YEAR 1884

Four storms were identified as having occurred in 1884. Tracks for these storms are presented in Fig. 1.

Storm 1, 1884 (Sept. 1-6).

This is a new storm case which has been recently documented by the author of this study.

Documentation of the storm was based on the following information: 1) Steamship "State of Nebraska", in lat. 42 30 N., long. 61 46 W. on Sept. 1, 4 A.M., barometer 28.81 inches (it should read 29.81 inches), wind S.E. force 5, wind hauling to E., ran into what was evidently the northern edge of a cyclone moving to the eastward, aneroid barometer falling 0.40 inch in two hours, very high sea from S.W.; 6 A.M., barometer 29.40 inches, oscillating 0.20 inch, wind N.N.E. force 9, very heavy rain; 9 A.M., barometer 29.60 inches, rising, wind N.W., weather clearing; noon, barometer 29.90 inches, light wind, fine weather (Monthly Weather Review, Sept. 1884). 2) Steamship "Oder", in lat. 43 55 N., long. 58 01 W. on Sept. 1. From 10 A.M. to 3 P.M. had a fresh S.S.E. gale, then from S.E. to S.W., blowing a hurricane with heavy rain (Monthly Weather Review, Sept. 1884). 3) Bark "Addie E. Sleeper". Sept. 1, lat. 41 N., long. 61 W., lost spars and sails in a heavy gale (Monthly Weather Review, Sept. 1884). 4) Bark "Engelbert". Sept. 1, 60 miles E. of Sable Island, lost sails in a hurricane (Monthly Weather Review, Sept. 1884). 5) The Naupactus", from St. John, arrived at Mersey and reported that on Sept.1 the ship labored heavily and, on a heavy sea running, a portion of the deckload was carried away (The Times, London, Sept. 25, 1884, p.10, col.6). 6) Sept. 2, moderate to strong S.W. breezes prevailed over the Banks, with S. to E. winds N. of 53 degrees N. and E. of 45 degrees W.; minimum reported barometer was 29.36 inches (Monthly Weather Review, Sept. 1884). 7) During Sept. 3-5, the disturbance moved eastward N. of the 55 degrees N. parallel, the pressure ranging from 29.20 to 29.60 inches (Monthly Weather Review, Sept. 1884). Author's note: On the basis of space-time continuity to Ireland on Sept. 6 (item 9) the storm did not seem to have reached lat. 55 N. during the above mentioned days. 8) Map showing a track for the storm to have been near 41 degrees N., 58 degrees W. on Sept. 1, about 51 degrees N., 49 degrees W. on Sept. 2, and in the vicinity of 55 degrees N., 46 degrees W. on Sept. 3, 58 degrees N., 41 degrees W. on Sept. 4 and 59 degrees N., 31 degrees W. on Sept. 5 (Monthly Weather Review, Sept. 1884). 9) The chart of Saturday morning (Sept. 6) showed that a new disturbance had appeared off the W. of Ireland causing the barometer there to fall fast, with a strong S.E. wind and rain. The disturbance advanced steadily and by 6 P.M. (Greenwich time) the center had reached the N.E. Ireland. S.W. and W. gales were then felt in the Channel, a N.W. gale in the S. of Ireland and a moderate N.E. gale at Mullaghmore while E. to S.E. breezes were felt in the N. of England (The Times, London, Sept. 8, 1884, p.6, col.4).

On the basis that the "Maggie" (which arrived at Bermuda under

jury masts on Sept. 6, coming from Sheet Harbor, Nova Scotia) reported having experienced heavy weather on Aug. 30 (The Times, London, Sept. 27, 1884, p.10, col.4), there are some clues that the storm existed as early as Aug. 30. However, the information given by the "Maggie" was found to be insufficient for starting a track on that day and, therefore, the author decided to begin his track in Sept. 1. Based on information in items 1) and 2) and to a lesser extent in other items, the author estimated a 7 A.M. Sept. 1 position near 41.5 degrees N., 60.7 degrees W. His 7 A.M. Sept. 2 position was estimated on the basis of information in items 6) and 8) and was about 50.0 degrees N., 50.0 degrees W. The author's 7 A.M. estimated positions for the period Sept. 3-5 were primarily based on interpolation between the 7 A.M. Sept. 2 estimate and an estimate over Ireland for 7 A.M. Sept. 6. These positions were as follows: Sept. 3, near 52.3 degrees N., 38.3 degrees W.; Sept. 4, near 53.0 degrees N., 27.0 degrees W.; Sept. 5, near 53.3 degrees N., 17.0 degrees W. Based on information contained in item 9), the author's estimated position for 7 A.M. Sept. 6 was near 53.5 degrees N., 9.0 degrees W. The author's track for this storm is displayed in Fig. 1.

According to information in items 2) and 4), Storm 1, 1884 attained hurricane intensity at least on Sept. 1. The storm should have gradually evolved into an extratropical system while traveling eastward across the North Atlantic.

Storm 2, 1884 (Sept. 3-16).

This storm corresponds to Storm 1, 1884 in Neumann et al. (1993).

