HURRICANES OF 1954

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GENERAL SUMMARY

A feature of the 1954 hurricane season, as in 1953 [1] was the pronounced meridional movement of the four major hurricanes, which can be seen by inspection of figure 1. Again as in the 1953 season, the hurricanes recurved northward at low latitudes, and westward movement was at a minimum, with the exception of hurricane Hazel during the first 5 days of its existence. A quote from Norton's report [2] of 1952 is in order for the current season:

> The low hurricane activity was in keeping with past experience for summers with widespread drought over the eastern half of the United States. A study of drought summers during the past half century indicates that only about half as many hurricanes occur in them on the average as during normal or wet summers. This suggests that the general pressure distribution which causes widespread drought, reflects itself in lessened storm activity in the tropics as well.

Another unusual feature of this hurricane season was the absence of tropical storms in Florida, Georgia, and the east Gulf States and the passage of three hurricanes through the North Atlantic States and New England. Considering past experience which indicates normal expectancy of only 5 to 10 hurricanes per century in New England, 2 in 1 year is extraordinary.

The hurricane season of 1954 had about the normal number of storms, but was abnormal in other respects. All except 3 out of a total of 8 storms were of hurricane intensity, Barbara and Gilda being of less than hurricane intensity. The intensity of Florence was not definitely determined. No storm was charted from the eastern Atlantic; in fact, all were charted west of longitude 65° W., with the exception of Hazel which had its origin between 55° and 65° W. Three major hurricanes, Carol, Edna, and Dolly originated only a short distance east of the Bahama Islands, while Hazel, the fourth major hurricane, built up in the eastern Caribbean. Of these four, Carol, Edna, and Hazel played havoc with the Atlantic States from the Carolinas northward during the 7-week period from August 30 to October 15. Dolly remained at sea, inflicting no coastal damage.

Hurricane Carol brushed the North Carolina coast and moved rapidly northward and inland into the New England States, causing about 60 casualties and a loss in excess of $460 million to property, crops, etc., in the North Atlantic States. No deaths were reported from North Carolina, and damage to that area was $227,500. Hurricane Edna came close on the heels of Carol, and all the North Atlantic area was eager to take precautions for the protection of life and property. Edna accounted for 20 casualties, mostly drownings, and over $42 million in damage, mainly from the Long Island area northward across New England. Precautionary measures were well in order for the populace when hurricane Hazel came along a month later. Hazel resulted in 20 deaths on the Carolina beaches and about $163 million in damage to the Carolina beaches and the interior of North Carolina. The death toll for the area along the hurricane's path north of the Carolinas into the Canadian provinces of Quebec and Ontario was about 149 with 78 of the total in Canada. Damage estimates for this area total over $148 million plus additional damage particularly in Virginia and New York for which figures are not available.

Total casualties from hurricanes Alice, Carol, Edna, Florence, and Hazel on the North American mainland were approximately 311, 43 of which were in Mexico and 78 in Canada. Total damage was likely in excess of $1 billion. A total of 104 advisories were issued and numerous bulletins for press and radio, hoist orders, special orders, etc., by the forecast offices concerned. The service, by allowing time for protective measures, reduced potential casualties and damage.

INDIVIDUAL HURRICANES

Alice, June 24–26.—A tropical storm developed rapidly in the west Gulf of Mexico on the 24th of June and by early on the 25th was of hurricane force. It moved inland south of Brownsville, Tex., early on the morning of the 25th. A fishing camp along the Mexican coast, about 100 miles south of Brownsville, estimated a maximum wind of 70 to 80 m. p. h. The storm moved up the Rio Grande Valley and passed over Laredo, Tex., late on the 25th. Apparently very little damage was caused by the winds and tides associated with the storm and only one death occurred in the Brownsville area. The major damage and casualties resulted from the floods on the Pecos and lower Rio Grande, caused by the attendant heavy rains. Seventeen deaths were reported in Texas and an estimated 38 in Mexico. There was considerable damage to crops, principally cotton. Dollar damage is not available.

