

Nineteen storms were identified as having occurred in 1887. Tracks for these storms are presented in Fig. 1.

Storm 1, 1887 (May 15-19), T. S.

This is a new storm case in the sense that it is not included in Neumann et al. (1993). However, the Monthly Weather Review, May 1887, referred to this system without attaching any tropical characteristics to it.

Documentation of this storm was based on the following information: 1) On May 15 the depression was central to the S.E. of Bermuda, with fresh to strong gales and rain over a considerable area to the northward. By May 16 the center had moved N.W. of Bermuda. Passing slowly northward, the storm disappeared N. of Newfoundland on May 20, with an area of high barometer over the ocean opposing an eastward course (Monthly Weather Review, May 1887). 2) Steamship "Orinoco", at Bermuda. May 15, in the morning very heavy rain, falling barometer, fresh gale; 8 P.M., barometer 29.57 inches, fresh S.E. gale, heavy rain and thunder. May 16, 6 A.M., barometer 29.55 inches, fresh S. gale, heavy rain; 10 A.M., wind S.S.E., rain; noon, barometer 29.45 inches, heavy S. gale; midnight (May 16-17). barometer 29.55 inches, fresh S.W. gale. May 17, in the morning fresh S.W. wind, rising barometer; in the afternoon, fine weather (Monthly Weather Review, May 1887). 3) Map showing a track for this system. Daily positions are as follows: May 15, 30.3 degrees N., 64.7 degrees W.; May 16, 32.3 degrees N., 66.0 degrees W.; May 17, 34.3 degrees N., 66.7 degrees W.; May 18, 36.5 degrees N., 66.7 degrees W.; May 19, 42.3 degrees N., 66.7 degrees W. (Monthly Weather Review, May 1887).

The author of this study has accepted the positions in item 3) as his 7 A.M. positions in preparing the track shown in Fig. 1. The 7 A.M. May 16 position was found to be in fairly good agreement with information given by the "Orinoco" (item 2); however, no information was available to verify the positions given in item 3) for the other days. The track was ended just N. of Newfoundland before 7 A.M. May 20 (item 1).

Although this system was classified as a tropical storm by the author of this study, it is possible that some subtropical characteristics might have been present. It is also very likely that the system gradually became extratropical as it advanced towards high latitudes.

Storm 2, 1887 (May 17-21), T. S.

This is the same storm which Neumann et al. (1993) identify as Storm 1, 1887.

The following information was found in relation to this storm: 1) Steamship "Athos". May 17., off the S.E. end of Jamaica, weather very dark and thick, with torrents of rain, vivid lightning and strong gusts of wind from S.E.; continued very squally and unsettled, with heavy rain until May 18 (Monthly Weather Review, May 1887). 2) Steamship "Pomona". May 17-18, in Montego Bay,

Jamaica; very heavy rain, wind from S.W., in heavy, short squalls, making a hard sea at times; at night very dark; lowest barometer 29.71 inches on May 18. This was an unusually heavy wind for Jamaica, for this time of the year (Monthly Weather Review, May 1887). 3) Steamship "Alvena". May 17, from Kingston to Lucea, Jamaica, experienced very rough weather after leaving Port Royal at 10 A.M. Greenwich mean time. May 18, the wind commenced to blow from the southward with heavy rain squalls and increased up to 4 P.M., during which time the wind hauled to the westward and a heavy sea was running from S.W.; barometer (mercurial) 29.60 inches at the last-mentioned hour. After 4 P.M. the wind and squalls decreased in strength, but wind continued to blow strong from the westward (Monthly Weather Review, May 1887). 4) May 18-19, 1887. 4) Cyclonic perturbation crossed the eastern portion of Cuba on a N.E. course. It only produced heavy rain and squally showers which reached Caibarien on the W. (Sarasola, 1928). Author's note: Actually taken from the catalog of Cuban cyclones by M. Gutierrez-Lanza, which is included in Sarasola (1928). 5) Steamship "Athos". May 20, lat. 26 13 N., long. 74 12 W., encountered an E. gale, accompanied by heavy rain squalls lasting 12 hours; lowest barometer 29.85 inches (Monthly Weather Review, May 1887). 6) Map showing a track for this storm as follows: May 17, 19 degrees N., 78.7 degrees W.; May 18, 21.2 degrees N., 79 degrees W.; May 19, 23.2 degrees N., 78.7 degrees W.; May 20, 23.8 degrees N., 74.7 degrees W.; May 21, 27.2 degrees N., 70.7 degrees W. (Monthly Weather Review, May 1887).