Quite abundant information was found in connection with this storm: 1) Bark "Campero". Sept. 3, in about lat. 13 27 N., long. 47 33 W., had threatening weather during the day; 9 P.M., N.N.W. wind; 11 P.M., W.N.W. wind; Sept. 4, 1 A.M., W. wind; 2 A.M., S.W. wind; 3 A.M., S. wind, barometer 29.84 inches. The wind blew in heavy and sudden squalls of about two minutes duration, with heavy rain and high seas; at 8 A.M. Sept. 4 the barometer began to rise; at noon Sept. 4 the wind was blowing a strong breeze from S.S.W. and the sea bacame more regular (Monthly Weather Review, Sept. 1884). 2) Bark "Ella". Sept. 4, lat. 16 N. (no longitude given), had a heavy gale from W. (Monthly Weather Review, Sept. 1884). 3) Brig "Emeline". Sept. 4, lat. 16 23 N., long. 52 24 W., had a heavy gale from N.N.E. to S.S.W., lasting 12 hours (Monthly Weather Review, Sept. 1884). 4) Brig "Lilian". Sept. 5, lat. 17 39 N., long. 57 50 W., reported very heavy E.N.E. to E.S.E. swell, with cloudy squally weather; strong N.W. wind until 2 P.M., then began to blow in heavy squalls , with rain, from the W. and W. by S.; barometer 29.79 inches; this weather continued for 6 hours, the wind shifting to S.W. and blowing a moderate gale (Monthly Weather Review, Sept. 1884). 5) Brig "Comalo" encountered a hurricane in lat. 18 58 N., long. 58 W. on Sept. 6 and put into St. Thomas, leaky and partly dismasted, on Sept. 23. The damage sustained by the "Comalo" shows that she was probably at no great distance from the storm center (Monthly Weather Review, Sept. 1884). 6) Some observations taken on board the steamship "Plato". Encountered a cyclone in lat. 22 N.,

long. 57 W. on Sept. 7. At 8 A.M. Sept. 6, barometer 29.71 inches, wind S.E. by S. blowing a strong gale, hard squalls and heavy rain; at 8 P.M. Sept. 6, barometer 29.68 inches, wind S., increasing gale, very hard squalls; midnight Sept. 6-7, barometer 29.38 inches, wind S. by E. strong gale; at 4 A.M. Sept. 7, barometer 28.90 inches. wind S.S.E., strong gale, rain and mountainous sea; at 8 A.M. Sept. 7, barometer 28.40 inches, blowing a hurricane, air thick with rain and high sea; at 9 A.M. Sept. 7, barometer 28.26 inches, wind S.E. by S.; at 10 A.M. Sept. 7, wind suddenly lulled and veered to W.N.W., again blowing a hurricane, ship settled to starboard, gunwale in water. The wind then decreased gradually and barometer rose gradually (Monthly Weather Review, Sept. 1884). Author's note: The New York Times, Sept. 17, 1884, p.8, col.6, wrongly stated that the "Plato" had reported that a cyclone was raging below Cape Hatteras on Sept. 7; however, The New York Times, Sept. 16, 1884, p.8, col.6, indicated that the "Plato", which arrived in New York on Sept. 15, spent 26 days in coming from Santos and Rio de Janeiro (Brazil). Such information was found to be useful because it served to verify that the vessel overtook the hurricane from a southeasterly direction. 7) Steamer "Antonio Lopez". On Sept. 6 had fresh S. to S.E. wind and rainy weather; at noon strong E wind, high sea from S. and S.W., barometer falling; position about lat. 25 N., long. 51 W. On Sept. 7, the wind became stronger and was accompanied by heavy rain; at night it increased to a hurricane from E. and E.N.E., with violent squalls and high sea from E., S. and S.W.; at 20 hours the barometer rose slightly; at 22 hours the wind hauled to N.N.E.and the barometer fell again; at 24 hours, hard squalls from N. and barometer rising. On Sept. 8, sky clearing and barometer rising (Monthly Weather Review, Sept. 1884). Author's note: The above report was sent to the U.S. Signal Service by Rev. Benito Vines, S.J., the director of Belen College Observatory, Havana. 8) Steamer "Ciudad de Santander". Sept. 7-8, the day began threatening, fresh S.E. wind, heavy swell from S.W. and W. and barometer gradually falling; 9 P.M., fresh S.E. wind, high, confused sea from S.W. and W., heavy rain and violent squalls. The sky and horizon took a grayish color and the sea became furious, hove to the port tack until 12 hours when it was blowing a strong S.E. gale; barometer falling until 15 hours, when there was a sudden fall from 29.88 to 29.49 inches with furious seas and heavy rain. Judging that the center of the cyclone bore approximately S.W. from the vessel, ran ship to the northeastward; barometer stationary at 29.49 inches; estimated position in lat. 25 42 N., long. 52 52 W. of Greenwich. Sept. 8-9, strong S.E. gale , high sea from S.E., S., S.W. and W., threatening weather, rain squalls and violent gusts of wind; at 10 P.M. wind hauled to S.S.E. and blew with great force; very high sea, rain, barometer stationary at 29.49 inches. At 15 hours put ship on starboard tack; at daylight wind hauled to S., no change in barometer; at 20 hours the barometer began to rise; at noon, estimated position in lat. 27 45 N., long. 51 03 W. of Greenwich; barometer 29.76 inches, rising. Sept. 9-10, fresh S. wind, barometer 30.00 inches, cloudy weather, sea less violent; at 12 hours laid on our course, full speed ahead, sky clearing (Monthly Weather Review, Sept. 1884). Author's note: This report was also sent to the U.S. Signal Service by Father

