TABLE 3.—*Maximum free-air wind velocities (m. p. s.) for different sections of the United States, based on pilot-balloon observations during November 1938*

Section	Surface to 2,500 meters (m. s. l.)					Between 2,500 and 5,000 meters (m. s. l.)					Above 5,000 meters (m. s. l.)				
	Maximum velocity	Direction	Altitude (m), m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m), m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m), m. s. l.	Date	Station
Northeast [1]	45.3	W	1,940	13	Cleveland, Ohio	44.2	W	3,040	13	Cleveland, Ohio	43.2	W	5,800	20	Syracuse, N. Y.
East-Central [2]	55.8	WNW	2,500	14	Washington, D. C.	69.1	WNW	2,620	14	Washington, D. C.	50.0	WSW	8,200	22	Nashville, Tenn.
Southeast [3]	30.5	NNW	1,780	24	Spartanburg, S. C.	44.4	WSW	4,350	26	Atlanta, Ga.	48.8	WSW	6,150	25	Atlanta, Ga.
North-Central [4]	49.1	W	820	14	Detroit, Mich.	47.0	W	2,630	13	Detroit, Mich.	62.0	SW	8,570	3	Fargo, N. Dak.
Central [5]	43.0	SSE	2,080	12	Chicago, Ill.	46.0	SW	5,000	12	Wichita, Kans.	57.6	WSW	9,560	5	Wichita, Kans.
South-Central [6]	38.0	NNW	2,470	24	Ft. Worth, Tex.	48.0	WNW	4,630	7	Abilene, Tex.	55.0	WSW	7,570	13	Oklahoma City, Okla.
Northwest [7]	35.8	W	1,940	15	Havre, Mont.	44.2	N	4,820	18	Medford, Oreg.	57.6	NNW	9,820	5	Medford, Oreg.
West-Central [8]	32.2	WNW	2,480	30	Cheyenne, Wyo.	51.8	WSW	4,320	8	Reno, Nev.	66.0	NNW	6,430	17	Modena, Utah.
Southwest [9]	34.7	NNW	2,110	2	Burbank, Calif.	51.5	W	5,000	1	Las Vegas, Nev.	90.0	WSW	12,020	14	Winslow, Ariz.

[1] Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and northern Ohio.
[2] Delaware, Maryland, Virginia, West Virginia, southern Ohio, Kentucky, eastern Tennessee, and North Carolina.
[3] South Carolina, Georgia, Florida, and Alabama.
[4] Michigan, Wisconsin, Minnesota, North Dakota, and South Dakota.
[5] Indiana, Illinois, Iowa, Nebraska, Kansas, and Missouri.
[6] Mississippi, Arkansas, Louisiana, Oklahoma, Texas (except El Paso), and western Tennessee.
[7] Montana, Idaho, Washington, and Oregon.
[8] Wyoming, Colorado, Utah, northern Nevada, and northern California.
[9] Southern California, southern Nevada, Arizona, New Mexico, and extreme west Texas.

RIVERS AND FLOODS

[River and Flood Division, MERRILL BERNARD in charge]

By BENNETT SWENSON

No floods occurred during November 1938 with the exception of a flood in the Chippewa River from the 6th to the 9th. This flood resulted from heavy rainfall during the first week of November averaging more than 3 inches over the basin. The river crested at Durand, Wis., at 4 p. m. of the 7th with a stage of 13.0 feet, 2 feet above flood stage. The damage caused by this overflow is estimated at about $5,000.

WEATHER ON THE ATLANTIC AND PACIFIC OCEANS

[The Marine Division, I. R. TANNEHILL in charge]

NORTH ATLANTIC OCEAN, NOVEMBER 1938

By H. C. HUNTER

Atmospheric pressure.—Pressure averaged much lower than normal over north-central and northeastern regions, the mean at Reykjavik, Iceland, being 0.4 inch less than the normal. The center of the Icelandic low-pressure area lay to the eastward of the average November location. The southeastern area averaged above normal pressure, with notably high readings constantly from the 12th onward to the end of the month. At the Azores, pressure averaged about normal, low readings from the 3d to the 14th being balanced by higher readings after the latter date.

The western North Atlantic had pressure moderately above normal to northward of latitude 30°, but over the Greater Antilles pressure averaged a little below normal, the first 12 days of the month being marked by readings quite low for the latitude.

The extremes of pressure among dependable vessel reports at hand are 30.71 and 28.40 inches. The higher reading was recorded not far to southwestward of the western Azores during the forenoon of the 28th by the Dutch steamship *Amsterdam*. The low mark was noted on the American steamship *Black Gull*, about 4 p. m. of the 11th, close to 49° N., 37° W.

Table 1 shows that the island station at Reykjavik had pressure slightly lower than the low mark mentioned, the date of occurrence being the 27th. Furthermore, a reading of 28.10 inches, uncorrected, has been reported from the North Sea, not far from Tynemouth, England, noted during the 23d on the British steamship *Lunula*.