Based on the content of the items above, some modifications along the track which Neumann et al. (1993) showed as for Storm 1, 1887) were proposed by the author of this study. He estimated new 7 A.M. positions for the period May 17-19 and decided to keep unchanged the positions displayed in Neumann et al. (1993) for May 20 and 21 because they were found to be supported by information in items 5) and 6) and in item 6), respectively. The author's estimates were as follows: May 17, near 16.5 degrees N., 77.5 degrees W, based on information in items 1) and 3); May 18, near 18.7 degrees N., 78.7 degrees W., based on information in items 2) and 3) and, to a lesser extent, in item 4); May 19, 22.0 degrees N., 77.5 degrees W., based on information in item 4). The author's track for Storm 2, 1887 is shown in Fig. 1.

The tropical storm status which Neumann et al. (1993) assigned to this storm was found to be supported by the content of the items above.

Storm 3, 1887 (Jun. 11-13), T. S.

This is a new storm case that the author of this study has recently documented. However, this case is not entirely new because it had been previously mentioned in some catalogs of Cuban cyclones (Sarasola, 1928; Martinez-Fortun, 1942).

Documentation of this case was based on the following information: 1) Jun. 11-15, 1887. Vast cyclonic perturbation passed over the South Sea (the Caribbean) and over Vuelta Abajo towards the Gulf of Mexico. Its effects reached Havana, Matanzas and Santa Clara. There were torrential rains and moderate winds. It caused

extensive flooding, with the loss of crops and some lives (Sarasola, 1928). Author's note: Actually taken from the catalog of Cuban cyclones by M. Gutierrez-Lanza which is included in Sarasola (1928). 2) Jun. 11-15. 1887. Cyclonic weather from Santa Clara to Pinar del Rio due to a cyclone in the Gulf of Mexico (Martinez-Fortun, 1942). 3) Havana, Jun. 13. Excessive rain has fallen here and will continue for some time. Several districts have been flooded. The barometer is falling (The New York Times, Jun. 14, 1887, p.1, col.6). 4) New Orleans, Jun. 28. The steamer "Faxhall", from Puerto Limon (Costa Rica), reported: The steamer sailed Jun. 11 from the Passes (heading for Puerto Limon). The weather was cloudy and strong S. winds and high seas made the captain unable to take ship's positions. On the afternoon of Jun. 13 (Monday), the steamer ran ashore off Colorados Reef, 21 miles E. of Cape San Antonio (western tip of Cuba) and remained fast for 40 hours (The New York Times, Jun. 29, 1887, p.5, col.1). 5) Pensacola, Jun. 16. On the afternoon of Jun. 13, 90 miles E. of Sand Island Light, the steamship "Vidette", from New York for Mobile, sprung a leak. She labored heavily and at 7:30 P.M. was abandoned. The crew was taken from 2 boats by a tug about 12 miles off Pensacola Light and arrived here this afternoon (The New York Times, Jun. 17, 1887, p.1, col.6). 6) Mobile, Jun. 16. The vessel "Vidette" was heavy laden and made water freely during the storm of Jun. 13. She was down by the stern and filling rapidly when abandoned (The New York Times, Jun. 17, 1887, p.1, col.6).

In spite of information in item 1), this system does not seem to have been a tropical storm when crossing over the westernmost portion of Cuba. Item 2) and items 4) through 6) provided, however, strong clues that it reached, at least, the intensity of a weak tropical storm in the Gulf of Mexico. Consequently, the author of this study decided to add this case as a tropical storm to the cyclones of 1887 which are covered in Neumann et al. (1993).

The author's 7 A.M. positions for Storm 3, 1887 are as follows: Jun. 11, 20.5 degrees N., 84.0 degrees W., primarily based on information in item 1); Jun. 12, near 23.5 degrees N., 86.5 degrees W., based on items 1), 2) and 4); Jun. 13, near 27.0 degrees N., 88.0 degrees W., primarily based on information in items 4) through 6). Due to the limited data available, the confidence the author has in the above positions is rather low but, nevertheless, such positions enabled him to produce the storm track shown in Fig. 1, which is believed to still depict quite well the general motion of the storm. Although items 1) and 2) suggest that the storm life-span extended to Jun. 15, the author was unable to find any information beyond Jun. 13 and, therefore, ended his track on this latter day.

Storm 4, 1887 (Jul. 28-28), H.

This is the same storm which Neumann et al. (1993) identify as Storm 2, 1887.

