

NORTH ATLANTIC TROPICAL DISTURBANCES OF 1937

By WILLIS E. HURD

[Weather Bureau, Washington, January 1938]

The hurricane season of 1937 was of comparatively short duration. The first tropical disturbance originated on July 29 and the last of definite tropical origin disintegrated over land on October 4. There were nine tropical disturbances in all over the North Atlantic, including the Gulf of Mexico. The final occurrence of the season was the only one on waters of the Caribbean Sea and that over only its extreme northwestern part. The year 1936 was also deficient as to occurrences in the Caribbean.

As in 1936, with 17 disturbances, of which less than 30 percent attained hurricane intensity, the percentage of those of like force, 2 in number, in 1937, was only 22. Thus for 2 consecutive years the percentage of disturbances of full hurricane force was much below the normal of about 50 percent for the past 51 years. The two hurricanes of the year occurred in September. Of the nine disturbances charted, seven occurred wholly or partly in September. Four were charted in the Gulf of Mexico;

and the tracks of three, two of which were hurricanes, lay almost entirely in Atlantic waters. Five of the disturbances dissipated over land, one at sea south of Nova Scotia, and three continued toward upper waters of the Atlantic or into the Arctic Ocean.

The only disturbance of the year to cause any considerable amount of damage was that of August 24-September 2 (track III in the chart). The damage occurred partly as the result of wind and rain in northern Florida on August 30, but was largely due to the heavy rains of the disturbance with accompanying floods over southern Alabama on August 31-September 1. A disturbance was in progress in the Gulf of Mexico from November 23 to 26, but it was apparently of extratropical origin. This disturbance was discussed in the November issue of the REVIEW.

A synopsis of some of the more important features of the nine disturbances of 1937 is given in the table herewith. Their tracks, numbered I to IX chronologically, are shown in the accompanying chart.

North Atlantic tropical disturbances of 1937

[Synopsis of tropical disturbances of 1937 (number of storm in table corresponds to 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
I.....	July 29-Aug. 2.	Off west coast of Florida.	Florida, Nova Scotia.	60 miles, S.W. S. S. <i>Munizite</i> . Force 10, S. S. <i>Clare</i> .	29.44, S. S. <i>Clare</i>	St. Lawrence Valley.	Not of hurricane force.	Small damage to fruit and roads in Florida (A).
II.....	Aug. 2-8.....	Near 24° N., 76° W.	None.....	Force 10, on 3 vessels.	29.67, S. S. <i>American Trader</i> .	Near Sable Island.do.....	No damage reported (B).
III.....	Aug. 24-Sept. 2.	Northeast of Leeward Islands.	Florida.....	Force 10, S. S. <i>Solana</i> .	29.38, Coast Guard, Daytona Beach, Fla.	Arkansas.....do.....	Some damage due to wind, rain, and floods (B).
IV.....	Sept. 9-14 ¹	Near 18° N., 55° W.	Nova Scotia, Maine.	Force 10, S. S. <i>Winnamac</i> and S. S. <i>Darcolla</i> .	29.30, on 3 vessels.....	St. Lawrence Valley.do.....	(C).
V.....	Sept. 14-19 ²	Northeast of Leeward Islands.	None.....	Force 12, several vessels.	28.20, on M. S. <i>California Express</i> .	North Atlantic.....	Hurricane.....	(C).
VI.....	Sept. 16-21.....	Gulf of Campeche.....	Florida.....	Force 10, S. S. <i>Oliier Olson</i> .	29.64, Port Eads, La.	Florida.....	Not of hurricane force.	(C).
VII.....	Sept. 20-26.....	Near 15° N., 44° W.	Nova Scotia, Newfoundland.	Force 12, S. S. <i>Nordenham</i> .	28.94.....	Arctic Ocean.....	Hurricane.....	(C).
VIII.....	Sept. 26-30.....	Near north coast of Cuba.	Newfoundland.....	Force 8, S. S. <i>Gulflhawk</i> .	29.83.....	North Atlantic.....	Not of hurricane force.	(C).
IX.....	Sept. 30-Oct. 4 ³	South of Yucatan Channel.	Louisiana.....	Force 8, S. S. <i>Gulflprince</i> .	29.62.....	Arkansas.....do.....	(C).

Complete reports of these disturbances may be found in the MONTHLY WEATHER REVIEW: (A) July 1937; 65: 281, 282. (B) August 1937; 65: 303, 304. (C) September 1937; 65: 332-335.

¹ Disturbed conditions were reported in the vicinity as early as the 6th, but no evidences until the 9th of a storm center.

² On Sept. 10 the S. S. *Chincha*, near 19½° N., 40° W., reported a fresh to strong east-southeast gale and signs of a tropical cyclone.

³ This disturbance was associated with a second low on Oct. 1. The 2 apparently merged on Oct. 2.