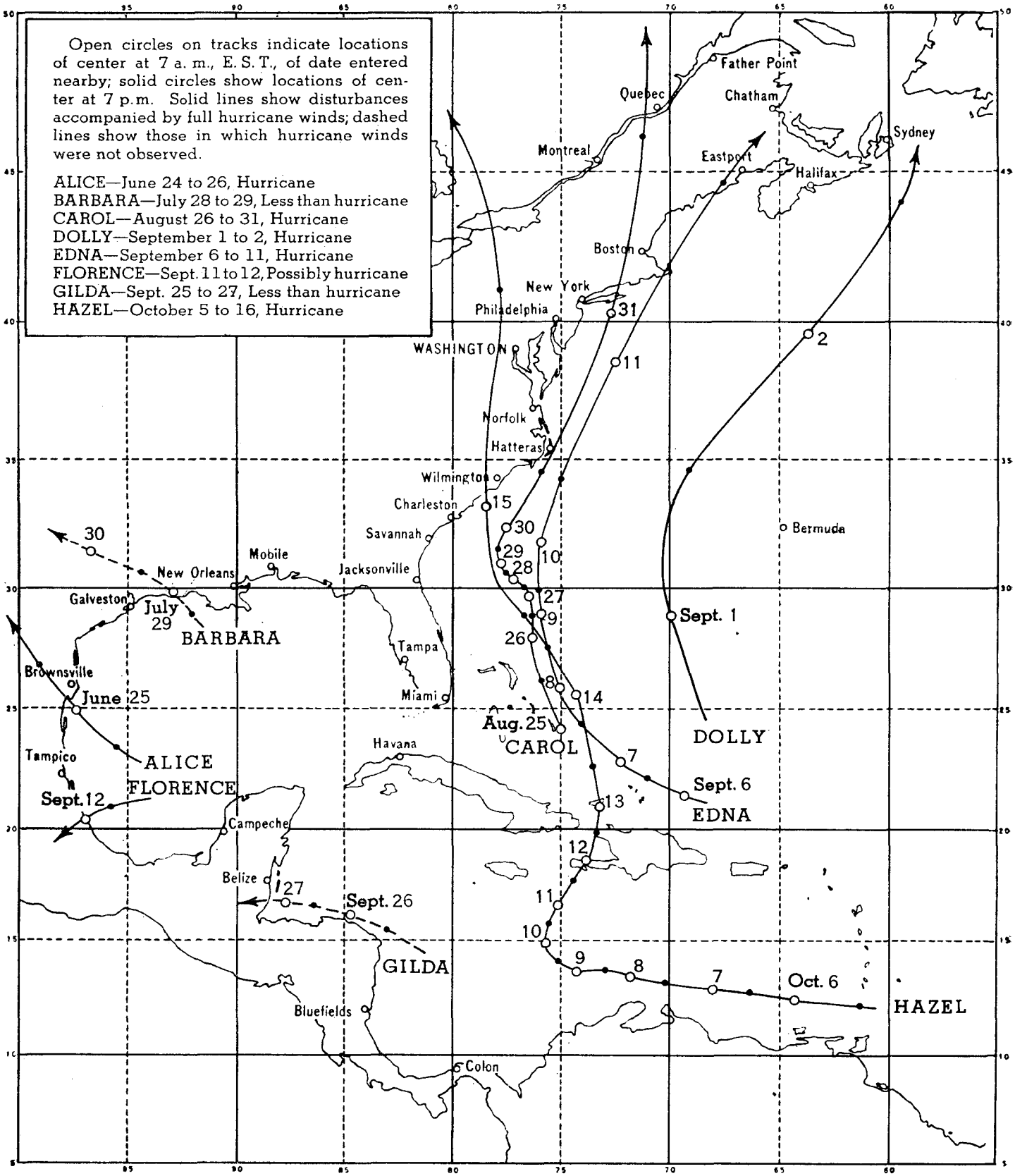

FIGURE 1.—Track of hurricanes of 1954.

Barbara, July 28–29.—This storm formed in the north Gulf of Mexico off the Louisiana coast on July 28 and moved inland in the Vermilion Bay area early on the morning of the 29th. Highest wind reported was 60 m. p. h. by the *Henry M. Dawes* on the afternoon of the 28th. Some damage to crops, such as rice and corn, was reported from the heavy rains, but the general opinion was that the rains associated with the storm were far more beneficial than damaging. Wind damage was negligible.

Carol, August 26–31.—Hurricane Carol formed from a weak easterly wave during the night of August 26 and the forenoon of the 27th near the northeastern Bahama Islands. After forming it moved northward to a position near 30° N., 76° W., where it came to a near standstill, but during the ensuing 3 days it drifted very slowly to about 32.5° N., 77.5° W. on the 30th. It then began an accelerating north-northeast movement and passed very near Cape Hatteras about 2100 or 2200 EST on the 30th. Highest winds, estimated by reconnaissance aircraft, varied from 75 to 125 m. p. h. When the hurricane passed the North Carolina Capes, with all reporting stations on the weaker side, the west, highest wind speeds on land were gusts of 55 m. p. h. at Wilmington, 65 m. p. h. at Cherry Point, and 90 to 100 m. p. h. at Cape Hatteras. Damage in North Carolina was estimated at $227,500 with no deaths.