The following information was found about this storm: 1) Bark "Florence", at Barbados, Jul. 20. During the last two days we have had light squally weather with rain storms, sultry weather and falling barometer. At 4 A.M. (Greenwich time) the weather commenced

to threaten, the glass having fallen to 29.64 inches. We put out extra ropes and lines and made all secure for a blow; 6 A.M., blowing heavily, with squalls and sea running from E.S.E.; 7:30 A.M., wind increasing in the squalls; 8:30 A.M., in a terrific squall we parted all our lines and drove over the other side of the Creek, doing considerable damage; about the same time we saw distress signals out of the Roads and when daylight broke it was something terrific to look at, there being no less two barks, one barkentine, one brigantine, one no-masted schooner, one small steamer and two condemned vessels on the shore; one bark and brigantine broken up; the sea was like a mountain on the shore (Monthly Weather Review, Jul. 1887). 2) The path pursued by the cyclone was determined by a number of vessel's logs, reports and observations. It appears to have been a little S. of Barbados on Jul. 20, then to have moved westward over the central portion of the Caribbean Sea to just N. of lat. 15 N., long. 85 W. and then N.W. over the extreme eastern portion of Yucatan to about lat. 25 N. About the latter point. the path seemed to have been northerly and then changed to N.E. (Monthly Weather Review, Jul. 1887). 3) Jul. 24-26, 1887. A strong hurricane which came from Barbados passed far to the south of Cuba, with gusty winds of moderate intensity from Trinidad westward. At Batabano, several schooners were sunk. The hurricane caused heavy rains and flooding in the interior of the island. It passed over Yucatan into the Gulf of Mexico and then it recurved towards the N.E. (Sarasola, 1928). Author's note: Actually taken from the catalog of Cuban cyclones, which is included in Sarasola (1928). Trinidad is located practically on the coast of south-central Cuba and Batabano is a port on the southern coast of Havana province. 4) Through the kindness of Padre Benito Vines, S.J., Director of the Magnetic and Meteorological Observatory, Belen College, Havana, the Chief Signal Officer was kept informed by telegraph of the progress of the cyclone before it reached the coast of the United States, and timely warning was given to shipping on the Gulf and South Atlantic coasts, both by cautionary wind signals and special storm messages (Monthly Weather Review, Jul. 1887). 5) The cyclone arrived on the coast of western Florida on the morning of Jul. 27, with a central pressure of 29.60 inches and a wind velocity of 54 mph. After reaching Florida, the cyclone continued northeastward to the vicinity of Augusta, Ga. (Monthly Weather Review, Jul. 1887). Author's note: At landfall on the Gulf coast, the central pressure should have been much lower than the one of 29.60 inches which was indicated. That value was probably the one reported at a Signal Service station, either at Pensacola or at Cedar Keys. 6) Maximum wind velocities: Cedar Keys, 54 mph; Pensacola, 36 mph; Jacksonville, 36 mph; Savannah, 36 mph; Augusta, 20 mph; Atlanta, 30 mph; Mobile, 26 mph (Monthly Weather Review, Jul. 1887). 7) Total rainfall associated with the cyclone: Jacksonville, 3.50 inches; Titusville, 4.54 inches; Cedar Keys, 8.00 inches; Pensacola, 1.34 inches; Montgomery, 3.57 inches; Atlanta, 3.93 inches; Augusta, 6.02 inches (Monthly Weather Review, Jul. 1887). 8) Montgomery, Al., Jul. 27. The wind blew a gale here all day and the rain has fallen constantly. Reports from the surrounding country indicated immense damage to crops. Opelikea had 5.5 inches

of rain (The New York Times, Jul. 28, 1887, p.1, col.4). 9) Columbus, Ga. Jul. 30. This city is about the center of the district damaged by the rains which set in 4 days ago. The cotton crop is entirely ruined. Many cattle were swept away. Cabins were swept away like toy houses (The New York Times, Jul. 31, 1887, p.3, col.6). 10) Map showing a track for this storm. Daily positions along that track are as follows: Jul. 20, 15 degrees N., 61.5 degrees W.; Jul. 21, 15 degrees N., 67 degrees W.; Jul. 22, 15 degrees N., 72.2 degrees W.; Jul. 23, 16 degrees N. 76.5 degrees W.; Jul. 24, 18 degrees N., 82 degrees W.; Jul. 25, 20.5 degrees N., 87.5 degrees W.; Jul. 26, 25.7 degrees N., 91.2 degrees W.; Jul. 27, 30 degrees N., 86 degrees W. (Monthly Weather Review, Jul. 1887).

With the exception of a minor adjustment introduced for the 7 A.M. Jul. 20 position, the track in Neumann et al. (1993) as for Storm 2, 1887 was accepted as reasonable for Storm 4, 1887 in the light of most information contained in the above items. Therefore, after adjusting westward the 7 A.M. Jul. 20 position in Neumann et al (1993) by about 90 miles, to near 12.3 degrees N., 61.0 degrees W., to satisfy information in item 1), the track shown in the above publication was reproduced in Fig. 1.

The content of several of the items above allowed the author of this study to verify the hurricane status given in Neumann et al. (1993). In fact, the terms "strong hurricane" used in item 3) suggested the possibility that Storm 4, 1887 could have been a major hurricane.

Storm 5, 1887 (Jul. 30- Aug. 7), T. S.

This is the same storm that Neumann et al. (1993) identify as Storm 3, 1887.