SMALL TROPICAL DISTURBANCE OF LATE JULY, 1937

By WILLIS E. HURD

July 29-August 2.—During July 29 radio reports from the eastern part of the Gulf of Mexico, off the Florida coast, indicated the existence of a minor tropical disturbance with gentle cyclonic circulation and slight barometric depression. A special report, however, later received by mail from the American steamer *Mariana*, going from Tampa toward New Orleans, showed that some storm development had occurred during the morning of the 29th. The ship reported a southeast gale of force 8, barometer 29.86, at 6:30 a. m., E. S. T., in latitude 27°41' N., longitude 83°18' W.; and at 8:30 a. m., a southwest wind of force 7, barometer 29.82, in 27°46' N., 83°37' W. At 9 a. m. the wind had changed to northwest, force 5, with lowest barometer, 29.80.

As the disturbance moved toward the coast, an estimated wind velocity of 40 to 45 miles an hour occurred at Egmont Key, at the entrance to Tampa Bay, at about 3 p. m., barometer 29.85. At that time the American steamship *Mundixie*, about 30 miles northwest of Egmont Key, as later reported by telephone, encountered a 60-mile gale from the southwest, barometer 29.62. The observed wind shifts on the vessel were from east through southeast and south to southwest. All evidence at hand shows that the strong winds of the disturbance on this day occupied only a very small area.

The disturbance crossed the west Florida coast north of Tampa late in the afternoon, moving northeastward. At Tampa the lowest barometer, 29.80, occurred at 6:25 p. m., and the maximum 5-minute wind velocity, 51 miles per hour from the southeast, at 6:34 p. m. At this station wind velocities exceeding 30 miles per hour lasted from 5 to 7 p. m. The heaviest rainfall, 8.88 inches in 24 hours, was reported at Clearwater.

In crossing Florida, according to Gordon E. Dunn, forecaster on duty at the Weather Bureau office at Jacksonville, "the storm speedily lost intensity in wind and rainfall and passed into the Atlantic near Daytona Beach about 4 a. m. (of the 30th) attended by about a 20-mile wind and very little rain." At 7 a. m., E. S. T., of the 30th the disturbance, then of mild force, was centered near 30° N. 80½° W. No gales were reported during the day, but at 1 a. m. (local time) of the 31st, the northbound Honduran

steamship *Tela*, in 33°10' N., 78°08' W., encountered a northeast gale of force 9, lowest barometer 29.75. Two hours later the wind at ship had diminished to force 6 from the northwest.

Between 6 and 7 a. m. (local time) the American steamer *Clare*, southbound, near 34°20' N., 76°35' to 76°40' W., ran into northwest gales of force 9—extreme force 10. At 8:30 a. m. the ship, with little change in position, was evidently in the center of the cyclone, with lowest barometer 29.44, wind southeast, force 2.

At 7:30 a. m., E. S. T., the storm was centered a short distance southwest of Hatteras, continuing northeastward at a speed of about 20 miles an hour, which was almost two times its progressive rate on the 30th. During the forenoon its center passed very close to Hatteras, where the maximum wind velocity, from the northwest, was at the rate of 65 miles an hour, lowest barometer 29.53.

At 2 p. m., local time, of the 31st, the American steamer *Coppename*, Castilla to Boston, reported the lowest barometer, 29.40, observed in connection with the storm. This was in the approximate position 36°08' N. 74°06' W. The ship experienced heaviest wind at 4:30 p. m. with a gale from northwest, force 9, accompanied by squalls of greater intensity. The highest recorded wind force reported by any ship was 11, north-northwest, encountered on board the Dutch steamship *Medea*, at 3 p. m. (local time), lowest barometer 29.58, in 36°48' N. 73°54' W. The next highest, force 10, north-northeast, was experienced by the French steamer *Capitaine Paul Lemerle*, at local noon, in 36° N., 75° W., barometer 29.92 (uncorrected).

Other vessels that reported gale winds in the vicinity on the 31st were the American steamer *Peten*, northwest 9, lowest barometer 29.79, in 35°08' N., 75°12' W., at noon; the American motorship *Gulfpride*, north 8, lowest barometer 29.82, near 36° N., 75° W., at noon; the American steamship *Santa Lucia*, northwest 8, lowest barometer 29.56, in 36°30' N. 73°42' W., at 2 p. m.; the American steamer *Turrialba*, southwest 8-9, lowest barometer 29.64, near 38° N. 71° W., at 7 p. m.; and the British motorship *Wellfield*, southwest 9, barometer unrecorded, near 38° N. 68° W. The *Turrialba* and the *Wellfield* met diminishing gales which continued until 1 a. m. of August 1.

Thereafter, with abating intensity, the disturbance moved toward Nova Scotia, the coast of which it crossed late on August 1, and dissipated over the lower St. Lawrence Valley during the night of August 2-3.

The report of the forecaster, Mr. Dunn, at Jacksonville, said that, "except for some road washing at Clearwater and a slight fruit loss in Pinellas County, no damage resulted from the storm" in the Florida district.

As early as the character of the disturbance off the Florida west coast became known, storm warnings were issued at 5:30 p. m. of July 29 for the coast from Palmetto to Tarpon Springs. Thereafter, through the 31st, advisories or warnings were issued for the coast as far northward as the Virginia Capes.

TROPICAL DISTURBANCES ON THE NORTH ATLANTIC OCEAN, AUGUST 1937

By WILLIS E. HURD

[Weather Bureau, Washington, D. C., September 1937]

Two tropical disturbances originated on the North Atlantic in August 1937. Like the first tropical cyclone of the 1937 season, that of July 29–August 2, an account of which was published in the July issue of the REVIEW, neither of these was of hurricane intensity so far as present ships' reports indicate. The first of these disturbances showed signs of forming on the day that the July–August cyclone disappeared over the St. Lawrence Valley.

