

TABLE 2.—Precipitation departures, monthly and annual, 1934

District	January	February	March	April	May	June	July	August	September	October	November	December	Sum
New England.....	-0.2	+0.3	-0.2	+0.6	-0.5	+0.3	-1.2	-1.7	+2.1	-0.7	-0.4	-0.4	-2.0
Middle Atlantic.....	-1.0	-1	+7	-4	+6	-3	-3	-5	+5.1	-1.7	+4	-8	+1.7
South Atlantic.....	-1.7	-2	-1	-1	+2.2	0	-1.7	-4	+8	-2	+8	-1.0	-1.6
Florida Peninsula.....	-7	+1.5	-2	+1.5	+4.0	+2.6	+1.2	-2.5	+9	-2.6	-7	-1.1	+3.9
East Gulf.....	-1.1	-4	+2	-9	+7	+2	+5	+9	-1.9	+3.4	+6	-1.9	+3
West Gulf.....	+2.4	-6	+2.1	+5	-2.1	-2.9	-7	-1.2	+1.0	-2.7	+2.3	-2	-2.1
Ohio Valley and Tennessee.....	-1.6	-1.9	-4	-1.7	-2.0	+4	-7	+9	+1.2	-1.4	+1	-1.2	-8.3
Lower Lakes.....	-8	-1.3	0	+2	-2.5	-1.0	-1.2	-8	+5	-1.4	-5	-6	-9.4
Upper Lakes.....	-4	-1.1	-3	-3	-1.8	-8	-1.4	-5	+5	-7	+2.5	-4	-4.7
North Dakota.....	-2	-4	-2	-1.1	-1.8	-4	-1.5	-1.2	-7	0	-5	-2	-8.2
Upper Mississippi Valley.....	-6	-9	-4	-1.6	-3.3	-1.2	+4	-4	+2.7	-2	+3.6	-4	-2.3
Missouri Valley.....	-5	-6	-6	-1.5	-1.9	-1.1	-2.0	-1.0	+1.5	-6	+1.8	-6	-7.1
Northern Slope.....	-5	-3	+1	-3	-1.7	0	-8	-4	+1	-1	-3	-2	-4.4
Middle Slope.....	0	+5	-5	-1.1	-1.1	-1.5	-1.9	-8	+5	-7	+7	-4	-6.3
Southern Slope.....	-4	-4	+1.1	-6	-8	-1.6	-1.6	-1.5	-1.1	-1.2	+3	-5	-8.3
Southern Plateau.....	-3	-2	-4	-2	+3	-2	-6	0	-2	-4	+2	+1	-1.9
Middle Plateau.....	-4	+2	-7	-3	-3	+1	-2	+2	-2	0	+4	0	-1.2
Northern Plateau.....	-5	-6	-1	-6	-1.1	+1	-3	-2	-3	+4	+4	-4	-3.2
North Pacific.....	+5	-3.7	0	-1.1	+3	-9	+2	0	-6	+1.4	+2.2	+6	-1.1
Middle Pacific.....	-3.3	-1.1	-2.3	-1.1	-5	0	0	-1	-4	+3	+1.8	-5	-7.2
South Pacific.....	-1.0	-3	-2.0	-9	-4	+2	0	0	0	+9	+1.4	+1.0	-1.1
United States.....	-6	-6	-2	-5	-7	-4	-7	-5	+5	-4	+8	-4	-3.7

TROPICAL STORMS OF 1934

By G. E. DUNN

Eleven tropical disturbances were reported this year in the Atlantic, Caribbean Sea, and the Gulf of Mexico. While six of these probably reached hurricane intensity, no especially intense hurricane reached the coast of the United States. Two storms either crossed or reached the Texas coast and one crossed the Louisiana coastline, all of which were barely of hurricane intensity. An examination of the storm paths on the following page reveals some unusual tracks. Storms 2 and 5 were especially erratic and no. 3 started as an extratropical storm off the coast of South Carolina.

Monthly frequency of West Indian hurricanes and other tropical storms of the North Atlantic Ocean in 1934

	Hurricane intensity	Doubtful	Not of hurricane intensity	Total
May.....	0	0	1	1
June.....	1	0	0	1
July.....	0	1	0	1
August.....	1	0	1	2
September.....	1	0	1	2
October.....	1	0	2	3
November.....	1	0	0	1
Total.....	5	1	5	11

Synopsis of tropical storms of 1934 (number of storm in table corresponds with number of track on accompanying chart)