The following information was found about this storm: 1) A track for this storm starting near 10 degrees N., 51 degrees W. towards the end of Jul. (it should be on Jul. 30) and ending to the south of central Cuba (Mitchell, 1924). Author's note: A much shorter track which is partially similar to the one described above is shown in the Monthly Weather Review, Aug. 1887. This shorter track extends from about 17 degrees N., 70.5 degrees W. on Aug. 5 to about 20.5 degrees N., 80.8 degrees W. on Aug. 7. 2) Storm of Jul. 30- Aug. 7, 1887. Windward Islands, Caribbean Sea (Tannehill, 1938). 3) The presence of this system was indicated by vessel reports to the south of Santo Domingo on Aug. 5, whence it apparently moved eastward (it should read westward) over the Caribbean Sea into the Gulf of Mexico on Aug. 8, accompanied by rain and fresh gales. Its course after Aug. 7 cannot be determined, owing to an absence of reports (Monthly Weather Review, Aug. 1887). 4) Bark "Florence", at East Harbor, Caicos Islands. Aug. 5, 4:30 A.M. (Greenwich time), threatening weather, barometer 29.61 inches and falling; 7:30 A.M., wind and sea rising rapidly; 8:30 A.M. barometer 29.57 inches, wind a hard gale, with heavy squalls and rain and high sea from S.E.; 10 A.M., barometer 29.55 inches, a very heavy S.E. squall of wind and rain, gale at its height; 11:30 A.M., barometer rising and gale moderating (Monthly Weather Review, Aug. 1887). 5) Aug. 6-8, 1887. Diminutive cyclone, owing its

extension and every, came from S. of Santo Domingo and Santiago de Cuba and passed to the S. and near Havana on Aug. 7, moving towards the Gulf of Mexico on a W.N.W. course. There was no important damage (Sarasola, 1928). Author's note: Actually taken from the catalog of Cuban cyclones by M. Gutierrez-Lanza, which is included in Sarasola (1928).

Although item 4) strongly suggests the possibility of a tendency for the cyclone to have reformed just N. of Hispaniola, such a happening was discarded because it would have been against information contained in the remaining items. The content of the latter items, however, was found to support the track shown in Neumann et al. (1993) as for Storm 3, 1887 and, consequently, that track was reproduced as for Storm 5, 1887 in Fig. 1.

As no evidence of hurricane intensity was shown in the above items, the tropical storm status which Neumann et al. (1993) attributed to this system was accepted by the author of this study.

Storm 6, 1887 (Aug. 15-23), H.

This is the same storm that Neumann et al. (1993) identify as Storm 4, 1887.

The following information was found in relation to this storm:

- 1) The depression apparently originated to the eastward of the Windward Islands and moved N.W. to about 22 degrees N., 63 degrees W. on Aug. 16 (Monthly Weather Review, Aug. 1887). Author's note: This position appears to be too far east.
- 2) Schr. "Mary A. Douglas" was towed to New York by the steamer "Pomona". The schooner left New York on Aug. 6 and on the evening of Aug. 16, at lat. 26 26 N., long. 71 18 W. was struck by a hurricane and thrown on her beam ends while the sea made a clean breach over her. At 9 P.M. a heavy sea struck the vessel and carried away the jibboom mast about 25 feet from the deck. At 1 A.M. Aug. 17, the wind moderated somewhat (The New York Times, Aug. 27, 1887, p.8, col.5).
- 3) Nassau, Aug. 24. Schr. "Mabel F. Staples" (from New York to Caibarien, Cuba). Aug. 18, lat. 24 43 N., long. 73 18 W., experienced a hurricane during which she sprung her foremast badly and lost foretopmast, bowsprit, some sails and rigging. She arrived in Nassau in distress on Aug. 21 (The New York Times, Aug. 30, 1887, p.5, col.6).
- 4) Storm of Aug. 16-20, 1887. Atlantic E. of Florida. Hurricane winds of exceptional violence along the coast (Tannehill, 1938). Author's note: The storm extended beyond Aug. 20.
- 5) Steamship "City of San Antonio" reported a hurricane on Aug. 19-20; wind veered from E.S.E. to S.W.; lowest barometer 28.56 inches at 1:45 A.M. Aug. 20 in lat. 33 48 N., long. 76 36 W. (Monthly Weather Review, Aug. 1887).
- 6) Savannah, Ga., Aug. 21. The "City of Savannah", which arrived here 12 hours late from New York, reported passing through a violent hurricane on Friday night (Aug. 19-20). The ship was then off Hatteras with the light in sight. She was headed out to sea and ran into the storm (The New York Times, Aug. 22, 1887, p.1, col.3).
- 7) Steamship "Manhattan". Aug. 20, 9 A.M., off S.E. point of Hatteras Shoal, weather very threatening, barometer falling fast from 29.94 inches, wind E.; 11 A.M., hove to on starboard track, head to E.; 1 to 3:30 P.M., storm very severe, the wind at times estimated 90 to 100 mph, barometer 29.13 inches