Cyclone of August 2–8, 1937.—At the 8 p. m. (E. S. T.) observation of August 2 evidence pointed to the existence of a slightly disturbed condition central near 24° N., 76° W. There was squally weather in the locality of the northern Bahamas on the morning of the 3d, accompanied by a weak cyclonic circulation, and a slight depression of the barometer central east-northeast of Nassau. By 3 p. m. (E. S. T.) of the 3d the circulation had strengthened and the depression had enlarged, with northward movement. The center was then near 26½° N., 76½° W.

During the 4th the slow northward movement of the low continued, with the center approximately 250 miles off the northeast Florida coast. Its intensity increased only slightly during the day, but the winds, though generally light, continued squally, with local winds of force 6, the highest reported.

On the morning of the 5th the low with center 175 miles east of the South Carolina coast, had contracted somewhat in size, but with little or no increase in general intensity. In the afternoon, however, the American steamer *Andrea F. Luckenbach*, northbound near 34½° N., 74° W., encountered an east gale of force 8. The ship's lowest barometer, at 8 p. m., was only 29.81. The cyclonic center at that time was near 33° N., 75½° W.

During the 6th the disturbance, although continuing to be shallow, increased in wind energy, and at 2:30 a. m.—exact location within the disturbed area unknown—the American steamer *Bienville* experienced a southeast gale of force 10. The storm was centered at 8 a. m. (E. S. T.) of the 6th approximately 100 miles east of Hatteras, moving northeastward. At 8 p. m. it had reached a point about 200 miles east of the Virginia Capes, covering a small area as a closed circulation, but strengthening the winds for a considerable distance in the direction of the high-pressure area adjoining it to the eastward. At the evening observation the American ketch *Atlantis*, near 37½° N., 71° W., reported a southeast gale of force 9, increasing at 9:30 p. m. (local) to force 10.

On the morning of the 7th the center lay southeast of Nantucket, with no winds higher than force 7 reported at the regular observing hour. A special report from the Norwegian steamer *Harboe Jensen*, at 11 a. m., gave a southeast gale of force 10, barometer 29.71, at 40°12' N., 67°54' W. Shortly thereafter the wind on ship diminished and shifted to west-northwest. The lowest reported barometer in connection with this disturbance was 29.67, read on the American steamer *American Trader*, wind south-southwest, force 9, at 11:30 p. m. of the 7th, at 41°10' N., 65°50' W.

During the 8th the disturbance lost energy while passing to the east-northeastward south of Nova Scotia and had practically dissipated near Sable Island before the regular

morning observation of the 9th. Its entire course was spent at sea.

As early as the 3d, the Weather Bureau forecast center at Jacksonville, Fla., issued an advisory warning of the disturbance, and further advisories regarding its energy, location, and movement, were issued up to 9:30 a. m. of the 4th. At 10 p. m. of the 5th, when the cyclone was nearly due south of Hatteras, northwest storm warnings were ordered from Washington for the coast between Cape Hatteras and the Virginia Capes, and caution advised for small vessels in the vicinity.

Cyclone of August 24–September 2, 1937.—In a report received on August 23 at the forecast center at San Juan, P. R., from Fort-de-France, Martinique, transmittal was made of a ship report indicating a disturbed area south of 18° N., in longitude 51° W. On the strength of this information, San Juan issued an advisory warning for the benefit of vessels east of the Leeward Islands. At 11 p. m. of this date the Dutch S. S. *Baarn* had an east-northeast wind of force 7, barometer 30.06, in 19°48' N., 58°36' W. This wind appeared to denote an intensified trade, but Lesser Antillean land reports indicated a mildly disturbed area east of the Leeward Islands.

On the 24th a depressed area, not yet established as an inclosed low, appeared northeast of the Leeward Islands in the morning and north of them at the evening observation, thus indicating it to have a west-northwest bearing.

During the 25th and 26th the disturbed condition, still showing immature circulation and lack of strong winds, continued to advance toward the west-northwest, and by 8 p. m. of the 26th was north of Turks Island. At 8 p. m. of the 27th it was over the eastern Bahamas, attended by winds no stronger than light to moderate squalls. During the 28th the weather continued squally as on the preceding day, though the disturbed area had widened over a region central near, but slightly north of Nassau, and with little evidence of cyclonic circulation to be observed. At a distance of nearly 200 miles to the eastward of the center, near 25½° N., 74° W., the American steamer *C. A. Canfield* reported a south-southeast wind of force 7, barometer 29.88, at 4 p. m., and near that time a maximum force of 8 from the south. Slightly to the northward, at 7 p. m., the American steamer *Colombia* reported a southeast gale, also of force 8.