Storm	Date	Place where first reported	Coast lines crossed	Maximum wind velocity reported	Lowest barometer reported	Place of dissipation	Intensity	Remarks
1.....	May 27-30.....	Southeastern Gulf of Mexico. ¹	Between Charleston, S. C., and Savannah, Ga.	53-SE., Charleston..	29.17, Savannah.....	Northwestern South Carolina.	Not of hurricane intensity.	Damage \$155,000.
2.....	June 4-23.....	Gulf of Honduras ¹	British Honduras (probably twice) and Louisiana.	Steamship <i>Belfast Maru</i> , 70-SSE.	28.52, Jeanerette, La.	Passed beyond field of observation.	Hurricane.....	(A).
3.....	July 21-25.....	On South Carolina coast. ¹	Between Corpus Christi and Freeport, Tex.	52-S., Corpus Christi.	29.12, Corpus Christi.	Northern Mexico.....	Doubtful, but near hurricane intensity.	(B).
4.....	Aug. 20-22.....	East of Dominica ¹	None.....	.....	.....	South of Santo Domingo.	Very minor.....	.....
5.....	Aug. 26-Sept. 1.....	Middle Gulf ¹	Mexico, north of Tampico.	Steamships <i>Clare</i> and <i>Simon von Utrecht</i> , hurricane.	29.34, steamship <i>Simon von Utrecht</i> .	Mexico.....	Barely hurricane intensity short period.	(C).
6.....	Sept. 5-9.....	Eastern Bahamas ¹	Touched Cape Hatteras and passed over Long Island Sound.	Hurricane force from many ships.	28.56, steamship <i>Albert Watts</i> .	Northern New England.	Hurricane.....	.....
7.....	Sept. 15-21.....	Short distance east of Windward Islands. ¹	None.....	50 NE., steamship <i>Selene</i>.	.....	Off Middle Atlantic coast.	Not of hurricane intensity.	.....
8.....	Oct. 1.....	Latitude 23:40, longitude 42:20. ²	None.....	Steamship <i>Selene</i> , Hurricane.	29.06, steamship <i>Selene</i> .	North Atlantic.....	Hurricane.....	Recurved east of longitude 50.
9.....	Oct. 3-5.....	Southeastern Gulf of Mexico. ¹	Near Pensacola, Fla.	33-S., Pensacola.....	29.65, steamship <i>Del Sud</i> .	Northwestern Florida.	Minor.....	Record rain, Pensacola.
10.....	Oct. 19-23.....	South of Jamaica ¹	Eastern Cuba.....	.....	.....	Near Bermuda.....	Very minor.....	.....
11.....	Nov. 21-28.....	North of Leeward Islands.	None.....	Steamship <i>Milacca</i> , hurricane.	28.20, steamship <i>Milacca</i> .	Haiti.....	Hurricane.....	.....

¹ Approximate place of origin.
² Well developed when first appeared in field of observation.

(A) More complete report M. W. R., 62:202-203. June 1934.
 (B) More complete report M. W. R., 62:251. July 1934.
 (C) More complete report M. W. R., 62:344. September 1934.

THE TROPICAL DISTURBANCE OF JUNE 5-23

By G. E. DUNN

[Weather Bureau, Washington, Aug. 6, 1934]

The early history of this storm remains rather obscure. Disturbed conditions were noted in the Gulf of Honduras on the 4th and, as the depression had deepened and some movement was apparent, advices were issued the morning of the 5th, the day it crossed the coastline of British Honduras near Belize, where a maximum wind of 34 miles from the northwest was recorded. During that afternoon and night it apparently turned to the southwestward or south. On the morning of the 6th Tapachula, on the coast of Mexico, near the Guatemalan border, reported a barometer reading of 29.6 inches and a 24-hour fall of 0.18 inches. On June 7 the following message was received from the Pan American Airways station at San Salvador, Salvador:

A severe storm struck this place early this morning with torrential rain and winds in excess of 50 miles per hour. Present wind south 30 miles per hour. Considerable damage reported due to heavy rain.

Press reports indicate that between 1,000 and 3,000 persons were killed or injured in Honduras, perhaps due to floods in the majority of cases. The town of Oco-tepeque in western Honduras suffered greatly, with more

than 500 people killed. Only the church remained standing after the flood. The rainfall, according to some reports, was in excess of 25 inches at a number of places. Great destruction and suffering occurred in both Salvador and Honduras.

Because of the extreme paucity of reports from this area considerable conjecture is necessary, but the disturbance may have moved southwestward or southward from British Honduras to the Guatemalan or Salvadorean coast, intensified along their Pacific coasts, and recurved inland again over Salvador, crossed Honduras and passed northward into the Gulf of Honduras where it was definitely located on the 8th. During its passage over this Gulf it apparently regained hurricane intensity once more and then passed inland over the extreme northern portion of British Honduras in the late afternoon of the 8th. On the 9th it crossed the Yucatan peninsula and moved into the Gulf of Mexico. The Mexican Meteorological Service reported that winds of hurricane force occurred over a portion of the peninsula.