at 1 P.M.; 3:30 P.M., barometer commenced to rise and wind veered to S. and S.W. and commenced to moderate when it hauled to N.W. and cleared off (Monthly Weather Review, Aug. 1887). 8) Bark "Walter S. Massy" arrived here from Brunswick, Ga. in a dilapidated condition. Weather was fine until meeting a hurricane at 4:20 A.M. Aug. 20 when off Hatteras. At 8 A.M. the foremast was carried away. At about 1 hour later the wind moderated but the vessel was then scuding under bare poles with about 4 feet of water in her hold (The New York Times, Aug. 28, 1887, p.9, col.7). 9) Schr. "Louis Bucki". Had a hurricane on Aug. 19-20; lowest barometer 29.00 inches at 3 A.M. Aug. 20 in lat. 34 25 N., long. 76 50 W. Wind set in from S.E. to E. and steadily increased from 11 P.M. Aug 19 to 3 A.M. Aug. 20; after a lull of 15 minutes, the wind suddenly shifted to W.N.W., blowing squally and hard, then moderated gradually (Monthly Weather Review, Aug. 1887). 10) Steamship "Wyoming". Noon Aug. 21 (Greenwich time), lat. 43 32 N., long. 59 08 W., barometer 29.79 inches, light variable winds, mostly southerly with rain, wind backing to E.; 4 P.M., lat. 43 17 N., long. 60 16 W., barometer 29.70 inches, strong E.S.E. wind, with heavy rain, wind veering to S.W.; 6:10 P.M., wind fell light and veered around by W. to N.W. and N.E., and increased to hurricane force with a very heavy sea; 7:30 P.M., lat. 43 02 N., long. 60 50 W., barometer 29.05 inches, still blowing the same with very heavy rain and very confused sea; 8 P.M., wind moderating and backing to N.W.. barometer 29.16 inches; midnight, lat. 42 46 N, long. 61 36 W., barometer 29.72 inches, strong N.W. breeze and clearing (Monthly Weather Review, Aug. 1887). 11) Bark "Bassano" reported a whole gale on Aug. 20 and 21, wind backed from S.W. to S.E. to N.; lowest barometer 29.35 inches at 1:30 A.M. Aug. 21 in lat. 40 35 N., long. 68 04 W. The gale was accompanied by very heavy rain, terrific thunder and lightning and confused sea (Monthly Weather Review, Aug. 1887). 12) Steamship "State of Nebraska" reported a hurricane of short duration on Aug. 21; wind backed from S.E. to N.N.E.; lowest barometer 29.21 inches at noon Aug. 21 in lat. 42 33 N., long. 62 04 W. (Monthly Weather Review, Aug. 1887). 13) Steamship "British Prince", had a hurricane on Aug. 20 and 21; wind backed from S. by E. to S.E. by S. and shifted suddenly to N.W. by N.; lowest barometer 29.09 inches at 11:30 P.M. (Aug. 20) in lat. 39 54 N., long. 69 20 W. (Monthly Weather Review, Aug. 1887). 14) Steamship "Rhein" reported a S.S.W. to W.N.W. storm on Aug. 21; lowest barometer in lat. 40 05 N., long. 66 20 W. (Monthly Weather Review, Aug. 1887). 15) Ship "Charles S. Whitney" reported a hurricane on Aug. 21 and 22; wind veered from S.E. to N.W.; lowest barometer 29.29 inches at 4 A.M. Aug. 22 in lat. 42 15 N., long. 52 50 W. (Monthly Weather Review, Aug. 1887). 16) Steamship "Galileo". Aug. 22, noon, lat. 42 22 N., long. 51 19 W.; 3 A.M., a strong gale from S.W., with high rough sea; 7:30 A.M., shifted to W., barometer 29.44 inches; 11 A.M., shifted to N.W., barometer 29.58 inches; wind gradually decreased into a strong breeze (Monthly Weather Review, Aug. 1887). 17) Steamship "Ohio". Aug. 22, 10 A.M., in lat. 45 N., long. 41 30 W., wind S., increasing and hauling to W.; 4 P.M., wind falling light; 6 P.M., wind increasing from N.W., barometer 29.57 inches; 7 P.M., blowing a hurricane, barometer 29.08 inches; 7:30 P.M., moderating, strong gale (Monthly Weather