On the 29th the disturbance, moving northwestward, was central at 8 p. m. off the middle east coast of Florida attended by increasingly squally weather and a slight fall in barometer. The American motorship *Maitagalpa*, in 28°30' N., 78°40' W., reported an east-southeast gale of force 9, barometer 29.69, during a squall that was apparently of short duration. At about 10 p. m. a southeast gale of force 10—the heaviest reported by a ship in connection with the disturbance—was encountered by the American steamer *Solana*, barometer 29.75, in 28°36' N., 78°38' W. This ship, southbound, had heavy weather with strong to whole gales from 5 p. m. of the 29th until 2:30 a. m. of the 30th, after which the weather rapidly moderated.

At 7:30 a. m. (E. S. T.) of August 30 the center of the disturbance then turning more toward the west was near the extreme northeastern Florida coast. At that time,

near 29° to 30° N., 78° to 80° W., ships were reporting southeast winds of force 6 to 8. The highest wind reported by a vessel in east coast waters during the morning was of force 9 from the southeast, at 4.30 a. m., in 30° N., 80°15' W., barometer 29.79.

The following description of the history of the storm as it affected the coast and mainland of Florida, is quoted from the report of Mr. Grady Norton, forecaster on duty at Jacksonville:

The center of the storm passed inland on the east Florida coast moving in a northwesterly direction about 9 a. m. to 10 a. m. on August 30 in the vicinity of Ormond Beach, attended by gales of 50 to 60 miles per hour over a stretch of the coast extending roughly from New Smyrna to St. Augustine. The lowest pressure reported was 29.38 inches, by the Coast Guard at the northern end of Daytona Beach, though this location was probably not in the exact center and may not represent the lowest experienced.

No lives were lost on this stretch of coast, but considerable minor property damage occurred to communication lines and electric wires, and also to some buildings and other flimsy structures. A good many trees were blown down on wires and across highways, causing temporary delays in traffic.

Timely and accurate warnings doubtless resulted in considerable saving of property throughout the affected area. Small craft had been secured in safe places and low islands evacuated well in advance of the storm.

This storm was very small in diameter but rather intense for its

size, and was remarkably persistent after passing inland. Although it gradually lost intensity, it caused some damage to power lines at Lake City, Fla., more than 100 miles from where it entered land from the Atlantic, and heavy rains and squalls persisted on through the northwestern counties of Florida causing considerable damage by flooding and washing out of roads and bridges. A maximum wind velocity of 28 miles per hour was reported from Apalachicola just after the passage of the center some distance to the north of that place.

The S. S. *Tarpon* sank off Panama City, Fla., with loss of possibly 15 lives. Press reports indicate that heavy squalls attending the disturbance may have been the cause, but this had not been definitely established. * * * The disturbance preserved its identity on northwestward through Alabama, Mississippi, and Arkansas.

As the storm went inland, exceptionally high tides were reported northward along the upper Florida and the Georgia coasts. In Alabama, on September 1, heavy rains over the southern part of the State caused damage to crop and other property estimated in press reports as amounting to possibly millions of dollars.

The disturbance was well covered by advisories issued at San Juan on August 23 to 25, and later by those issued at Jacksonville. Northeast storm warnings were ordered at 7.30 p. m. (E. S. T.) of the 29th northward from Vero Beach to St. Augustine, Fla., and at 3 a. m. of the 30th, from St. Augustine to Savannah.

TROPICAL DISTURBANCES ON THE NORTH ATLANTIC OCEAN AND GULF OF MEXICO SEPTEMBER 1937

By WILLIS E. HURD

[Weather Bureau, November 1937]

Five disturbances of tropical origin were charted in North Atlantic waters (including the Gulf of Mexico) during September 1937. A sixth disturbance may be mentioned in connection with those of September, as it originated on the 30th. Two of the six were confined almost entirely to the Gulf of Mexico, and were of only minor intensity. Of the remaining four, one, of moderate energy, passed up the east coast of the United States and entered the open ocean beyond Newfoundland; the other three, two of which developed known hurricane intensity, originated to the eastward of the Leeward Islands and moved generally to the northward. Two of them entered the continent at Nova Scotia, while one, with a northeasterly inclination, entered high latitudes wholly away from land.

The tracks of all these disturbances are shown in the accompanying figure, numbered I to VI, chronologically.

Disturbance of September 9-14, 1937.—(Track I.) As early as September 6 disturbed conditions existed in the vicinity of 14° N., 44° W., but it was not until the 9th that a more positive development was reported. At 4 a. m. of that date a radio message was received from the French motorship *Fort Royal*, in latitude $18^{\circ}40'$ N., longitude $55^{\circ}06'$ W., reported a barometer of 29.71 falling rapidly, with gusty east winds, heavy rain, and very heavy seas. Four hours later, with the ship near 19° N., 55° W., the wind had changed to south, force 7 while the barometer had fallen to 29.65. At regular p. m. observation of the 9th a southeast gale of force 9, barometer 29.80, was reported by another ship in $20^{\circ}12'$ N., $53^{\circ}54'$ W.