During the next 2 days this disturbance continued to move northwestward, but on the 12th made a complete

loop in the southwestern Gulf of Mexico and then began to move slowly north-northeastward. On the afternoon of the 15th the first vessel report from the vicinity of the center was received, the S.S. *Belfast Maru*, about 240 miles south of the Louisiana coast, reporting a wind velocity of 70 miles from the south-southeast and a barometer reading of 28.76 inches. The following warning was immediately issued:

Hoist northeast storm warnings 4 p.m. Pensacola, Fla., to Morgan City, La. Tropical disturbance central 1 p.m. about 26° N. and 96° 40 minutes W. moving slowly north-northeastward attended by shifting gales and probably by winds of hurricane force near center. Caution advised vessels in path. Present indications are that center will reach eastern Louisiana coastline Saturday afternoon or night.

Hurricane warnings were ordered the next morning between Grand Isle and Vermilion Bay, La. As the storm approached the Louisiana coast, its rate of movement increased and Dr. I. M. Cline, of the Weather Bureau at New Orleans, reports that between Jeanerette

and Baton Rouge, La., it traveled about 27 miles per hour—an unusually rapid rate. It crossed the coastline a short distance west of Morgan City, which reported a barometer reading of 28.9 inches and a wind velocity of 68 miles from the southeast at 2 p.m. The center passed over Jeanerette, Iberia Parish, where a calm and a barometer reading of 28.58 inches occurred from 2 p.m. to 2:45 p.m. The center passed slightly to the west of Baton Rouge about 4:10 p.m. with a barometer reading there of 28.8 inches. Six persons in Louisiana were killed and damage to property amounted to about \$2,605,000.

The storm, slowly decreasing in intensity, moved northeastward during the next few days, giving needed rainfall to the North and Middle Atlantic States, and passed over central Maryland on the 19th. A maximum wind velocity of 50 miles per hour was recorded at Atlantic City, N.J. It passed beyond the field of observation over northern Greenland on the 23d.

THE TROPICAL CYCLONE OF JUNE 16, 1934, IN LOUISIANA

By ISAAC MONROE CLINE

[Weather Bureau office, New Orleans, La., July 20, 1934]

The tropical cyclone of June 16, 1934, was attended by some features of special interest as it traveled north-northeastward over southeastern Louisiana. It moved into a barometric depression which covered the Gulf States, and in which the sea level barometer readings over Louisiana and Texas on the morning of the 16th were generally below 29.70 inches. The lowest reading at 8 a.m., 29.40 inches, was at Morgan City, La., At Del Rio, Tex., the barometer was 29.58 inches, only 0.18 of an inch higher than at Morgan City. The depression extended well westward into Mexico and over the southern Rocky Mountain region. The cyclone was of small diameter but destructive winds attended it to the right of the line along which the center traveled. It was of such small diameter and traveled with such speed that a destructive storm tide was not developed. A storm tide of 2 feet to 3 feet was built up with its passage on the coast between Grand Isle and Vermilion Bay. It moved in on the Louisiana coast with its center over Vermilion Bay in the forenoon of the 16th and traveled thence north-northeastward with the center passing over Jeanerette, Iberia Parish, where Rev. J. B. Gedbout reported a calm and the barometer 28.58 inches from 2 p.m. to 2:45 p.m. At Houma, La., the anemometer of the United States Department of Agriculture Experiment Station shows that the highest 5-minute velocity was 22 miles per hour, at 8:05 a.m. This was probably about the time that the front of the storm was moving in over Vermilion Bay. Morgan City reported the barometer 28.90 inches and the wind velocity 68 miles per hour from the southeast at 2 p.m., after which the pressure rose and the wind diminished. The center of the disturbance passed near but to the westward of Baton Rouge about 4:10 p.m. when the barometer read 28.795 inches. The air-line distance from Jeanerette to Baton Rouge is about 55 miles, which shows that the cyclone was traveling about 27 miles per hour. This is an unusually rapid rate of travel for these storms. At New Roads, to the left of the line followed by this disturbance, the barometer read 28.90 inches about 5 p.m. This place is 22 miles farther north than Baton Rouge.

Well in front, and for some distance to the right, of the path of the center of the cyclone the wind came in irregular, sudden, powerful gusts with a much greater and more destructive force than velocities recorded by anemometers indicated. These local squalls made their appearance several hours before there was any important fall in the barometer, and were the most destructive agents attending the cyclone.

Mr. A. B. Learned, of Natchez, Miss., reports that on the 16th before noon there was a severe local windstorm at Ferriday, La., 10 miles west of Natchez, which blew down some houses and unroofed others. The storm did not reach Natchez until some 10 or 12 hours later, with the lowest barometer 29.12 inches, between 10 p.m. and 11 p.m. of the 16th.