Review, Aug. 1887). 18) Steamship "Holland" reported a fresh gale on Aug. 22; wind backed from S.E. to N.; lowest barometer 29.12 inches at 11:44 A.M. in lat. 47 10 N., long. 41 30 W. (Monthly Weather Review, Aug. 1887). Author's note: 11:44 P.M. would fit better the space-time continuity along the track. 19) Steamship "Europa" reported a fresh gale on Aug. 22 and 23; lowest barometer 29.20 inches at 11:09 A.M. (probably on Aug. 22) in lat. 48 23 N., long. 38 09 W.; wind backed from N.E. to N.W. (Monthly Weather Review, Aug. 1887). Author's note: 11:09 P.M. would fit better the space-time continuity along the track. 20) Steamship "Umbria" reported a hurricane on Aug. 23-24; wind backed from S.E. to E. and N.W.; lowest barometer 28.85 inches at 1 P.M. Aug. 23 (Monthly Weather Review, Aug. 1887). 21) Steamship "Arizona". Aug. 23, noon (Greenwich time), lat. 50 51 N., long. 26 W., barometer 29.34 inches, wind S., moderate gale, barometer falling very rapidly and wind backing to S.E.; 9 P.M., lat. 50 30 N., long. 30 W., barometer 28.73 inches, wind had backed to N.W. round by E., N.E. and N.; barometer began to rise and a furious N.W. gale prevailed until after midnight Aug. 23-24 (Monthly Weather Review, Aug. 1887). 22) Steamship "Mineola" reported a hurricane on Aug. 23 and 24; wind veered from S.E. to W. and N.N.E., lowest barometer 29.00 inches at 8 P.M. Aug. 23 in lat. 51 10 N., long. 30 30 W. (Monthly Weather Review, Aug. 1887). 23) Steamship "Marengo" reported a whole gale on Aug. 23 and 24; wind veered from S.W. to W.N.W., lowest barometer 28.74 inches at 6 P.M. Aug. 23 in lat. 49 18 N., long. 26 33 W. (Monthly Weather Review, Aug. 1887). 24) Steamship "Oxford" reported a whole gale from Aug. 23 to Aug. 27, wind veered from S.E. to N.W.; lowest barometer 28.69 inches at 2:30 P.M. Aug. 23 in lat. 51 21 N., long. 30 39 W. (Monthly Weather Review, Aug. 1887). 25) Steamship "Britannic" reported a gale on Aug. 27, wind veered from S.E. to N.W.; lowest barometer 29.09 inches in lat. 51 06 N., long. 23 58 W. (Monthly Weather Review, Aug. 1887). 26) Steamship "Gellert" reported a whole W. to N.W. gale from Aug. 27 to Aug. 29; lowest barometer 29.26 inches at 5 A.M. Aug. 27 in lat. 49 20 N., long. 23 20 W. (Monthly Weather Review, Aug. 1887). 27) Steamship "Island" reported a fresh gale on Aug. 26 and 27; wind backed from S.E. to E. and N.W.; lowest barometer 28.84 inches at 9 A.M. Aug. 25 (it should probably read Aug. 26 or 27) in lat. 56 06 N., long. 26 35 W. (Monthly Weather Review, Aug. 1887). 28) Steamship "Indiana" reported a strong gale on Aug. 26 and 27; wind veered from S.W. to N.W.; lowest barometer 29.13 inches at noon Aug. 26 in lat. 50 52 N., long. 21 05 W. (Monthly Weather Review, Aug. 1887).

Information in the above items suggested the need for a number of modifications along the storm track presented in Neumann et al. (1993) as for Storm 4, 1887. For the period Aug. 15-16 such a track was accepted because, due to the lack of data, the author of this study was unable to verify their 7 A.M. Aug. 15 position and, on the other hand, their 7 A.M. Aug. 16 position appeared to be reasonable in the light of information in item 2). The author estimated new positions as follows: Aug. 17, 25.0 degrees N., 72.5 degrees W., based on item 2); Aug. 18, 27.0 degrees N., 76.7 degrees W., primarily based on item 3) and on space-time continuity along a smooth curve; Aug. 19, 29.5 degrees N., 79.0 degrees W., based on space-time continuity with some deceleration near the

recurving point and also on information in item 4); Aug. 20, 35.0 degrees N., 75.0 degrees W., based on the analysis of the content of items 5) through 9); Aug. 21, 41.0 degrees N., 66.0 degrees W., based on the analysis of the content of items 10) through 14); Aug. 22, 44.0 degrees N., 49.5 degrees W., primarily based on information in items 15) and 16); Aug. 23, 48.5 degrees N., 35.0 degrees W., primarily based on information in items 21) through 24). The author decided to end his track on Aug. 23 because he found that information in items 25) through 28) carried too much uncertainty for track purposes and, in addition, he suspects that much of such information might pertain to another low pressure area which could have absorbed the storm. The author's track for Storm 6, 1887 is displayed in Fig. 1.

Information in many of the above items allowed one to verify the hurricane status that Neumann et al. (1993) attributed to this storm (Storm 4 in their publication). If the wind information in item 4) were correct, the storm would appear to have been a major hurricane.