At 10 a. m. of the 10th, in latitude $21^{\circ}30'$ N., longitude $57^{\circ}12'$ W., the British steamer *Winamac* had a barometer reading of 29.39 inches, with a north-northeast gale of

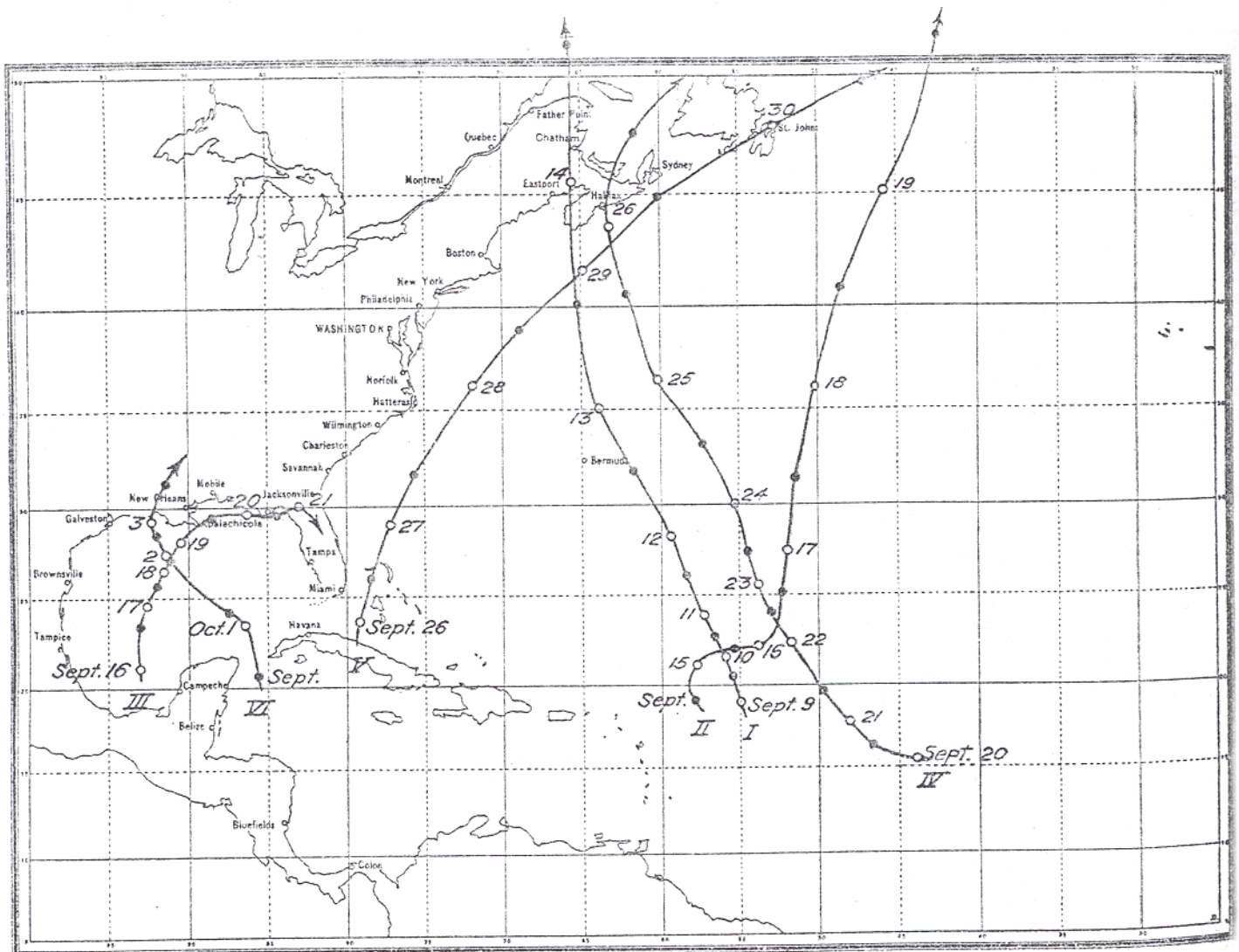


FIGURE 1.—Approximate tracks of tropical disturbances, September 1937.

force 10. At local noon the wind had changed to south-southwest, force 9, with rising barometer. At 6 p. m., of the 10th the Dutch steamer *Telamon*, in 24°21' N., 57°16' W., had an east-southeast gale of force 8, barometer 29.68.

On the morning of the 11th the storm center was approximately at 24° N., 57½° W., moving north-northwestward. Ship reports were few, but an 8 a. m., local time, observation from the German steamer *Vege sack* gave a northeast wind of force 9, barometer 29.77, near 25° N., 60° W.

During the remainder of the 11th and through the 12th, on the night of which the storm passed east of Bermuda, little is known of the storm's intensity beyond that indicated by a few ships which reported moderate to fresh gales well outside the center. At 2:30 a. m. of the 13th, however, the British steamer *Cadillac*, in 33° 50' N., 63° 20' W., had a north gale of force 9 and a barometer of 29.30 inches, which indicated the center to be a short distance to the eastward, and still moving in a north-northwesterly direction.

During the night of the 13-14th the storm, then progressing almost due northward, showed little change in depth, with the British steamer *Cyrus Field*, in 42° 50' N., 65° 48' W., at 5 a. m., reporting a barometer of 29.30 inches, wind north-northwest, force 7. About 2 hours earlier this ship, northbound, had highest wind force, 9, from the northeast. The strongest gale reported on the 14th was at 1 a. m., when the British steamer *Darcoila* had a wind of force 10 from the south-southwest, barometer 29.30, in 43° 20' N., 64° 50' W. At 8 a. m. of the 14th the center, after crossing western Nova Scotia, passed near Eastport, Maine, where the barometer read 29.48 inches. Thereafter the disturbance moved rapidly northward across New Brunswick and at 8 p. m. of the 14th lay over the lower St. Lawrence Valley.