Vines. 9) Bark "Norden". Sept. 8, in lat. 25 N., long. 52 W., had a hurricane from noon that day to 6 P.M. Sept. 9 (Monthly Weather Review, Sept. 1884). 10) Bark "Superbo". Sept.10, lat. 28 N., long. 52 45 W., in the evening, sky obscured, fresh S.S.W. wind, heavy sea from same direction, barometer falling gradually; at midnight (Sept. 10-11) wind increasing with heavy squalls and high sea; at 4 A.M. Sept. 11, wind hauled from S.S.W. to S. with falling barometer; at 10 A.M., wind hauled to E., barometer rising and weather improving; the wind afterwards hauled to N.E.; position at noon Sept. 11: lat. 29 10 N., long. 54 10 W. (Monthly Weather Review, Sept. 1884). 11) Bark "Friedrich Scala". Sept. 12, lat. 29 N., long. 54 W., had a severe gale from S.S.E. to S.S.W. during which she lost several spars (Monthly Weather Review, Sept. 1884). 12) Brig "Emanuele". Sept. 13, lat. 28 40 N., long. 52 37 W., had a S.S.W. gale, which lasted several days, causing much damage to the vessel (Monthly Weather Review, Sept. 1884). 13) Brig "D.A. Small". Sept. 14, lat. 32 N., long. 46 W., had winds of hurricane force from S.S.W., was under bare poles for 5 hours and lost sails, etc. (Monthly Weather Review, Sept. 1884). 14) Steamship "Marseille". Sept. 14, noon, lat. 34 50 N., long. 46 05 W.; 1 P.M., barometer 29.76 inches, wind S. force 6; 2 P.M., barometer 29.45 inches, wind S.E.; 3 P.M., barometer 29.29 inches, wind E.S.E. force 8; from that hour until 5 P.M., the barometer fell to 29.02 inches, at which reading it remained stationary until 6 P.M., the wind increasing from E.S.E. until it reached force 10; 7 P.M., wind W.N.W. force 10 and blew from that direction until 9 P.M., barometer rising; 10 P.M., wind W. force 8; midnight (Sept. 14-15), barometer 29.61 inches, wind W. force 7. The sea was very heavy during the storm and caused some slight damage to the vessel (Monthly Weather Review, Sept. 1884). 15) Steamship "Weser". Sept. 15, lat. 42 54 N., long. 38 17 W., reported barometer 29.50 inches, a fall of 0.57 inches, wind shifting from S.W. to S.E. force 5 to 6 (Monthly Weather Review, Sept. 1884). 16) On Sept. 16, the area of least pressure was near lat. 50 N., long. 27 W., attended by moderate S. to S.W. gales and raising barometer, and by the following day the depression had apparently filled in (Monthly Weather Review, Sept. 1884). 17) Map showing the storm being tracked as two separate cyclones. The first cyclone was tracked from about 14 degrees N., 47 degrees W. on Sept. 3 to about 29 degrees N., 51 degrees W. on Sept. 11; the second one was tracked from about 29 degrees N, 54.7 degrees W. on Sept. 12 to about 51 degrees N., 28 degrees W. (Monthly Weather Review, Sept. 1884).

The information contained in the items above was found to support, in general, the track for this storm which is displayed in Neumann et al. (1993) as for Storm 1, 1884. Therefore, the author of this study decided to accept such a track and to reproduce it in Fig. 1.

Storm 2, 1884 was a major hurricane as a surface pressure as low as 28.26 inches was reported by the steamship "Plato" in or very near the center of the storm on Sept. 7 (item 6).

Storm 3, 1884 (Sept. 10-20).

This is the same storm that Neumann et al. (1993) identify as

Storm 2, 1884.

Abundant information was found in relation to this storm: 1) Steamship "City of Palatka", between Jacksonville and Charleston. Off the coast from Charleston to about 15 miles S. of Savannah in the night of Sept.9, N.E. to E.N.E. wind ranging from 8 to 19 knots, the latter during squalls, overcast and very cloudy, heavy sea bearing in from E.S.E. The wind did not back to W.N.W. before 7 A.M. Sept. 11 (Monthly Weather Review, Sept. 1884). 2) On the morning of Sept. 10, the barometer at Savannah showed a fall of 0.11 inches in 8 hours with a fresh E. wind and rain. The center was between Savannah and Jacksonville (Monthly Weather Review, Sept. 1884). 3) Steamship "Guadeloupe" was at Key West on Sept. 11. She had fine weather until the night of Sept. 10 when the vessel had light rains and wind squalls between the Bahamas and the Florida peninsula (Monthly Weather Review, Sept. 1884). 4) In the next 24 hours from the morning of Sept. 10, the center moved inland and was between Savannah and Augusta, with rain at both places and a fresh S. wind at Savannah and a fresh N. wind at Augusta. At midnight Sept. 11-12 and in the morning of Sept. 12, the center remained nearly N. of Charleston, where the barometer read 29.84 inches. By afternoon Sept. 12, it appears that the center was near the coast between Charleston and Savannah, the barometer being 29.78 inches at Charleston. Weather maps showed the center to have been to the S.E. of Savannah at midnight Sept. 12-13 and to the E. of that place in the morning of Sept. 13 (Monthly Weather Review, Sept. 1884). 5) Steamship "Algiers", between lat. 27 55 N., long. 79 35 W. on Sept. 11 and lat. 36 15 N., long. 74 40 W. on Sept. 14, reported a phenomenal backing of the wind from S.W. on Sept. 11 by way of E. to N.N.E. on Sept. 13 (Monthly Weather Review, Sept. 1884). 6) Bark "Alabama". Sept. 13, lat. 31 30 N., long. 78 30 W., had a heavy N.E. gale lasting 17 hours, during which she had decks swept, spars and sails carried away and sustained other damage (Monthly Weather Review, Sept. 1884). 7) Steamship "Louisiana", from New Orleans, Sept. 10. Encountered a heavy N.E. gale with high sea on Sept. 13-14 during which was obliged to lay to for 12 hours (The New York Times, Sept. 16, 1884, p.9, col.6). 8) Our Philadelphia correspondent telegraphed that the Mexican steamer "Hermanos" foundered during a gale off Frying Pan Shoals, N.C., on Saturday night (Sept. 13). The captain and 4 of the crew were drowned , 4 others were picked up on Sunday on a raft (The Times, London, Sept. 16, 1884, p.6, col.6). Author's note: The Monthly Weather Review, Sept. 1884 also referred to the wreck of the "Dos Hermanos", which appears to have been the full name of the vessel. 9) Schr. "Five Brothers". Sept. 13, about 140 miles E. of Charleston, lost and split sails in a N.E. gale which lasted 48 hours (Monthly Weather Review, Sept. 1884). 10) Steamship "Grip Fast". Sept. 14, lat. 29 14 N., long. 74 48 W.; at 4 A.M., fresh S.W. wind; at 8 A.M., barometer 29.80 inches, wind shifted to N.W. in a heavy gale with high sea; at 4 P.M., barometer 29.70 inches; at 8 P.M., wind shifted to N.E. and blew a strong gale with thick heavy rain squalls (Monthly Weather Review, Sept. 1884). 11) Steamship "Andes". Sept. 14, 5 A.M., wind shifted from S.S.E. to N. and increased in force very rapidly with heavy rain and occasional flashes of lightning; after 3 P.M., the wind shifted gradually from