By the morning of the 31st Carol was just south of Long Island and moving rapidly north-northeastward. It crashed across the New England States diminishing as it swept into Canada. Highest winds were at Block Island, R. I., where 130 m. p. h. was measured in gusts. The storm left 60 dead and over $460 million damage to property and crops in the North Atlantic States. About one-third of Providence, R. I., was under 8–10 feet of water for several hours and many shore communities were demolished.

A discussion of hurricane Carol in relation to the planetary wave pattern has been given by Winston [3].

Dolly, September 1–2.—This small hurricane formed in an easterly wave near 26° N., 69° W., during the night of August 31–September 1, and by early morning of the 1st was near 29° N., 70° W. It moved very rapidly northward and northeastward and by afternoon of the 2d was east of Nova Scotia, reduced in force, and rapidly becoming extra-tropical. Strongest winds estimated by aircraft were around 100–115 m. p. h. on the afternoon of the 1st. This hurricane remained at sea and no damage was reported.

Edna, September 6–11.—Hurricane Edna formed in an easterly wave on the afternoon of September 6 near 22° N., 70° W., and increased to hurricane intensity during the night. During the 7th and 8th it swept the outer Bahama Islands as it moved on a broad curving path northward. The center passed very close to San Salvador Island, Bahamas, late on the 7th where winds were up to hurricane force in gusts, but no appreciable damage resulted. High seas and gale winds were experienced on the outer fringe islands northward to Great Abaco. During the 9th and 10th, the storm moved northward very near the 76th meridian and gradually turned to the north-northeast closely paralleling Carol's path 11 days earlier. It passed just east of Cape Hatteras early in the night of the 10th and winds of about 75 m. p. h. were felt on the North Carolina Capes from Cape Lookout to Manteo. Thereafter, it moved rapidly northeastward and passed about over Cape Cod on the 11th, and thence moved into eastern Maine, Nova Scotia, and New Brunswick that night where it caused great damage and some loss of life. There was no loss of life in North Carolina where damage was minor. Damage in New England was estimated at over $40 million and there were 20 casualties. Strongest winds were estimated by aircraft at about 115 to 120 m. p. h. The highest wind speed over land (95 m. p. h.) was measured at Brookhaven National Labratory, Long Island.

The meteorological conditions associated with the formation and movement of hurricane Edna have been analyzed by Malkin and Holzworth [4].

Florence, September 11–12.—This storm formed in the southwestern Gulf of Mexico and moved into Mexico between Tuxpan and Nautla on the morning of September 12. The highest wind reported by reconnaissance aircraft was about 65 m. p. h. The press reported 5 dead and more than $1,500,000 damage around the oil center of Poza Rica, mostly to the banana crop. The storm was possibly of hurricane force as it hit the coast.

Gilda, September 25–27.—Small tropical storm Gilda formed in the Caribbean Sea east of Cape Gracias, Nicaragua on September 25 and moved westward along the north coast of Honduras and into British Honduras near Stann Creek, about 60 miles south of Belize, around 1530 EST of the 27th. The storm was less than hurricane force throughout its life, with highest winds of 60 to 70 m. p. h. in squalls. Damage was slight to buildings and no casualties resulted directly from the storm. Rainfall was very heavy in northern Honduras, resulting in disastrous floods, especially around San Pedro Sula, La Lima, and the adjacent valley areas. Press reports indicated 29 dead and thousands homeless and marooned in the flooded area, and extensive damage to property and crops.

Hazel, October 5–16.—This hurricane developed in an easterly wave at latitude 12° N., longitude 61.2° W., on October 5 at which time highest winds were estimated about 100 m. p. h. The hurricane passed near or slightly north of the island of Grenada in the Windward Islands and into the Caribbean Sea during the evening of the 5th. It continued on a west to west-northwest course until the night of the 9th–10th when it slowed in forward speed and curved northward. During this period, the hurricane slowly gained in size and intensity; highest winds were 115 m. p. h. on the 7th and 125 m. p. h. on the 8th, as estimated by reconnaissance aircraft. On the latter date, the Navy reconnaissance plane encountered severe turbulence and one member of the crew was severely

injured, requiring hospitalization, and another sustained minor injuries.