In New Orleans these gusts or local squalls appeared early in the forenoon of the 16th, and blew down substantial trees in different parts of the city. The highest wind velocity for a 5-minute period at the Weather Bureau office in New Orleans was 24 miles from the southeast at 2:53 p.m. At the Shushan Airport the velocity was 35 miles from the southeast at noon and 35 miles from the south-southeast at 2 p.m. The wind

velocity was as great at Baton Rouge as at Morgan City. The cyclone did not diminish in intensity until after it passed Baton Rouge, where the highest velocity was 66 miles per hour, 2:40 to 2:50 p.m., reported by Prof. Fred B. Kniffen, of the School of Geology of the Louisiana State University. He says the wind was from the northeast from 6 a.m. till noon, east from noon till 2:40 p.m., then southeast till 4:30 p.m., and south with varying easterly and westerly components until 5:40 p.m. and after 5:40 p.m. from the southwest.

The warnings received in connection with this disturbance were given a thorough distribution. The order to hoist northeast storm warnings over the threatened area was received at New Orleans at 3:06 p.m. June 15. Besides other distribution it was given at once to the

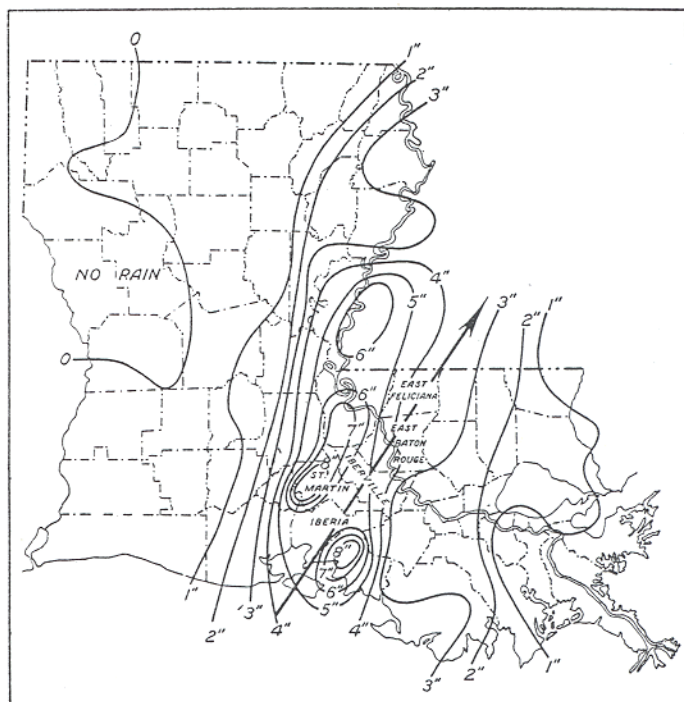


FIGURE 1.—Rainfall map of Louisiana for June 16, 1934. The arrow line shows the path of the tropical cyclone.

Houma-Terrebonne Chamber of Commerce and to the producing department of the Texas Co., Houma, La., for distribution by motor boat and special messenger (without expense to the Government) to fishing, shrimp, and oil-producing interests operating in the bays and bayous between Grand Isle and Atchafalaya Bay. The order to hoist hurricane warnings at 10:00 a.m., Grand Isle to Vermilion Bay, was given the widest possible distribution, by telephone, telegraph, and radiophone. The people of Grand Isle had been instructed to listen in for radiophone broadcasts at frequent intervals when a disturbance was approaching the Gulf Coast. The radiophone broadcasts made by WSMB, WDSU, and WWL were very effective throughout the entire region threatened with dangerous winds and high tides. At Grand Isle, which has neither telegraph nor telephone, the warnings were received by radiophone promptly and frequently. The radiophone managers were informed that the people had been told to look to them, and they gave commendable service. The

special observations, tide reports, etc., received at New Orleans were given to the radiophone stations and this information was broadcast. In this way the public was kept well informed concerning the storm, its intensity and progress.

Six persons in Louisiana lost their lives during the storm. Near the coast two small children were drowned by being washed from a raft on which their father was taking them from a shrimp platform. One man was

habitable, and between 3,000 and 7,000 were damaged more or less (Times-Picayune, June 20, 1934). A survey made by the Weather Bureau indicates that the total loss damage to buildings in Louisiana amounted to about \$1,000,000.

Damage to shrimp-drying platforms on the coast, \$75,000.

Damage to oil derricks on the coast, \$30,000.