N. until it reached E.N.E. at 6 P.M. at which time it blew strongest; hove to from 8 P.M. till the morning of Sept. 15; barometer at midnight (Sept. 14-15) 29.73 inches. The noon position was lat. 30 49 N., long. 74 27 W. (Monthly Weather Review, Sept. 1884). Author's note: According to The New York Times, Sept. 21, 1884, p.14, col.5, the "Andes" came to New York from Puerto Limon (Costa Rica); however, The New York Times, Sept. 21, 1884, p.3, col.7, stated that the ship was coming from Mayaguez (Puerto Rico). 12) Steamship "St. Alpin", from St. Thomas, experienced a terrific N.E. gale with very high and dangerous sea on Sept. 14, the wind having blown with hurricane force (The New York Times, Sept. 19, 1884, p.8, col.7). 13) Schr. "R.M. Walls", noon Sept. 14, lat. 33 29 N., long. 75 W., barometer 30.10 inches, strong N.E. wind with very high sea (Monthly Weather Review, Sept. 1884). 14) Steamer "Valencia". Sept. 14, lat. 29 30 N., long. 70 35 W., barometer 29.90 inches, wind S. by E. force 8, heavy sea from S.S.W. At 9:45 A.M. wind suddenly veered to S.S.W. in a squall of hurricane force with heavy rain and lightning, strong gales and squalls during the remainder of the day (Monthly Weather Review, Sept. 1884). 15) Schr. "Carrie E. Woodbury". Sept. 14, lat. 30 40 N., long. 70.05 W., barometer 30,04 inches, wind E. force 6 (Monthly Weather Review, Sept. 1884). 16) Bark "Paul". Sunday, Sept. 14, 4 A.M., barometer 30.20 inches, strong W.S.W. wind, lightning at N.W.; 5 A.M., barometer 29.85 inches, wind blowing strongly from W. and N.W.; 8 A.M., barometer 29.60 inches, wind blowing fearfully; noon, lat. 29 10 N., long. 75 W.., barometer 29.50 inches, very high sea; 4 P.M., barometer 29.20 inches, vessel all the time on her beam ends; 6 P.M., barometer 29.20 inches, weather moderating; 8 P.M., barometer 29.00 inches, calm, high sea running, sky very bright; 11 P.M., barometer 29.00 inches, wind fell out from N.E. with very heavy rain; midnight Sept. 14-15, barometer 29.15 inches and rising, wind wearing back to N.N.E., terrific squalls; Monday, Sept. 15, 4 A.M., barometer 29.20 inches, wind blowing at its strongest from N., heavy rain; 8 A.M. barometer 29.35 inches, wind blowing at its strongest from N.N.W., heavy rain; noon, barometer 29.50 inches, wind blowing a full gale from N.W.; 4 P.M., barometer 29.55 inches, full N.W. gale; 8 P.M., barometer 29.70 inches, N.W. wind moderating at times, very high sea; midnight Sept. 15-16, barometer 29.80 inches, moderating W.N.W. wind, very high sea. At the end of the hurricane the "Paul" reported a position at lat. 27 20 N., long. 73 50 W. (Monthly Weather Review, Sept. 1884). 17) Steamship "Grip Fast". Sept. 15, lat. 30 N., long. 75 W., barometer slowly rising from 29.80 inches at 4 A.M. to 29.90 inches at 4 P.M., had a N.E. hurricane all day (Monthly Weather Review, Sept. 1884). 18) Steamship "Andes". Sept. 15, lat. 31 22 N., long. 74 46 W., barometer 29.88 inches, wind N. to E. wind and sea slightly moderating (Monthly Weather Review, Sept. 1884). 19) Schr. "Bonanza". Sept. 15, lat. 31 27 N., long. 77 46 W., had a strong E. gale and heavy sea throughout the day (Monthly Weather Review, Sept. 1884). 20) Schr. "R.M. Walls". Sept. 15, lat. 29 27 N., long. 75 29 W., barometer falling from 30.00 inches at 11 A.M. to 29.35 inches at 1 P.M., the wind being about N. by E., during this time "the air was full of mist and vapor" and a very heavy cross sea was running; midnight Sept. 15-16, barometer 29.20 inches; 11:30 A.M.

NORTH ATLANTIC TROPICAL STORMS
ORIGINATING IN THE PERIOD
1884
1
Sept. 1
2
Sept. 3
3
Sept. 10
4
Oct. 7

Fig. 1.