Storm 7, 1887 (Aug. 18-27), H.

This is the same storm which Neumann et al. (1993) identify as Storm 5, 1887.

The following information was found about this storm: 1) The presence of this weather system to the eastward of the Windward Islands (it should probably read the Leeward Islands) was indicated by vessel reports on Aug. 19; by Aug. 20 the center of the depression had moved W.N.W. to about 22 degrees N., 66 degrees W. then it was traced to 26 degrees N., 76 degrees W. by Aug. 21 (Monthly Weather Review, Aug. 1887). 2) Steamship "City of Para". Aug. 20, noon, lat. 23 40 N., long. 74 16 W., wind fresh from W.N.W., cloudy and threatening weather, heavy N.E. swell, barometer 29.75 inches. Supposed we were in the S.W. quadrant of a cyclone, then steered N. by E. 1/2 E. forty-four miles until 4 P.M. when barometer 29.60 inches with a W.N.W. gale; slowed engine lowest possible speed heading N.N.E., took in all sails; 8 P.M., barometer 29.51 inches, hard W.S.W. gale with squalls and rain, increased speed to 6 mph making N.N.E. course; midnight (Aug. 20-21) barometer 29.41 inches, increasing S.W. wind, steering N. 11 mph; Aug. 21, 4 A.M., barometer 29.35 inches, hard S. gale, squally with blinding rain; 8 A.M., barometer 29.51 inches, very hard S.S.E. gale, terrific squalls, blinding rain, heavy sea, ship running before it; noon, barometer 29.67 inches, wind S.E., moderate, weather clearing in N.E.; wind continued S.E. and barometer rose rapidly (Monthly Weather Review, Aug. 1887). 3) Steamship "Earnmoor". Aug. 19, 11 P.M., left Santiago de Cuba with a light N.W. breeze and hazy weather, barometer falling slowly and sky having the appearance of an approaching hurricane. Aug. 20, weather fine with light to fresh N.W. and W. to W.S.W. breeze and falling barometer. Aug. 21, in lat. 23 35 N., long. 74 16 W. at noon, heavy squall of wind and rain from S.W., lasting 1 hour and a heavy northerly sea, falling barometer; 2:40 P.M. passed Watling Island (San Salvador) with a fresh and increasing S. gale and a heavy sea, also a short N. sea and terrific squalls accompanied by rain. Aug.

22, in lat. 27 06 N., long. 74 20 W., a heavy gale and tremendous sea running, with torrents of rain, brought ship to the wind which was S.S.E. at 4 A.M, with slowly rising barometer; 5 A.M., barometer again falling, S.E. gale and S.W. sea, with very unstable barometer continuing throughout the day. Aug. 23, in lat 30 44 N., long. 74 36 W. at noon, fresh gale continued until 4 P.M., then moderated; midnight (Aug. 23-24), fresh gale again from E.S.E. with falling barometer. Aug. 24, in lat. 33 51 N., long. 74 40 W., at noon, fresh gale, falling barometer, heavy sea; towards noon it blew a heavy gale from E. to S.S.W. with terrific squalls and rain; 4 P.M.; hard gale and high sea, falling barometer, fresh gale continued until midnight (Aug. 24-25). Aug. 25, in lat. 36 56 N., long. 74 49 W., at noon; at 4 A.M., wind hauled to N.E. with fresh gale and tremendous sea; noon, strong N. gale and rising barometer; wind moderated in the afternoon (Monthly Weather Review, Aug. 1887). 4) Steamship "Pamona". Aug. 20, after leaving Cape Maysi, Cuba, wind came into the N.W., moderate; wind refreshed at night and sky looked very red; during night wind hauled to W. and refreshed, with squalls and heavy rain. Aug. 21, at Watling Island (San Salvador), weather looked very dirty and barometer continued falling; wind hauled to S. with terrific squalls and heavy rain; ship running before the rain (it should probably read the wind) and sea; at 5:30 P.M., hove the ship's head to the sea, barometer still falling; between 10 and 11 P.M. it blew very hard, afterwards moderating. Aug. 22, in lat. 26 44 N., long. 74 11 W. took off the crew of the wrecked schooner "Mary A. Douglas", which had been caught in two hurricanes. Aug. 23, lat. 30 56 N., long. 74 20 W. at noon, strong gale from S.E. and high sea with rain. Aug. 24, in lat. 34 24 N., long. 74 20 W. at noon, very squally, with rain and high seas. Aug. 25, lat 38 04 N. long. 72 00 W., at noon; at 5 A.M., wind changed to N. and blew a gale with very heavy sea (Monthly Weather Review, Aug. 1887). 5) Schr. "Mary A. Douglas". After having had a hurricane in the evening of Aug. 16, on Aug. 20 another hurricane sprung from N. and lasted about 2 hours (The New York Times, Aug. 27, 1887, p.8, col.5). Author's note: The time of 2 hours appears too short for the hurricane duration. 6) Schr. "Mabel S. Staples" (from New York for Caibarien, Cuba) arrived in Nassau in distress on Aug. 21. She made Nassau in a heavy gale and on the same day dragged ashore in the harbor, suffering damages and causing to leak badly (The New York Times, Aug. 30, 1887, p.5, col.6). 7) New Orleans, Aug. 29. The "El Dorado" arrived here from New York and struck the tornado (it means the hurricane), having left New York at midday Aug. 20. The hurricane was encountered at the latitude of Jacksonville (The New York Times, Aug. 30, 1887, p.1, col.5). 8) Nassau, N.P., Sept. 5. On Aug. 21 and 22, a severe hurricane passed over the islands of Grand Bahama and Abaco. The wind commenced blowing from N. and worked around to the S.E. The barometer reading at the lowest 28.80 inches. Nassau being just on the southern edge escaped with trifling damage (The New York Times, Sept. 19, 1887, p.1, col.6). 9) New Orleans, Sept. 1. The "Knickenbocker" left New York at 5 P.M. Aug. 20. The steamer passed Hatteras at midnight Aug. 21-22. At 7 A.M. Aug. 23, the wind was blowing a gale. At 1 P.M. the ship headed to open sea and at 4 P.M. the wind blew a heavy gale. At 9 P.M. the vessel shipped a heavy