The hurricane moved on a north-northeast course from the night of the 10th–11th until it passed through the Windward Channel and into the southeast Bahamas on the morning of the 13th. It changed course to north then to north-northwest on the 13th, continuing on that course until it passed inland on the North Carolina coast about 0915 EST of the 15th.

Considerable damage and loss of life resulted in Haiti, especially on the southwest peninsula. This area is very mountainous, with peaks up to almost 8,000 feet in the western portion. High winds and seas and torrential rains resulting in floods and landslides accounted for the loss of life, estimated between 400 and 1,000, including 200 or more buried in landslides. The dollar estimate of damage is not available.

After passing through the Windward Channel, the hurricane moved northward over the island of Great Inagua, Bahamas, between Mayaguana and Acklin Islands and passed a short distance east of the remainder of the Bahamas. Six lives were lost, out of a total of 15 aboard, when a sailboat capsized that was trying to take shelter at Inagua on a trip from Turks Island. Damage to property and salt mining was minor at Inagua, and only minor damage resulted elsewhere in the Bahamas.

At Inagua a minimum pressure of 29.34 inches was recorded and a maximum wind of 40 m. p. h. The center passed a short distance to the east of the observing station; however, the comparatively light wind indicated that the hurricane had become distorted and the strong surface winds apparently deflected aloft while passing through the mountainous terrain bordering the Windward Channel. The exposure of wind instruments at Inagua is excellent, with no obstructions to free wind flow.

Storm warnings were hoisted at 1100 EST on the 14th from Charleston, S. C., northward on the Virginia Capes, and the remainder of the coast northward to New England was placed on the alert by Washington and Boston Weather Bureau offices. Warnings were adjusted slightly before the center moved inland; however, the affected area from Charleston northward had 24 hours warning, and of course, had been watching the movement of Hazel for several days prior to the 15th.

During the 14th and 15th, and until the hurricane passed inland, the highest winds were estimated in all warning messages in excess of 100 m. p. h. Wilmington, N. C., reported a top gust of 98 m. p. h. and the fastest mile was 82 m. p. h. Minimum pressure there was 28.68 inches. Myrtle Beach, S. C., reported top gusts of 106 m. p. h. and lowest pressure of 28.47 inches. (This was the lowest pressure reported on land although 27.70 inches was reported by a fishing boat at Tilgham Point while in the eye of the storm at 10:30 a. m. EST.) Wind estimates from several points between Myrtle Beach and Cape Fear varied from 130 to 150 m. p. h. The devastation along the North and South Carolina beaches was staggering. Every pier in a distance of 170 miles of coastline was demolished and whole lines of beach homes literally disappeared. In some places the tide was over 17 feet higher than mean low water.

Rainfall was heavy along and to the west of the storm track in North Carolina. Record 24-hour amounts ranged from 6.5 inches at Burlington, High Point, and Lexington up to 9.72 inches at Carthage, located in the sandhills section of the southern Piedmont. One U. S. Geological Survey station at Robbins, several miles north of Carthage, reported 11.25 inches. Rainfall in the eastern half of the storm was comparatively light, several stations reporting less than an inch.

Total casualties in the Carolinas were 20, most of which were drownings. Damage to the Carolinas is estimated at around $163 million with $36 million from the North Carolina beach area, $25 million from the South Carolina beach area, and the remainder from crop and property losses in the interior.

In the 12 hours after Hazel struck the Carolina coast it traveled with extreme speed on a north-northwest track, sometimes at 60 m. p. h. It passed through the western suburbs of Washington, D. C., and spun across Pennsylvania and New York into Ontario maintaining its intensity all the way. Peak wind speeds of 90 m. p. h. or over were reached near and east of the center from the Carolinas through New York and a pressure 28.75 inches was measured at Richmond, Va. Rainfall was heavy on the west side of the storm—over 9 inches in western Virginia and over 10 inches locally in the Appalachians. Floods were destructive in western Pennsylvania, and in Toronto, Ontario, and vicinity floods took 78 lives.

A discussion of hurricane Hazel in relation to the large-scale circulation has been given by Krueger [5] and a detailed State-by-State account of path and damage is presented by Seamon [6].

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6. L. H. Seamon, "The Storm of October 15, 1954," *Climatological Data—National Summary*, vol. 5, No. 10, October 1954, pp. 381–385.