Sept. 16, barometer 29.18 inches, the gale was at its height blowing from N.; it then suddenly died out, leaving the vessel in a dead calm in a trough of a very heavy sea. After about 5 minutes the wind suddenly burst out from W.S.W. and the barometer rose to 29.35 inches, but shortly fell again to 29.18 inches, at which reading it remained until 4 A.M. Sept. 17 (?). The "R.M. Walls" reported to have been at lat. 27 50 N., long. 75 59 W. at noon Sept. 17 (Monthly Weather Review, Sept. 1884). Author's note: The statement that the barometer remained at 29.18 inches until 4 A.M. Sept. 17 seems to be erroneous. 21) Steamer "Serra". Sept. 15, noon, lat. 31 51 N., long. 76 12 W. Day began with tempestuous winds from N.N.E. , heavy sea from N. and E., barometer 30.00 inches ; at 8 hours, barometer 29.90 inches, N.E. wind, sky of a hurricane-like appearance; at 10 hours, barometer 29.70 inches; at 14 hours, barometer 29.60 inches, confused sea from E., N.E. and S.W.; at 20 hours, barometer 29.20 inches. Sept. 16, noon, lat. 30 40 N., long. 76 03 W.; at 2 hours, barometer 29.10 inches, N. wind; at 4 hours, barometer 29.00 inches, wind extremely baffling; 6 hours, barometer stationary, N.W. wind; 7 hours, barometer 29.05 inches. After this time, the barometer rose gradually and wind moderated; Sept. 17, noon, lat. 27 30 N., long. 75 28 W. (Monthly Weather Review, Sept. 1884). Author's note: It is obvious that the above hours were counted from midday. 22) Schr. "Bonanza". Sept. 17, lat. 30 20 N., long. 77 48 W., had W. and N.N.W. gale with rain squalls (Monthly Weather Review, Sept. 1884). 23) Schr. "Carrie E. Woodbury". Sept. 17, lat. 31 12 N., long. 70 30 W., barometer 29.74 inches, wind S.S.W. force 7 (Monthly Weather Review, Sept. 1884). Author's note: The barometer reading should have been 29.94 inches in order to match the equivalence of 760.5 millimeters of mercury which was also given. 24) Steamship "Muriel". Sept. 17, lat. 30 45 N., long. 69 24 W., barometer 29.94 inches, wind S.W. force 5 (Monthly Weather Review, Sept. 1884). 25) Steamship "San Marcos". Sept. 17, lat. 29 22 N., long. 79 20 W., barometer 29.99 inches, wind N.W. force 6 (Monthly Weather Review, Sept. 1884). 26) Steamship "Andes". Sept. 17, lat. 32 20 N., long. 75 W., barometer 29.64 inches, wind shifting from E.N.E. to N.W., weather clearing (Monthly Weather Review, Sept. 1884). 27) Steamship "Benvenue", from Yokohama (Japan). Sept. 17, 450 miles E.S.E. of Sandy Hook, encountered a hurricane from S.S.W. to N. by way of E., the hurricane lasted 6 hours (The New York Times, Sept. 21, 1884, p.14, col.5). Author's note: The Monthly Weather Review, Sept. 1884, also referred to this ship report but stated that she encountered the hurricane about 400 miles instead of at 450 miles E.S.E. of Sandy Hook. The "Benvenue" should have met the storm late on Sept. 17. 28) Ship "John T. Berry", from Antwerp. On Sept. 18, a terrific hurricane struck the ship, lasting 3 hours. On the morning of Sept. 20, the ship sighted the bark "Halcyon" in a disabled condition. The bark had left New York for Cette (France) on Sept. 12 and lost her rudder and foremast in a hurricane on Sept. 18 (The New York Times, Sept. 27, 1884, p.2, col.3). Author's note: The Monthly Weather Review, Sept. 1884, added that the "Halcyon" was abandoned at lat. 40 N., long. 60 50 W. on Sept. 20. Regarding the "John T. Berry", the same publication stated that, in about lat. 41 N., long. 58 W. at 7 P.M. Sept. 19, the wind hauled from S.S.E. to

N.N.W. and blew a hurricane with very high sea. However, the day seems to be in error and the correct time should have been 7 P.M. Sept. 18. 29) Schr. "Anna Bell". Sept. 18. lat. 36 N., long. 62 W., had a heavy gale during which she lost sails, had decks swept and sustained damage to rigging (Monthly Weather Review, Sept. 1884). 30) Bark "Wellington", Sept. 19, lat. 42 26 N., long. 55 14 W. Strong S.W. wind and heavy sea. In the evening (of Sept. 18), the wind increased to a hurricane from E.; at midnight (Sept. 18-19), the wind died out and backed to N. and then blew with renewed force until 4 A.M., when it was W. and moderating. The barometer fell from 30.20 to 29.00 inches in 12 hours (Monthly Weather Review, Sept. 1884). 31) Steamship "Rugia". Sept. 19, in about lat. 44 16 N., long. 53 58 W., 3 A.M., barometer falling, minimium 29.57 inches, wind southerly force 3 to 7, rainy, threatening weather; 4:30 A.M., wind shifted to N. to N.N.E. force 7 with rising barometer and clearing weather. The wind afterward shifted to N.W. and decreased in force. From 8 A.M. to noon a high S.W. sea prevailed (Monthly Weather Review, Sept. 1884). 32) Lloyd's agent at Crookhaven telegraphed that brigantine "W. Gale" reported that in lat. 42 32 N., long. 51 44 W., on Sept. 19, during a gale, lost part of her deckload (The Times, London, Oct. 8, 1884, p.11, col.6). 33) Bark "Cito". Sept. 19, near lat. 44 N., long. 50 W., reported a terrific hurricane from S.S.W. which lasted for 3 hours; after a short lull, the wind suddenly shifted to N., N.N.W. and W.N.W. and blew as fiercely as before. Officers of the vessel stated that the barometer fell nearly one inch during the hurricane and rose rapidly when the wind changed (Monthly Weather Review, Sept. 1884). 34) The "Valkyrian", from St. John, arrived at Liverpool and reported that on Sept. 19, in lat. 46 N., long. 82 W. (?), she lost her deckload and had a portion of her bulwarks on port side carried away (The Times, London, Oct. 2, 1884, p.11, col.6). Author's note: Long. 82 W. is obviously wrong; it might have been long. 52 W. 35) By Sept. 20, the area of low barometer was shown near lat. 51 N., long. 25 W., the readings ranging from 29.90 to 29.69 inches (Monthly Weather Review, Sept. 1884). 36) By Sept. 21, the low pressure was to the N.W. of Ireland (Monthly Weather Review, Sept. 1884). 37) Map showing a track for this storm starting off the Georgia coast on Sept. 10 and extending to the vicinity of 51 degrees N., 29 degrees W. on Sept. 20 (Monthly Weather Review, Sept. 1884).