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure (sea level) at selected stations for the North Atlantic Ocean and its shores, November 1938*

Station	Average pressure	Departure	Highest	Date	Lowest	Date
	Inches	*Inch*	*Inches*		*Inches*	
Julianehaab, Greenland	29.41	−0.15	30.00	6	28.72	15
Reykjavik, Iceland	29.22	−.40	29.86	9	28.38	27
Lerwick, Shetland Islands	29.38	−.32	30.33	15	28.50	1
Valencia, Ireland	29.66	−.23	30.18	15	28.73	23
Lisbon, Portugal	30.21	+.17	30.45	17	29.77	10
Madeira	30.14	+.13	30.36	29	29.80	8
Horta, Azores	30.15	+.02	30.58	28	29.38	9
Belle Isle, Newfoundland	29.83	+.06	30.36	27	28.90	14
Halifax, Nova Scotia	30.08	+.13	30.62	26	29.26	27
Nantucket	30.12	+.07	30.57	3	29.15	25
Hatteras	30.18	+.07	30.47	29	29.59	24
Bermuda	30.17	+.09	30.36	6	29.98	1
Turks Island	29.95	−.04	30.10	14	29.71	7
Key West	30.01	−.01	30.26	28	29.74	8
New Orleans	30.15	+.05	30.62	28	29.77	18

NOTE.—All data based on a. m. observations only with departures compiled from best available normals related to time of observation, except Hatteras, Key West, Nantucket, and New Orleans, which are 24-hour corrected means.

Cyclones and gales.—November lived up to its reputation for being a stormy month over the North Atlantic. While most of the reports of winds of very great force come from northern waters east of the 50th meridian, yet there are interesting features to be noted of cyclones that occurred near American or West Indian shores.

Elsewhere in this issue is a description of a cyclone of the West Indian region, noted about the 6th to 10th. Save for brief periods over limited areas the winds were not very intense, but two vessels, near the Bahamas, noted force 11. A large proportion of the November LOWS of these waters advance toward the north or east, but during the life of this particular LOW the pressure was notably high around Bermuda, and the movement of the LOW, at first toward the northwest, was later toward the southwest. Chart IX shows the conditions on the 8th, also the track of the LOW.

About this time some whole gales were experienced in mid-Atlantic, but it was on the 11th that winds exceeding whole gale force were first noted there. On that day an intense cyclone was formed near 50° N., 30° W., by the uniting of one LOW, which had moved slowly northward from near the Azores, with another which had come rapidly from Labrador. One vessel noted force 11 when somewhat to northeastward of the Grand Banks. The LOW traveled to Iceland and continued toward the northeast.

A strong cyclone which crossed the southern part of Hudson Bay on the 13th was central 2 days later between Labrador and southern Greenland; intense winds associated with the system were felt so far to southeastward that a vessel near the northeastern edge of the Grand Banks reported force 11 on that day. The LOW already was shifting its course toward the north, so there were practically no later vessel reports of high winds due to it.

Not quite a week later, when a large LOW system covered the waters near Greenland and Iceland, there was rapid development in the southern portion of the area of low pressure, a part of the ocean where vessels ply in considerable numbers. On the evening of the 21st this development had taken form, central near 50° N., 35° W.; and thence there was rapid advance toward the east-northeast. Late on the 22d this cyclone was located not far to the westward of Ireland; on the 23d it was over the North Sea; and the next day it centered over the Scandinavian peninsula. The east-bound *General Gassouin* and the west-bound *Black Heron* met winds of hurricane force between noon and midnight of the 22d, when a few hundred miles to the southwestward of Ireland.

During the final week storm developments of note occurred near the American coast, there being two distinct storms, about 60 hours apart, showing much similarity in their behavoir and their courses. Starting well to southward, these LOWS gained strength with great rapidity and moved at unusually high speed.

The earlier of these storms was central late on the 24th near Hatteras, and the next morning not far from the southern tip of Nova Scotia. Its advance to northeastward carried it to Iceland by the 27th. The third and final instance yet reported of force 12 this month over Atlantic waters was connected with this storm, the American liner *Scanmail* meeting such force late on the forenoon of the 26th, when near 51° N., 44° W.

The other storm was central between Bermuda and Nantucket, but nearer Nantucket, early on the 27th. It likewise traveled northeastward, and was over northern Newfoundland the following day, then turned nearly northward to the vicinity of Cape Farewell.

Fog.—On the whole, fog was even less common than usual during November. Two widely separated 5° squares furnish the greatest number of reports, 7 days each; one is close to southeastern Newfoundland, 45° to 50° N., 50° to 55° W., while the other is near Europe, 45° to 50° N., 10° to 15° W. From the 20th meridian to the shores of Europe and the British Isles, notably in latitudes from 35° to 50°, there was rather more fog than normally occurs in November, the chief periods of occurence being 3d to 6th and 14th to 18th.

The main steamship lanes to northern Europe yield practically no items of fog between meridians 20° and 45° west, and the Grand Banks region had often less than normal, especially south of 45°.

Near Nova Scotia and eastern New England fog was locally somewhat more prevalent than shown by averages of previous Novembers; but to the southwestward of Cape Cod there was scarcely any. Over the Gulf of Mexico and over all the North Atlantic to southward of 35° latitude fog was wholly lacking, so far as reports now at hand indicate.