The most dramatic incident in connection with this entire disturbance was the disappearance of the British racing yacht *Endeavor I*, after breaking loose from tow in the storm on the 13th, when about 200 miles east of the Nantucket Lightship, with 18 persons on board. Several days' search for the missing vessel failed to disclose her whereabouts until the 22d, when she was sighted about 260 miles from Fastnet Rock.

Advisory messages regarding this disturbance were first issued from the Forecast Center at San Juan, P. R., on the 9th and continued until the 10th. Thereafter, continuing through the 12th, advisories were issued by the forecaster on duty at Jacksonville. At 10 p. m. of the 13th the Washington forecaster ordered northeast storm warnings on the New England coast from Boston to Eastport. These were hauled down on the 14th after the passage of the storm inland.

Hurricane of September 14-19, 1937.—(Track II). A tropical storm of near-hurricane intensity when earliest reported appeared near midday of the 14th near 20° N., 57° W. At 1 p. m., local time, of that date, the Norwegian motorship *California Express* experienced a southeast gale of force 11, barometer 29.57, in 20°12' N., 57°18' W. At 7 p. m., E. S. T., the ship had a northeast gale of force 9, barometer 28.72, near 20° N., 58° W. At 1 a. m. of the 15th, in 20° 39' N., 57°48' W., she reported a barometer down to 28.20 inches, with an east-northeast gale of force 9. At 7 a. m., E. S. T., near 21½° N., 57½° W., the wind at ship had changed to northeast, force 7, barometer 28.29. At the same time the British S. S. *Glendene*, near 22° N., 58° W., had a northeasterly wind of force 8, barometer 29.68. The storm appeared to be moving slowly during the 17th, at first in a northerly, then in a northeasterly to east-northeasterly direction.

At the morning observation of the 16th no very low barometer was in evidence, but near-hurricane winds continued, with the British motorship *Atheprince* reporting a northeast gale of force 11, barometer 29.41, near 22½° N., 54° W. During the afternoon of the 16th the storm took a north-northeast course. There were then few reporting ships in the immediate vicinity of the center, one of the nearest being the Dutch steamer *Crynssen* which, near 22° N., 51° W., had a southwest wind of force 7, barometer 29.89. Early in the morning of the 17th, according to a report received at Bermuda, the Norwegian motorship *Teddy* passed very close to the center, in about 26°50' N., 51° 40' W., with barometer 28.60 and winds of force 11 to 12 shifting from southeast to northeast and northwest, with heavy rain and seas. Later, at morning observation of the 17th, the French S. S. *Carimare*, near 27½° N., 52½° W., had a north wind of force 9, barometer 29.50, and close by to the eastward a ship (name not reported) had a gale of like force from the northeast, barometer 29.09. The storm at that time was centered close by and moving more rapidly northward.

During the 18th the cyclone appeared to have gathered energy. At about 3 a. m., local time, the American steamer *Otho*, near 34° N., 50° W., encountered a southeasterly hurricane, changing at 5 a. m. to a north-northwest hurricane, lowest pressure 28.54. At 11:30 a. m., near 35° N., 48° W., the British steamer *Oropesa* had a hurricane wind from southeast, barometer 29.53. Early in the afternoon of the 18th the Italian motorship *Maria*, near 37½° N., 45½° W., met a south gale of force 9, barometer 29.92 and at 4 p. m., near 36½° N., 46½° W., the Belgian motorship *Lubrafol* had a like gale, barometer 29.80.

By night of the 18th the hurricane, then moving on a north-northeast course, was centered near 40° N., 49° W.

The intensity of the storm on the 19th is well shown by excellent special reports furnished by the American steamer *City of Newport News*, Capt. Robert L. Wright, to the United States Hydrographic Office, and the Dutch steamer *Bilderdyk*, Capt. C. H. P. Coster, to the United States Weather Bureau. The S. S. *City of Newport News*, bound from Havre toward Norfolk, after encountering severe gales on the eastern side of the hurricane during the morning, ran into the calm center at 46° 20' N., 46° W., at 9:20 a. m., barometer 28.65. "We were treated," said Captain Wright, "to a perfect exhibition of the old story—the eye of the storm—the wind dropped from force 11 to a dead calm, the sea suddenly lost its strength, and long and confused swells continued running from the south-southwest. At that time the sun came out blindingly—a sickly yellow—and occasional patches of blue sky appeared momentarily around its vicinity. This condition lasted for 18 minutes." The ship's lowest barometer, 28.55, was read at about 9:37 a. m., local time, when the wind shifted to northwest. The highest wind on the ship was from the northwest, force 12.

The Holland-America Line steamer *Bilderdyk* was en route from Rotterdam to New York; her noon position on the 19th was at 47°29' N., 40°06' W. At 3 p. m., according to Captain Coster's report, the ship had run into the storm, with a southeasterly wind of force 9. The gale increased to a south-southeast hurricane at 5 p. m. and so continued until 6:30 p. m., when it lightened to force 6, near the storm center, and changed to south-southwest, thereafter increasing to force 11 from the southwest. The lowest barometer on ship was 28.93, with the instrument fluctuating by about a millimeter between 6 and 6:30 p. m., local time.