Damage to all kinds of crops, including pecans, is estimated at \$1,500,000. Mr. C. W. Moore, marine surveyor, board of underwriters, says:

On the morning of June 16, 1934, about 9:10 o'clock as no doubt you may recall, when you handed me your latest storm bulletin, I immediately returned to my office and telephoned our marine companies the information which you had given me. I also phoned to several of the towboat owners in the New Orleans harbor giving them your latest storm warning. I then called up my son, G. F. Moore, treasurer of the Dalton Co., Baton Rouge, La., and read your storm bulletin to him.

Last week my son informed me that after he had gotten the storm warning through me, he at once ordered all valuable window displays in the Dalton Co. store removed to safety and had the windows reinforced.

Your storm bulletin, which I had phoned him fully 5 hours in advance of the storm, gave them ample time to protect their valuable dress goods and other merchandise. It was then, he said, that they fully appreciated the splendid service rendered by the Weather Bureau office of New Orleans, as their loss was found to be nil.

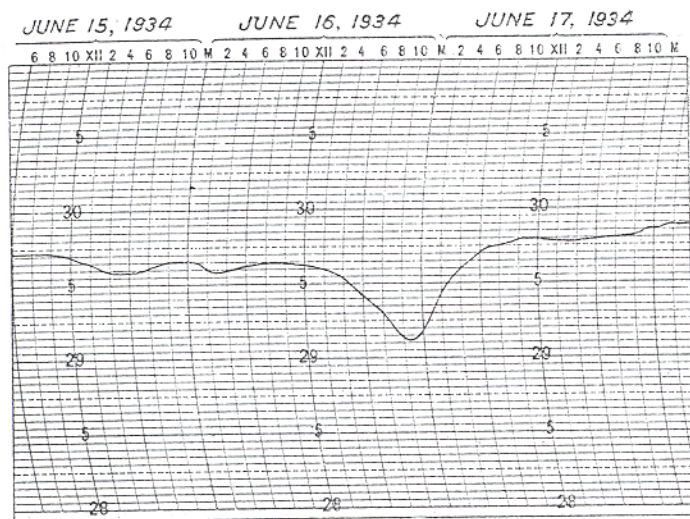


FIGURE 2.—Barogram for June 11-17 at Natchez, Miss.

killed by an automobile in the blinding rain near New Iberia, La. Another man was electrocuted by a fallen power wire near Bunkie, La. A man was drowned in attempting to swim Bayou Plaquemine. A colored man was killed near Baton Rouge, La.

Red Cross officials estimated that 75 to 150 houses were totally destroyed, 1,500 others were rendered unin-

TROPICAL DISTURBANCE OF JULY 21-25, 1934

By C. L. MITCHELL

This disturbance was unprecedented, so far as is known, in that it was of extra-tropical origin, but moved southwestward into the Gulf of Mexico and assumed all of the characteristics of a disturbance of tropical origin. Its extreme southern position was 5° south of its place of formation. The nearest recorded approach to a development and movement of this character was that of October 1913, when a secondary disturbance that formed southeast of Nantucket, Mass., moved steadily southward and southwestward for several days and then westward, and passed inland on the South Carolina coast north of Charleston with all the characteristics of a tropical disturbance of moderate intensity.

On July 20 a disturbance of wide extent was advancing slowly eastward, with center over eastern Quebec and with slowly falling pressure southwestward to the Carolinas. The winds aloft, which had been westerly, changed to northerly as far south as Florida. By the morning of the 21st a further slight decrease in pressure along the South Carolina coast, together with a slight rise over Virginia and North Carolina, resulted in a wind shift line that extended from about 75 miles east of Cape Hatteras southwestward to Charleston. However, there was no material change in air mass as shown by airplane flights made at Washington, Norfolk, and Montgomery. The barometer at Wilmington and Savannah read 29.92 inches, and at Charleston 29.90 inches, so that a slight secondary disturbance was shown on the map at that place. As a rule, such minor disturbances quickly disappear, or else move off to the east or northeast; but with the upper air moving from the north and north-northeast over the South Atlantic States, this one was carried south-southwestward to the vicinity of Jacksonville by the evening of the 22d. At this time the wind at 8,000 feet elevation was 54 miles per hour from the east-northeast, and at Tampa 12 miles per hour from the

northwest. This was the first evidence of the deepening of the disturbance, inasmuch as there was little pressure gradient at the surface.

During the night of the 22d-23d the disturbance crossed the Florida peninsula and entered the Gulf of Mexico. For nearly 48 hours it moved steadily in a west-southwesterly direction with slowly increasing intensity. It was then (8 p.m. July 24) centered about 200 miles southeast of Galveston and was apparently still moving west-southwestward. However, a corrected report received later from M.S. *Sharon* in lat. $26^{\circ}8' N.$, long. $93^{\circ}6' W.$, (the only vessel near or west of the center) indicated that the direction of movement had, since the 1 p.m. vessel reports, changed to west, so that the center the following morning was about 60 miles farther north than was indicated from the 8 p.m. reports of the 24th. The center moved inland a short distance north of Rockport, Tex., about noon of the 25th. The lowest barometer reading reported was 29.12 inches at Corpus Christi, and the highest official wind velocity, 52 miles per hour from the south, at the same place. However, higher velocities were undoubtedly experienced between Corpus Christi and Freeport.