Most information contained in the items above was not found to support the storm track shown in Neumann et al. (1993) as for Storm 2, 1884. After a careful analysis of all available information, the author of this study concluded that information in items 1) through 3) and in portions of item 4) did support the above mentioned track for the 48-hour period from 7 A.M. Sept. 10 to 7 A.M. Sept. 12. The author felt that a new track was required to be established after the latter time indicated. Therefore, he estimated new 7 A.M. positions for the period Sept. 13-20 on the basis of information in items 4) through 37). The author's 7 A.M. Sept. 13 position was near 30.3 degrees N., 77.3 degrees W. and was based on items 4) through 6); his 7 A.M. Sept. 14 position was near 30.0 degrees N., 74.0 degrees W. and was chiefly based on items 10), 11) and 16); the 7 A.M. Sept. 15 position was about 28.5 degrees N., 74.0

degrees W. and was primarily based on items 16), 17) and 20); the 7 A.M. Sept. 16 position was about 28.5 degrees N., 75.3 degrees W. and was estimated on the basis of information in items 20) and 21); the author's position for 7 A.M. Sept. 17 was near 31.7 degrees N., 74.0 degrees W. and was primarily based on item 26); similarly, items 28) and 29) as well as space-time continuity helped the author in estimating his 7 A.M. Sept. 18 position near 38.0 degrees N., 64.0 degrees W.; his 7 A.M. Sept. 19 position near 44.0 degrees N.,50.5 degrees W. was based on information in items 30), 31) and 33) and on space-time continuity; the 7 A.M. Sept. 20 position was about 51.0 degrees N., 29.0 degrees W. and was primarily based on item 37) and to a much lesser extent on item 35). The author of this study used his 7 A.M. positions above, as well as those for Sept. 10-12 in Neumann et al. (1993) as for Storm 2, 1884, to prepare the track which is displayed in Fig. 1. Although item 36) suggested that the storm still existed on Sept. 21, the track was terminated on Sept. 20 because any crude 7 A.M. Sept. 21 estimate would have placed the storm on or beyond the limits of the tracking map.

The bark "Paul" (item 16) and the schooner "R.M. Walls" (item 20) were in the western portion of the center of the storm at 8 P.M. Sept. 14 and shortly after 11:30 A.M. Sept. 16, respectively. Both vessels reported calm with barometer readings of 29.00 inches and 29.18 inches, respectively. At high latitude, the barks "Wellington" (item 30) and "Cito" (item 33) reported lulls as the center of the storm went by them on Sept. 19. The "Cito" also reported a barometer reading of 29.00 inches and a third 29.00 inches reading was reported by the steamer "Serra" (item 21) as the center passed very close to the E. of the vessel at 4 P.M. Sept. 16. These pressure values suggested that the intensity of Storm 3, 1884 was near the threshold between a weak and a moderate hurricane.

It should be indicated as a matter of curiosity that neither Dunn and Miller (1960) nor Tannehill (1938) mentioned this storm. A probable reason for their omission could have been that the storm was very weak in Georgia and the Carolinas.

Storm 4, 1884 (Oct. 7-17).

This storm corresponds to Storm 3, 1884 in Neumann et al. (1993).

The following information was found in relation to this storm: 1) Prior to and during Oct. 7, very heavy rains were reported to have occurred in Jamaica (Monthly Weather Review, Oct. 1884). 2) The steamship "Cienfuegos" sailed from Cienfuegos to Santiago de Cuba and had strong N.E. wind with cloudy weather, barometer 29.80 inches. On the morning of Oct. 8, the "Cienfuegos" was off Cape Cruz with light E.S.E. breeze and heavy rain, wind increasing from 8 A.M. to noon. During the afternoon, the wind shifted to E.N.E. and N.E. with heavy rain squalls. At 4 P.M. Oct. 8, the vessel was in the harbor of Santiago de Cuba. From 4 to 9 P.M. the wind blew in hurricane-like squalls from N.N.E.; at 9:30 P.M.it was blowing a hurricane from N.N.E. with barometer 29.58 inches; by 10 P.M. the wind had shifted to N.N.W. and was blowing with hurricane force;