Thereafter, the storm passed rapidly into high northern latitudes and on the 22d was central near Iceland.

During the early stages of this disturbance in low latitudes, advisory messages were issued concerning its movements from the Forecast Centers at San Juan and Jacksonville.

Disturbance of September 16-21.—(Track III.) Somewhat disturbed weather conditions occurred over the southwestern part of the Gulf of Mexico on September 16, with slight lowering of pressure and evidence of a cyclonic circulation. The center of the depression was near 21° N., 93° W., in the morning and about 3° farther north 12 hours later. The highest wind reported in connection with it during the day was from the northwest, force 5, near 23° N., $94\frac{1}{2}^{\circ}$ W., at 1 p. m., local time.

The disturbance moved slowly in a north-northeasterly direction with little general change in energy during the 17th and at 6 p. m., E. S. T., was central at approximately $25\frac{1}{2}^{\circ}$ N., 92° W., but the weather was unsettled over much of the northwestern Gulf. At 10 a. m., according to a belated report, the American steamer *Oliver Olson* met a local gale of force 10 from the northeast, barometer 29.74, in $26^{\circ}55'$ N., $91^{\circ}37'$ W. This was the only high wind reported from the vicinity of the disturbance during the day.

On the 18th and 19th the region was more generally disturbed and several ships in the northern Gulf reported winds of force 7 on both dates. The highest reported at sea in the 2 days was of force 8, from the southeast, barometer 29.72, experienced by an unidentified vessel near 28° N., 89° W., at 7 p. m. of the 18th. At 3:30 p. m. of the 19th the center turned more to the east and passed over Port Eads, with barometer reading of 29.64, the lowest recorded during the existence of the depression. Quoting from the report of R. A. Dyke, forecaster in charge at New Orleans:

The wind at Port Eads on the 19th veered from south at 7:30 a. m. through west at 1:30 p. m. to north at 4 p. m. An incomplete wind velocity record at Port Eads gives a 5-minute maximum of 34 miles per hour at 3:28 p. m. and an extreme velocity of 41 at 3:32 p. m., both on the 18th.

Winds at Pensacola were highest on the 19th, with maximum of 28 miles per hour from the south. Winds at Apalachicola on the 20th were from south and southeast to 10 a. m. and veered through south and southwest to north at 3 p. m. The lowest pressure was 29.79 at 2:30 p. m. on the 20th and the highest wind was 30 miles per hour from the south at 5:28 a. m. on the 20th.

The depression moved in a general easterly direction across the extreme upper part of the eastern Gulf during the late 19th and the 20th, and disintegrated over northern Florida on the 21st. The average rate of movement along the entire track was about 9 miles an hour. No damage of importance resulted from the disturbance, although some injury was done to highways from the heavy rains south of Tallahassee.

During the 17th to 20th storm advisories and warnings were issued from the Weather Bureau office at New Orleans at frequent intervals.

Hurricane of September 20-26, 1937.—(Track IV.) Radio reports from ships in low latitudes early on the 20th showed the existence of an already well-developed storm of considerable extent with center in approximately 15° N., 44° W. At 9 a. m. the British steamer *City of Batavia* reported a southeast gale of force 10, barometer 29.60, in $18^{\circ}06'$ N., $44^{\circ}15'$ W., and at 10 a. m. the British motorship *Caprella* reported a southwest gale of force 11, barometer 29.48, in 14° N., 43° W.

On the 21st no ships appeared to be in the near neighborhood of the center of the disturbance, but at about 9 a. m., local time, an unknown vessel near 23° N., 49° W., reported a southeast wind of force 7, barometer 29.82.

Twelve hours later the American steamer *Cliffwood*, in the same position, had a similar wind, barometer 29.86.

On the morning of the 22d reports from the French steamer *Marigot* and another vessel, unknown, located the center with closer definiteness, and showed that the storm was moving in a northwesterly direction. The *Marigot* had a west gale, force 8, barometer 29.65, near $21\frac{1}{2}^{\circ}$ N., 54° W., and the other ship, a northwest wind of force 9, barometer 29.29, near $22\frac{1}{2}^{\circ}$ N., $52\frac{1}{2}^{\circ}$ W. In a special mail report later received from the *Marigot*, a northwest wind of force 10 was noted as experienced at about 2 a. m., local time, barometer 29.19 (uncorrected), near $22\frac{1}{2}^{\circ}$ N., $52\frac{1}{2}^{\circ}$ W. At regular p. m. observation of the 22d the wind reported by a ship in the storm area was of force 10, from the northeast, barometer 29.53, near 25° N., 54° W.

During the 23d the storm continued to move slowly northwestward, accompanied by strong to whole gales, lowest reported barometer 29.12, within the region 26° - 28° N., 52° - 56° W.

