 2nd, but its centre could not be located on the tri-daily charts until the a. m. reports of the 3rd, when it was south of Galveston. The heavy rain on the west Gulf coast, extending as far east as New Orleans, indicated the northeasterly movement of this storm. Between the p. m. and midnight reports, 1.58 inches of rain fell at Pensacola, 1.33 at Mobile, and 1.67 at New Orleans. The centre moved slowly to the northeast during the 3rd and 4th, passing over New Orleans, where the wind reached a velocity of 34 miles, from the east, while the maximum velocity at Indianola was 36 miles, from the north. The rain extended over the Southern States during the 4th, and snow prevailed in the Ohio valley, Lake region, Middle States and New England, as the centre advanced to the northeast. Northeasterly gales continued on the North Carolina coast during the 5th, but the wind did not reach the high velocities anticipated, owing to the northerly course of the storm after the centre had reached eastern Tennessee. During the night of the 5th, rain or snow fell in all districts east of the Mississippi, the centre of disturbance being near Pittsburg, where the pressure was 29.59. The barometer continued to fall at the centre of the storm, and it passed over the Lower Lake region with increasing violence. On the 6th the wind increased to gales as it passed over the Maritime Provinces. The p. m. report of the 6th indicated that a secondary depression had formed on the New England coast as this depression passed down the St. Lawrence valley, and the marine reports from the *City of Berlin* show ESE. gales in latitude 41° N. and longitude 66° W. on that day. The Cautionary and Off-shore Signals displayed in advance of this storm were verified, except at stations south of Wilmington and east of New Orleans, and at these stations the velocity ranged from 18 to 24 miles per hour.

No. IV.—This storm was central in Manitoba on the morning of the 4th, while the preceding depression was central near New Orleans. These two depressions, central within the limits of the United States on the same day, moved in opposite directions, as shown by the chart. The p. m. report of the 4th showed a well defined depression of 29.50 central in northern Minnesota, with snow and rain extending over Dakota, Nebraska and Montana. The snow extended southward as the central area moved south during the 5th, and by midnight the storm had reached northern Texas, and snow or rain prevailed in all districts, except in the Southwest. This depression disappeared after the midnight report of the 5th, and was followed by a general rise of barometer in the western districts, and a light "norther" in Texas on the 6th, during which the temperature was generally below freezing at stations in the Southwest.

No. V.—The gradual fall of the barometer over the region of the Gulf, and the heavy rains in Florida on the 8th, indicated the devlopement of a low area in that region. High winds were reported from Key West and Cedar Keys on the night of the 7th, resulting from a slight depression, which disappeared during the day, leaving the barometer low over the Gulf, with conditions indicating the speedy development of a severe storm. The centre of disturbance appeared to be in the West Gulf, to the south of Galveston, during the 9th, the wind reaching a velocity of 42 miles from the north at Indianola, and 28 miles from the northeast at Galveston. Heavy rain occurred at stations on the Gulf coast during the day, and by midnight rain or snow was reported from all districts east of the Mississippi. The barometer fell rapidly during the night, and the advance of the high area from the northwest was accompanied by a rapid transfer of the centre of disturbance from near Mobile, Ala., to the Middle Atlantic coast during the eight hours following the midnight report of the 9th. The pressure continued low in the South Atlantic States, with variable winds on the morning of the 10th, but during the day the winds shifted to the north and west, with a decided fall in temperature and increased pressure, and by the morning of the 11th. The centre moved to the northeast over the New England coast, causing violent northeasterly gales and very heavy rains at stations located near the track of the centre of greatest depression. The region of snow extended from Texas northeast to New England, where trains were delayed several hours during the 10th and 11th. Many observers located in the northeastern section of the country reported this as the severest storm of the season. At Bellow's Falls, Vt., nearly three feet of snow reported. The observer at Portsmouth, N. H., reports storm outside of harbor par-

ticularly severe—large fleet of vessels in harbor. Toronto observer reports heavy snow storm throughout Ontario. The British brig *Happy Return* went ashore near Nantucket Beacon—total loss. A violent southeast storm occurred at Provincetown, Mass., causing some damage to shipping on the 10th. Voluntary observers throughout New England report from 12 to 18 inches of snow. Cautionary Signals were displayed in advance of this storm, but they were not generally justified at the stations on the East Gulf and South Atlantic coasts. The Off-Shore signals on the West Gulf coast and the Cautionary Signals north of Cape Hatteras were generally justified, although in some cases the Signal was late.