barometer 29.51 inches; at 11 P.M., wind W. by N. with heavy rain squalls, barometer 29.60 inches and rising; midnight (Oct. 8-9),wind W. by S., moderating, squalls still heavy and frequent; noon Sept. 9, wind S.W., blowing strongly, weather clearing, barometer 29.85 inches (Monthly Weather Review, Oct. 1884). 3) Press report. A hurricane coming from the direction of Jamaica, passed over Santiago de Cuba on Wednesday night (Oct. 8). Some small vessels in the harbor and a number of houses in the city were slightly damaged (Monthly Weather Review, Oct. 1884). 4) Oct. 8-9, 1884. A cyclone of moderate intensity crossed the easternmost province of Cuba, its center passing to the east of the capital (Santiago de Cuba). It caused some heavy damage and several persons were injured (Sarasola, 1928). Author's note: Actually taken from the catalog of Cuban hurricanes by M. Gutierrez-Lanza which is included in Sarasola (1928). 5) The steamship "Cienfuegos" was in the harbor of Guantanamo Oct. 10-12 and reported light S. and S.E. winds with heavy rains during that period (Monthly Weather Review, Oct. 1884). 6) Letter from Nassau dated on Oct. 24. A heavy storm with hurricane proportions swept the eastern part of the Bahamas on Oct. 10-16, causing considerable damage to crops and fruit plantations and the loss of a number of vessels engaged in inter insular commerce and sponging. The schooner "Jonathan Knight" encountered the gale off Abaco and went upon a reef at Eleuthera at midnight Oct. 15. On Oct. 16, a portion of a schooner ran ashore 6 miles N. of Green Turtle Cay. The schooner "F.A. Server" sprung a leak and was abandoned off Harbor Island on the morning of Oct. 17 (The New York Times, Nov. 1, 1884, p.1, col.4). 7) Steamship "Ivanhoe". Oct. 11, off Cape Maysi (Cuba), wind S.W. force 7, increasing during the day to force 8, with heavy rain (Monthly Weather Review, Oct. 1884). 8) Schr. "Josephine". Oct. 12, lat. 27 N., long. 76 15 W., had a N.E. gale, blowing in gusts, with squalls of rain, barometer 28.65 inches (Monthly Weather Review, Oct. 1884). Author's note: The barometer reading is obviously in error and should probably read 29.65 inches. 9) Schr. "Isabel Alberto". Oct. 12, lat. 27 41 N., long. 75 21 W., had a severe E.N.E. gale with heavy rainshowers and high S.E. swells, barometer 29.83 inches, Monthly Weather Review, Oct. 1884). 10) Steamship "Ivanhoe". Noon Oct. 12, near Crooked Island, had a S.W. gale of force 8 to 10, with very heavy rain, barometer 29.60 inches and falling (Monthly Weather Review, Oct. 1884). 11) Schr. "Euphemia A. Hayes" left Fernandina (Florida) for Port-of-Spain (Trinidad) on Oct. 8. On Oct. 13, at lat. 31 N., long. 73 30 W., reported to have encountered a violent gale. The storm lasted for 5 days and the vessel was driven considerably towards the N. (The New York Times, Oct. 29, 1884, p.5, col.4). 12) Steamer "Kehrwieder". Oct. 13, lat. 27 11 N., long. 70 33 W., experienced a S.E. gale force 7 to 8, heavy rain squalls, thunder and lightning and high sea from all directions, barometer 29.63 inches (Monthly Weather Review, Oct. 1884). 13) The steamer "Jamaican" had similar weather and sea conditions on Oct. 13, but her reported position was in lat. 26 57 N., long. 72 27 W. (Monthly Weather Review, Oct. 1884). 14) Steamship "Ivanhoe". Noon Oct. 13, lat. 26 11 N., long. 74 23 W. During the forenoon (Oct. 13), the vessel had a S. gale force 10, with terrific squalls, heavy rain and dark, gloomy weather; at 2

P.M. Oct. 13, the wind shifted to E. and blew a whole gale, barometer (correction unknown) 29.10 inches; at 8 P.M. Oct. 13 it had shifted to N.E force 10, barometer 29.00 inches (Monthly Weather Review, Oct. 1884). 15) Steamship "Cienfuegos". Oct. 13, off Cape Maysi, had strong S.W. wind, with heavy rain squalls and barometer 29.85 inches and rising (Monthly Weather Review, Oct. 1884). 16) Steamship "Kehrwieder". Noon Oct. 14, lat. 26 14 N., long. 74 26 W. During the morning (Oct. 14) had S.S.E. wind force 9, barometer (correction unknown) 29.58 inches; during the afternoon (Oct. 14), continued to fall and the wind shifted from S. to S.E., E.S.E. and E., blowing with hurricane force throughout and with heavy rain squalls from S. and S.W.; at 4 P.M. Oct 14, the wind shifted to E., barometer 28.95 inches and at midnight (Oct. 14-15) it was N.E., moderating (Monthly Weather Review, Oct. 1884). 17) Steamship "Jamaican". Oct. 14, noon position in lat. 26 26 N., long. 74 15 W. Winds S.E. by S.to S.E. force 5 to 8 until 4 A.M. (Oct. 14); at sunrise the sky was clear overhead while a dense bank of clouds in the southwest with a wild and threatening appearance all around the horizon; at 8 A.M. the vessel appeared to steam into the bank of clouds and until noon she experienced heavy squalls with high confused sea; during the afternoon the wind shifted from S.S.E. to E. and at midnight it was blowing from N.E. force 9, barometer (correction unknown) 29.25 inches (Monthly Weather Review, Oct. 1884). 18) Schr. "Eunie Mc Kown", arrived from Bluefields. On Oct. 14, had her headgear carried away and lost sails in a heavy storm which continued until late the following day (The New York Times, Oct. 26, 1884, p.3, col.7). 19) Brig "Favorite" arrived from Martinique. Met a severe storm on Oct. 14-15. During the afternoon of Oct. 16, the wind began to back around. At 7 P.M., thick black clouds and a hurricane from N. struck the vessel. The wind might have blown at 90-100 mph. The barometer did not fall until the hurricane had struck the vessel (The New York Times, Oct. 29, 1884, p.5, col.4). 20) Schr. "Sunlight" had a hurricane from S. to N. on Oct. 15 at lat. 27 30 N., long 69 W. The storm continued for 18 hours (The New York Times, Oct. 29, 1884, p.8, col.4). 21) Bark "Atalaya", from Ponce, reported that at lat. 37 50 N. (it should read 27 50 N.), long. 68 30 W., encountered a N.E. hurricane lasting 10 hours (The New York Times, Oct. 29, 1884, p.8, col.4). 22) Bark "Scud" was dismasted during a heavy hurricane from S. to N. at lat. 27 30 N., long. 69 W. on Oct. 15 and will try to reach Nassau (The New York Times, Oct. 29, 1884, p.8, col.4). Author's note: According to The New York Times, Nov. 1, 1884, p.1, col.4, the "Scud" arrived in Nassau under jury masts on Oct. 21, having lost spars in a gale at lat. 27 30 N., long. 72 30 W. on Oct. 14-15. This additional information shows a difference of three and a half degrees in longitude with respect to the location previously given. 23) The steamship "Santo Domingo" arrived from Turks Is. and brought the crew of brigantine "Emma L. Hall" which was wrecked on Oct. 15. One sailor said that the brigantine arrived at Turks Is. from Rio de Janeiro, via Barbados on Oct. 7. When work was stopped in the evening of Oct. 6 (?) there were 12000 bushels of salt on board. The next day (?) the wind blew from S.W. and increased to a terrific gale. Huge waves rolled from the open sea and struck the vessel with great violence. It was the worst storm