On the 24th the disturbance moved with greater rapidity. The center at 7 a. m., E. S. T., was near 30° N., 55° W., accompanied by heavy rains and local gales, a north-west wind of hurricane force being reported by the German Steamer *Nordenham*, barometer, 29.44, near $29\frac{1}{2}^{\circ}$ N., 57° W. At 9 a. m., local time, an unidentified ship in $31^{\circ}36'$ N., $54^{\circ}48'$ W., had an east gale of force 10, barometer 29.29. During the day the storm center passed at a distance of several hundred miles to the eastward of Bermuda, and on the morning of the 25th was northeast of the island, centered near $36\frac{1}{2}^{\circ}$ N., 60° W. At evening observation of the 25th the center had moved to about $40\frac{1}{2}^{\circ}$ N., $62\frac{1}{2}^{\circ}$ W., with lowest pressure 28.94 inches, and strong winds to gales of force 10 blowing over the surrounding sea.

In crossing Nova Scotia during the 26th, the storm recurved into a northeasterly direction, crossed northern Newfoundland near the Strait of Belleisle during the night of the 26-27th, and by the 30th was over Iceland.

Ample advisories and warnings of this disturbance were issued, first, on the 20th, from San Juan, P. R.; then from Jacksonville, Fla., on the 22d to 24th; and from Washington, D. C., on the 25th and 26th. At 10:10 a. m., E. S. T., of the 25th, northeast storm warnings were ordered along the New England coast from Block Island to Eastport, and whole gale warnings along the east Maine coast at 6:50 p. m. These were continued until 9:30 a. m. of the 26th, at which time the storm was over Nova Scotia with a north-northeasterly trend in direction.

Disturbance of September 26-30, 1937.—(Track V.) Slight evidences of a cyclonic circulation appeared between the central north coast of Cuba and the Bahamas on the morning of September 26. The disturbed condition moved north-northeastward as a very shallow depression, accompanied by light winds, and at 7 p. m., E. S. T., of the 27th was central near $31\frac{1}{2}^{\circ}$ N., $75\frac{1}{2}^{\circ}$ W. Its course thereafter curved more into northeasterly.

On the morning of the 28th the center lay at some distance east of the Virginia Capes, continuing shallow and poorly developed. At this time, however, with high pressure on the west, north, and east, the wind circulation became more energetic and winds of force 7 occurred on its west and north quadrants. At 4 a. m. of the 28th the American steamer *Gulphawk*, in $34^{\circ}40'$ N., $75^{\circ}27'$ W., had a north-northeast wind of force 7, barometer 29.83 inches. Later in the day this ship experienced a northeast gale of force 8, the highest wind velocity reported by a ship in connection with the disturbance as it moved up the coast. Thereafter, the center of the depression continued at some distance from the coast until the 29th when it

skirted Nova Scotia close to the southward. On the morning of the 30th it crossed southeastern Newfoundland and late in the day merged with an extratropical cyclone in the high latitudes of the North Atlantic.

Relative to this disturbance, an advisory warning was issued by the Forecast Center at Jacksonville at 10 a. m. of the 27th, and storm warnings were ordered hoisted on the 28th from the Virginia Capes to Eastport, Maine. The latter order was issued by the Washington Forecast Center.

Disturbance of September 30–October 3, 1937.—(Track VI.) Slightly threatening conditions appeared over the southern part of the Gulf of Mexico and the western Caribbean Sea on the afternoon of September 30, with some evidences of cyclonic circulation centered a little south of the Yucatan Channel.

At 6 a. m., local time, of October 1 the center of the condition appeared to be at approximately $23\frac{1}{2}^{\circ}$ N., 86° W. No wind exceeding force 6 occurred there during the day. The center moved very slowly northwestward between 6 a. m. and 6 p. m., but with much greater rapidity from then until the morning of October 2, when it lay near $27\frac{1}{2}^{\circ}$ N., 91° W. The Honduran steamer *Morazan* reported a barometer of 29.62, wind southeast force 3, near this position. This pressure reading is the lowest of record in connection with the disturbance.

The center of the low continued to move toward the northwestward until the night of the 2d, when it turned

toward the north and entered the Louisiana coast at Atchafalaya Bay at about noon of the 3d.

Only one report of a gale wind connected with the disturbance in mid-Gulf is now at hand. This was experienced by the American steamer *Gulfprince*, from east-southeast, force 8, barometer 29.93, in $26^{\circ}36'$ N., $88^{\circ}12'$ W. at 7 a. m., local time, of October 2, at a considerable distance to the eastward of the center at that time. It may be mentioned, however, that at about 9 p. m. of September 30 the American steamer *Seminole* reported a northeast gale of force 8 in the vicinity of 27° N., 88° W., at that time far to the northward of the center of the unsettled area. On October 1, it may be mentioned further, a second low of some energy showed signs of developing in the Yucatan Channel, and at about noon, local time, the Honduran schooner *Racer* reported a gale of force 10 off the western end of Cuba. This secondary low deteriorated rapidly, however, and later merged with the primary low to the northward.

From late on September 30, until the principal low went inland in Louisiana on October 3, frequent advisory messages were issued by the forecaster at New Orleans. On October 1 storm warnings were ordered along the coast from Panama City, Fla., to Morgan City, La., and were extended at night as far eastward as Carrabelle, Fla., and on the 2d from Carrabelle to Port O'Connor, Tex. All warnings were lowered on the 3d.