No. VI.—This depression passed from the Pacific coast to the Atlantic, on or near the parallel of 45°, during the five days commencing on the afternoon of the 10th. At the midnight report of the 10th the barometer had fallen over three-tenths of an inch during the preceding eight hours, in Washington Territory, with 1.40 inches of rain at Olympia and 1.32 inches at Portland in eight hours. The belt of rain gradually extended south over northern and central California and the centre of this depression passed to the east of the coast-line at midnight of the 10th, when the barometer read 0.50 below the normal at Olympia near the centre. As the storm passed to the mountains heavy snows occurred, both on the east and west slope, at all stations on the Northern Division of Military Telegraph Lines, extending from Bismark to Fort Cœur d'Alene. The *Oregonian* of the 15th reports the Santiam river highest for eight years, bridges washed away, trees uprooted and carried into the channel. Several lives lost by heavy land-slides and buildings crushed by snow from the mountains. Unusual snows reported in the Silver City Mountains, Idaho, on the 11th, blockading all roads. At The Dalles an immense quantity of logs, railroad ties and wrecked bridges floating down the Columbia. At Harrisburg the water rose to within six inches of the high water of 1861, the town being flooded and a large number of stock drowned. After passing the mountains the general course of the storm was to the south of east until it had passed the centre of the continent and then the course changed to the northeast, except a slight curve while the centre was over the Upper Lakes. On the morning of the 12th the storm extended over all the districts east of the Rocky Mountains, the barometer at the centre reading 0.60 below the normal for the month over the State of Missouri, and 0.30 below the normal at stations in the Lake region and thence southwestward to Texas. During the 15th the temperature ranged from 39° to 73° above zero in the southern and eastern quadrants of the depression as it passed over the Lake region, while in the western quadrants it ranged from +33° to —20°. The most marked difference being in Texas, where the temperature at Fort Stockton was 73°, while at the same report it was 12° at Fort Elliott. This depression became elongated from the SW. to NE. as it approached the coast closely followed by an area of high barometer. At the centre the pressure increased as the storm passed to the east of New England. Cautionary Signals were displayed in advance of this storm on the Atlantic coast north of Wilmington and at Milwaukee and Grand Haven, and Cautionary Off-shore Signals on the Texas coast in advance of the "norther" which immediately followed. The maximum winds reported are as follows: Eastport, 40 miles per hour NW.; Boston, 42 NW.; Shoreham, 38 NW.; Atlantic City, 48 NW.; Del. Breakwater, 52 W.; Kittyhawk, 56 NE.; Hatteras, 48 N.; Indianola, 48 SW. and 44 N. Warnings were also forwarded to the Canadian Meteorological Service for stations in the Maritime Provinces.

No. VII.—The tri-daily reports of the 12th and 15th indicated the advance of a second area of low barometer from the Pacific coast, and the succeeding reports of that day show that the centre of this depression passed east of the coast from the north Pacific about midnight of the 12th. Heavy rains continued during the 13th and 14th in Washington Territory, Oregon and northern California and snow in Idaho, Montana, Dakota, and Wyoming. As the centre of lowest pressure passed to the southeast from British Columbia to the Lower Missouri valley during the 14th, the barometer fell on the south Pacific coast and thence eastward to the Mississippi valley, and the rain extended south to San Diego. The pressure continued low in the Southwest during the 15th, 16th and 17th as the depression passed slowly to the south from Omaha, accompanied by no marked disturbance until the approach of an area of high barometer from the northwest. A sudden fall of temperature and rapid increase of pressure were followed by a "norther" in Texas at Indianola and Galveston on the night of the 17th, and from this date the course of the low area changed to the northeast. On the 18th and 19th the centre advanced slowly from the West Gulf coast towards New Orleans, accompanied by heavy rains, over 4 inches of rain falling at New Orleans during the night of the 18th. The rain-area extended rapidly and included the Southern States, Ohio valley and southern portion of the Middle States by the a. m. report of the 20th, when the centre of this storm was near Memphis, Tenn. The barometer continued to fall at the centre of the storm and the gradient increased with the progressive movement to the north over the Ohio valley. At midnight of the 20th, the centre was inclosed by an isobar of 29.40, the centre of disturbance being to the west of Cincinnati. At this report, the three stations nearest the centre of the storm reported, as follows: Indianapolis, 29.40, temperature 33°, wind 12 N., rainfall 0.63 inch; Louisville, 29.39, temperature 40°, wind 12 SW., rain-fall 1.18; Cincinnati, 29.38 temperature 41°, wind 4 NE., rain-fall 0.70. At this point the course changed and the a. m. report of the 21st showed a rapid advance