The first advisory warning was issued at 9 p.m. of the 23d. Storm warnings were ordered displayed from Brownsville to Port O'Connor at 9:30 p.m. of the 24th, and hurricane warnings north of Corpus Christi and south of Galveston at 9:30 a.m. of the 25th. Storm warnings were ordered at Galveston at the same time.

The total monetary loss from this storm has been variously estimated at \$1,000,000 to \$2,000,000. Three lives were lost on or near the coast (1 at Texas City and 2 at Freeport), while 8 persons were killed in tornadoes that occurred at Morales and Wink, Tex., in the right front quadrant of the storm.

THE TROPICAL DISTURBANCE OF AUGUST 26-31, 1934

By W. R. STEVENS

[Weather Bureau, Washington, October 1934]

Disturbed conditions were first observed in connection with this storm on the morning of August 26, when two vessels in the north-central Gulf of Mexico reported squalls, and the wind velocity at Port Eads, La., was 28 m. p. h. from the east. During the night of August 25, 5.50 inches of rain fell at Port Eads. By the night of the 26th there had been an increase in wind velocity and a decrease in pressure, with a movement of the disturbed condition toward the west-northwest. However, no definite center had developed at this time; but storm warnings were issued for the Texas coast between Port Arthur and Port O'Connor. By the morning of the 27th a definite center had developed and was located about 50 miles east of Galveston, the lowest reported pressure being 29.46 inches, and the highest wind velocity 70 m. p. h. (estimated). A maximum wind velocity of 30 m. p. h. from the east-northeast was recorded at Port Arthur during the night of August 26. Storm warnings were changed to hurricane warnings from Port Arthur to Galveston at 8:30 a. m. E. S. T. on August 27, and hurricane warnings were issued west of Galveston to Freeport at 2:45 p. m. Caution was also advised against possibility of dangerous gales west of Freeport to Matagorda. It was apparent at this time that the disturbance was turn-

ing more to the west or west-southwest. After the 27th, the storm moved south-southwestward, and crossed the Mexican coast a short distance north of Tampico during the night of August 31. Such a course of a tropical disturbance along the Texas coast is unprecedented.

The lowest pressure reported at any coastal station was 29.62 inches at Galveston on the 27th. Approximately the same pressure was recorded by independent observers at Freeport during the early morning of the 28th.

The highest wind velocities recorded at coastal stations during the storm were as follows: Port Arthur, 34 m. p. h.; Galveston, 42 m. p. h.; and Freeport, 50-60 m. p. h. (estimated).

The lowest pressure and highest wind velocity were reported by the steamship *Simon von Utrecht* on the afternoon of August 28, when the vessel was about 75 miles south-southwest of Galveston: Pressure, 29.34 inches; wind velocity, 80 m. p. h. (estimated).

There was no serious damage along the Texas coast. After receipt of the storm warnings on August 26, beaches and low sections were evacuated, and precautions taken against property damage in the danger zone indicated in the warnings. No loss of life was reported on the coast or at sea.

Tropical storms.—Mention has been made of the tropical storm which was near the Bahama Islands on the 6th. This was apparently of minor importance till it had moved north of the Tropic of Cancer. Also the less important storm in about the same region a few days earlier has been mentioned; but this probably did not even start south of the Tropic. About the middle of the month a depression was noted to be moving northwestward, passing close to the Virgin Islands, but it seems never to have reached marked strength, and by the 21st, between the Bahamas and Bermuda, it ceased to be identifiable. One radio report indicated force 9 on the 17th, in connection with this storm, but no mail report of more than force 7 has come to hand. Other than these, North Atlantic waters south of latitude 30° seem to have had no storm of any consequence during September.

WEATHER OF THE ATLANTIC AND PACIFIC OCEANS

[The Marine Division, W. F. McDONALD in charge]

NORTH ATLANTIC OCEAN

By H. C. HUNTER

Atmospheric pressure.—The pressure during October 1934 averaged somewhat greater than normal over the eastern portion of the North Atlantic Ocean to southward of the vicinity of Ireland, but decidedly below normal in the regions adjacent to Scotland and Iceland. The western half of the ocean had pressure lower than normal nearly everywhere save to southward of the 25th parallel of latitude. The pressure at Bermuda was comparatively low for a while just before the middle of the month, and again from the 20th to the 28th. Farther eastward the semipermanent anticyclone was well developed except at times during the final 10-day period.