at Turks Is. in 25 years. Brig "Louise", schooner "Nellie M. Johnson" and bark "Caro" went ashore at Turks Is. during the same storm (The New York Times, Oct. 24, 1884, p.3, col.2). Author's note: The days indicated by (?) are obviously wrong; they are probably Oct. 14 and 15 because the brigantine was wrecked on Oct. 15. 24) On Oct. 16 the storm center moved northeastward and the heavy gales continued in all quadrants of the disturbance which was central near 28 degrees N., 68 degrees W. (Monthly Weather Review, Oct. 1884). Author's note: The above location is not far away from the route the brig "Favorite" should have followed while sailing from Martinique to New York, having felt the height of the storm late on Oct. 16 (item 19). 25) By Oct. 17, the storm had passed to the eastward of the 60 degrees W. meridian (Monthly Weather Review, Oct. 1884). 26) Map showing two separate tracks presumably associated with the storm. One of them was started just N.E. of Jamaica and was ended just N. of eastern Cuba on Oct.9. The second track was started near 22 degrees N. 75 degrees W. on Oct. 11 and was ended near 28 degrees N., 68 degrees W. on Oct. 16 (Monthly Weather Review, Oct. 1884).

The information contained in the above items suggested the introduction of some modifications along the track for this storm which is displayed in Neumann et al. (1993) as for Storm 3, 1884. Their 7 A.M. positions for Oct. 7 and 8 were kept unchanged but the author of this study introduced new 7 A.M. positions over the period Oct. 9-14. 7 A.M. positions given in Neumann et al. (1993) for the period Oct. 15-16 (Storm 3, 1884 in their publication) were also kept unchanged. The author of this study estimated the storm center to have been near 20.7 degrees N., 75.3 degrees W. at 7 A.M. Oct. 9; this position is slightly to the S.E. of the one shown in Neumann et al. (1993) and was based on the observations in item 2), on the content of items 3) and 4) and on space-time continuity. The author's 7 A.M. Oct. 10 position near 22.0 degrees N., 75.0 degrees W. was based on space-time continuity along the track since very little useful information for tracking purposes was available on that day. The author used observations in item 7) to estimate a position near 22.7 degrees N., 75.0 degrees W. at 7 A.M. Oct. 11. Based on items 8) through 10) in general and on the report furnished by the "Ivanhoe" (item 10), in particular, the author's estimated position for 7 A.M. Oct. 12 was near 23.7 degrees N., 75.0 degrees W. Observations which were taken in the core of the storm by the "Ivanhoe" on Oct. 13 (item 14) and by the "Kehrwieder" (item 16) and the "Jamaican" (item 17) on Oct. 14 clearly showed that the storm moved northward from 7 A.M. Oct. 12 to 7 A.M. Oct. 13 but that it moved very little from 7 A.M. Oct. 13 to 7 A.M. Oct. 14, and that an eastward motion began on Oct. 14. Based on the above observations, the author estimated a position near 25.7 degrees N., 75.0 degrees W. for 7 A.M. Oct. 13 and kept the storm stationary for 24 hours, resulting in the same estimated position for 7 A.M. Oct. 14. The author acknowledges that the stationary treatment is probably unrealistic and that most likely erratic motions, or even a small loop along the track, took place. The author's new positions, together with those shown in Neumann et al. (1993) as for Storm 3, 1884 which were not modified because they were found to be reasonable, allowed the author of this study to

prepare the storm track presented in Fig. 1.

On the basis of barometer readings of 29.00 inches taken by the "Ivanhoe" (item 14) and of 28.95 inches taken by the "Kehrwieder" (item 16), presumably near but not quite at the center of the storm, and on the wind estimate of 90-100 mph given by the "Favorite" (item 19), it is likely that Storm 4, 1884 had attained the intensity of a moderate hurricane.