to the east attended by violent NE. and ESE. gales on the Middle and South Atlantic coasts. The gradient increased rapidly in the northeast quadrant on the 21st, as the lowest pressure passed over the Middle States and along the New England coast, causing heavy snow from the Northeast coast westward over the Lake region, and rain changing to snow and sleet from southern New England southwestward to Texas. Cautionary Signals were displayed in advance of this storm at the stations on the Atlantic coast and succeeding reports show it to have been the most severe storm of the month. The wind reached a velocity of 40 miles per hour at New York City and much damage to property was reported in that vicinity, especially to the telegraph lines which were damaged to such an extent as to interrupt communications with other cities. The tri-daily telegraphic reports of this office were missing from the northern districts, and for several days were sent from New York by rail to the first telegraph station south in communiction with Washington. The Boston observer reports a velocity of 44 miles NE., wind violent from 1:30 p. m. to following morning and a sudden gust of 60 miles—communication of all kinds obstructed, the greatest damage occurring to telegraph lines, snow-fall from 12 to 14 inches, losses estimated at $100,000. New York City reports this as the most violent storm of the season. At Ashbury, N. J., the "Mammoth Hotel" in course of construction, demolished by gale which reached a velocity of 80 miles during the afternoon. Many losses occurred on the New Jersey coast. The maximum velocity at Eastport was 40 miles NE.; at Portland, 35 NE.; Wood's Holl, 42 E.; Sandy Hook, 45 NE.; Del. Breakwater, 52 N.; Kittyhawk, 49 SW.; Hatteras, 40 SW. The centre of lowest pressure passed to the east south of Halifax, after leaving the New England coast.

No. VIII.—This depression passed east from the Pacific over Washington Territory on the 28th, causing heavy rains and damaging floods in that region. The rains extended over California on the night of the 28th and continued during the remainder of the month as the severest storm in that region for many years. The unusual rain-fall and damage resulting from floods caused by this storm are noticed under the proper heading. The rains continued on the Pacific coast after the centre of depression had passed to the east of the Rocky Mountains, near the northern boundary of Idaho. The area passed over the Missouri valley and the Lake region during the 29th and 30th with the high average velocity of 47 miles per hour, but the pressure at the centre increased as it approached the Atlantic, and it disappeared as a cyclonic disturbance before reaching the New England coast.

No. IX.—This storm is marked on the chart as first central in northern Texas at midnight of the 30th, but it is probable that it passed from the Pacific coast or that its development was due to the heavy rain in that region on the previous day. The course of the centre after its first appearance was to the northeast until the centre reached the Ohio valley as a well defined storm, accompanied by very heavy rain near the central area, which, at that time, was marked by a small elliptical isobar of 29.80, central near Louisville at the 11 p. m. report of the 31st. The succeeding reports show that the direction of the area changed slightly on the following day, and that it passed off the South Atlantic coast, causing dangerous winds as far north as Boston. Cautionary Signals were ordered in advance of this storm at stations north of Ft. Macon, N. C. The maximum velocities reported were as follows: Macon, 32 N.; Hatteras, 40 N.; Kittyhawk, 52 N.; Cape Henry, 43 NW.; Del. Breakwater, 45 NW.; Cape May, 56 NW.; Wood's Holl, 28 NW.; Shoreham, 36 NE.; Barnegat, 48 W.

INTERNATIONAL METEOROLOGY.

Three International charts accompany the present REVIEW. No. IV is for the month of *December*, 1880. In lieu of charts Nos. V and VI for the month of *May*, 1879, which would have appeared with this issue if the regular order of publication had been adhered to, charts No. V for the months of *January* and *February*, 1877, are presented. The delay in the publication of the May, 1879, number of the "Monatliche Uebersicht der Witterung" of the "Deutsche Seewarte," is the reason for this change, that publication containing much valuable data which, previous to the month of April, 1879, was made use of in computing the mean pressure and wind-direction over the Atlantic ocean. It is therefore deemed advisable (while waiting for the above) to endeavor to complete, as well as possible, the series of charts No. V for the year 1877, by the publication of those for the eight months from January to August, inclusive. In these charts, the barometric pressure over India from January to May, inclusive, will be indicated by isobars, in broken lines, copied from the "Report on the Meteorology of India in 1877," published by the government of that country, the simultaneous observations not commencing until June, 1877.

Chart No. IV, for the month of *December*, 1880, indicates as well as is at present (February 16th, 1881) possible the general course taken by the most prominent storms over North Atlantic during that month. Nos. I, III, IV and V are continuations of low areas Nos. II, VII, XI and XV, respectively, of chart No. I for December. No. II appears to have developed during the 10th and on the morning of the 11th was central between the Bermudas and Newfoundland. These and other storms of less importance will be noticed in detail on the appearance of chart No. VI for this month. The weather over the Atlantic during this period may be characterized as very