The highest pressure reported by a vessel was 30.71 inches, by the *American Importer*, about latitude 50° N., longitude 29° W., during the forenoon of the 16th. The lowest reading was 28.49 inches, about 10 p. m. of the 21st, by the British steamship *Caledonia*, near 55° N., 14° W.

TABLE 1.—Averages, departures, and extremes of atmospheric pressure (sea level) at selected stations for the North Atlantic Ocean and its shores, October 1934.

Stations	Average pressure	Departure	Highest	Date	Lowest	Date
	Inches	Inch	Inches		Inches	
Julianehaab, Greenland....	29.72	-----	30.16	30	29.14	9
Reykjavik, Iceland.....	29.57	-0.11	30.51	15, 30	28.79	7
Lerwick, Shetland Islands.....	29.52	-.27	30.18	16	28.87	28
Valencia, Ireland.....	29.97	+0.06	30.52	16	28.89	4
Lisbon, Portugal.....	30.13	+0.11	30.39	6	29.94	23
Madeira.....	30.03	+0.04	30.22	5, 6	29.64	31
Horta, Azores.....	30.17	+0.06	30.40	17	29.46	24
Belle Isle, Newfoundland.....	29.84	-.03	30.28	24	28.94	8
Halifax, Nova Scotia.....	29.93	-.11	30.54	5	29.34	27, 28
Nantucket.....	29.96	-.09	30.47	5	29.42	26
Hatteras.....	30.04	-.02	30.32	17	29.65	27
Bermuda.....	29.98	-.09	30.18	29, 30	29.62	13, 24
Turks Island.....	29.95	.00	30.07	7	29.85	23, 24
Key West.....	29.96	+0.02	30.19	30	29.78	13
New Orleans.....	30.03	.00	30.32	28	29.76	5

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.

Extra-tropical cyclones and gales.—An unusually large number of reports of gales encountered outside tropical waters have come to hand, but in only two instances was the force of the wind greater than Beaufort 10. The earlier case was late on the 1st, when the Norwegian motorship *Slemmestad*, bound from Copenhagen to Montreal, was about 300 miles northeast of the Straits of Belle Isle, and met force 12 from the west-southwest. A well-developed low was moving northeastward from Labrador to southern Greenland, but so far to the northwest that vessels along the chief steamship lanes were but little affected.

Four days later a well-marked storm was centered about midway between Labrador and the Shetland Islands (see chart VIII). Strong gales and low pressure readings were noted by many vessels in mid-Atlantic waters near or to northward of the fiftieth parallel. The center of this storm advanced to northeastward on the 6th and crossed Iceland the following day.

For almost a fortnight after the 6th no important gales were encountered in North Atlantic waters. On the 20th,

however, a low had attained considerable strength to southeastward of New England and it increased in energy during the following days as it traveled eastward close to the chief steamship lanes. The second instance of force over 10 was connected with this storm; the American steamship *Syros*, from Galveston for Havre, noted storm wind (force 11) when near 49° N., 18° W. on the 24th. Shortly before it reached the British Isles, this low turned sharply to northward and on the 26th merged with another disturbance near Iceland.

On the forenoon of the 26th a cyclone that was, as yet, of comparatively small importance was centered near New York City, whence it moved first eastward with much increase of energy, then northward and later even to west of northward till near the northeastern corner of Hudson Bay. This storm caused widespread gales on the 26th and 27th in the area included between the coasts and lines drawn from Bermuda to Hatteras and to eastern Newfoundland. The situation on the 27th appears on chart IX. Several vessels close to Nova Scotia recorded pressures below 29 inches on that date.

Tropical storms.—Three interesting storms were noted within or comparatively close to tropical waters during the first week; none, however, seems to have attained great importance and in each of two cases only one vessel has furnished a report, so that small size and brief existence are probable.

The Dutch motorship *Selene*, about midnight of the 1st-2d, encountered a whole gale from the north, when near 29° N., 42° W. A period of calm ensued for about 50 minutes, the pressure being as low as 29.06 inches, then a southerly whole gale came, followed by lessening wind and rapid rise of barometer.

On the forenoon of the 2d pressure was moderately below normal at the Yucatan Channel; and a storm center traveled thence slowly northwestward into the Gulf of Mexico and later turned northeastward. The situation on the 5th appears on chart VIII. During the following night the center reached the coast line near Pensacola, Fla. No report concerning this storm shows great energy or marked damage, but several vessels encountered gales of forces 8 to 10.

About mid-day of the 7th, the French steamship *Eliane L. D.*, bound from Cape Verde Islands to Buenos Aires, encountered a vigorous but brief storm, with marked shift of wind, when in 9° N., 28° W. The lowest pressure noted was only 29.82 inches.

WEATHER OF THE ATLANTIC AND PACIFIC OCEANS, NOVEMBER 1934

[The Marine Division, W. E. HURD acting in charge]

NORTH ATLANTIC OCEAN

By H. C. HUNTER

Atmospheric pressure.—The pressure averaged distinctly above the normal over northern portions, notably near the British Isles and in the region of the Canadian Maritime Provinces. Nearer the tropics the pressure averaged below normal, especially round the Azores. In this section the last 8 days of the month were marked by unusually low readings. Turks Island also had low pressure at this time, whereas high pressure was then prevailing near Portugal and Ireland.

The highest pressure reported from a vessel was 30.85 inches, by the British motorship *Cheyenne*, about latitude 46° N., longitude 57° W., during the forenoon of the 27th. On that and the preceding day readings about as high or slightly higher were noted at land stations in the Maritime Provinces. The lowest reading of the month was 28.34 inches, reported by the American steamship *Steelmaker* at an early hour of the 17th, when near 53° N., 45° W., in the area of a well-marked storm moving toward the tip of Greenland.

TABLE 1.—Averages, departures, and extremes of atmospheric pressure (sea level) at selected stations for the North Atlantic Ocean and its shores, November 1934

Station	Average pressure	Departure	Highest	Date	Lowest	Date
	Inches	Inch	Inches		Inches	
Julianehaab, Greenland.....	29.66		30.28	28	28.35	17
Reykjavik, Iceland.....	29.70	+0.08	30.43	4	29.08	24
Lerwick, Shetland Islands.....	29.91	+ .21	30.36	29	29.44	13
Valencia, Ireland.....	30.08	+ .19	30.54	27	29.26	9
Lisbon, Portugal.....	30.04	-.00	30.42	26	29.58	15
Madeira.....	30.00	-.01	30.20	13	29.79	1
Horta, Azores.....	30.03	-.10	30.44	12	29.30	27
Belle Isle, Newfoundland.....	29.98	+ .10	30.64	27	29.40	17
Halifax, Nova Scotia.....	30.14	+ .19	30.86	27	29.34	7
Nantucket.....	30.13	+ .08	30.69	26	29.33	6
Hatteras.....	30.13	+ .02	30.40	16	29.70	7
Bermuda.....	30.07	-.01	30.36	30	29.42	25
Turks Island.....	29.93	-.06	30.04	5	29.66	28
Key West.....	30.03	+ .01	30.23	16	29.85	29
New Orleans.....	30.10	-.00	30.40	12	29.66	21

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.—During the first few days of the month a storm of considerable strength for the portion of the ocean it covered was located between the Azores and the vicinity of Gibraltar. After several days of slow and irregular movement it turned northeastward over the Bay of Biscay and France on the 4th to 6th.

There were several reports of strong or whole gales near the chief steamship lanes during the first fortnight of the

month, particularly over the eastern half from the 8th to 12th.

A storm of moderate energy was noted between Hatteras and Bermuda on the 14th; it gained force rapidly, moving first toward the northeast, but near the fifty-fifth meridian turning its course toward the north-northeast, and reaching the neighborhood of Cape Farewell on the 17th. This storm showed marked strength during the 16th and the early hours of the 17th; two steamers noted readings below 28.50 inches, and a third, the *Brachholm*, reported wind force of 12 from the west. (See charts VIII to X.)

Two storms during the final 11 days of November followed courses so unusual as to be of marked interest. On the evening of the 20th a storm of moderate strength was indicated as central near 25° N., 60° W., whence it advanced northwestward for 3 days, with somewhat increased energy, till about midway between Turks Island and Bermuda. There it turned north-northeastward and on the 25th was central close to, but south of, Bermuda. Thereafter it moved slowly toward the south-southwest, with lessening strength, and was still perceptible on the 29th a short distance southwest of Haiti. No report of any force greater than strong gale (9) has been received in connection with this storm, which was felt most forcefully in the general vicinity of Bermuda.

By the evening of the 21st a low of considerable energy was clearly defined near 46° N., 40° W., or a short distance to eastward of the Grand Banks. The slow eastward progress of this storm had changed by the 23d to a southeastward movement, and on the 25th the center was near Horta. On the following day it was slightly to southward of the western Azores. Then the movement became northwestward, and on the 28th the storm center was near 41° N., 39° W. A more normal northeastward course was then taken, and at the end of the month the storm was slightly south of the fiftieth parallel and close to the thirtieth meridian. There were intense winds in connection with this storm, especially on the 23d, when the Belgian steamship *Emanuel Nobel* met force 12 north of the Azores, and from the 27th to 29th, when the Italian liner *Conte di Savoia* and the American liner *President Johnson* noted force 12 and several other vessels force 11.