sea. When in lat. 30 N., the wind blew with great fury and gradually hauled to N. At 9 A.M. Aug. 24, the port wheel ropes parted, leaving the vessel at the mercy of the sea. At noon the wind moderated slightly. Still there was a terrific swell but the barometer, which had fallen as low as 28.20 inches, was now rising. By midnight (Aug. 24-25), the weather had moderated. The wind at one time blew a velocity of at least 100 mph (The New York Times, Sept. 2, 1887, p.8, col.1). 10) The "Chalmette", which left New York for New Orleans on Aug. 23, was struck by a gale off Hatteras, which lasted 12 hours (The New York Times, Aug. 30, 1887, p.1, col.5). 11) Aug. 21-23, 1887. Cyclone of a large diameter, but slight energy, which moved over the Bahamas. It was felt in central Cuba, producing heavy showers and cyclonic winds which even reached places on the southern coast like Cienfuegos and Jucaro (Sarasola, 1928). Author's note: Actually taken from the catalog of Cuban hurricanes by M. Gutierrez-Lanza, which is included in Sarasola (1928). The statement that this was a storm of slight energy in the Bahamas seriously underestimated the storm intensity as inferred from information in item 8). 12) Steamship "Manhattan". Aug 22, 11 P.M., in lat. 30 N., long. 80 40 W., very bad looking weather and barometer falling rapidly, strong E.N.E. gale and very heavy S.W. sea, hove to head to the northward. Aug. 23, 9:30 A.M., turned around and ran to the southward, barometer 29.63 inches, wind inclined to back to N.; 11 P.M., hove to head to eastward, hard W.N.W. gale, barometer 29.43 inches, very heavy N.E. sea. Aug. 24, 9 A.M., rising barometer, hard N.W. gale. On Aug. 23 at sunset the sky was full of "mare-fails" moving in all directions, the lower clouds from N., the ones next above then from S.W., then some from S.E. and some from N.E. (Monthly Weather Review, Aug. 1887). 13) The "Bermuda" left St. Kitts on Aug. 19. On the morning of Aug. 22 Capt. Fraser did not like the weather because the horizon looked "greasy" and rain fell with sudden squalls; the wind had refreshed significantly and changed from N.E. to S. On Aug. 24, the barometer began to fall and by 4 P.M. the wind changed to S.E. by S.; at 8 P.M., the barometer read 29.50 inches. At 8 A.M. Aug. 25, the wind tried a new dodge and went to the E. By 8:30 A.M., the hurricane had left itself loose and in half an hour (9 A.M.) the barometer had reached 28.47 inches. Capt. Fraser kept the vessel off and ran with the wind, and a tremendous sea struck the ship. By noon the center of the storm had gone by. The barometer began to rise and the wind had backed to N.W. In two hours (2 P.M.), the barometer was at 29.10 inches and the weather much clearer. In the morning of Aug. 26 the sea was calmer and the barometer back to 30.00 inches (The New York Times, Aug. 30, 1887, p.1, col.3). 14) Baltimore, Aug. 30. A fleet of 4 British steamships arrived here coming from ports of Spain: the "Orpington", the "Triumph", the "Ashfield" and the "Kathleen". They encountered a hurricane, the "Orpington" having had the roughest experience and greatest damage. The vessels had ordinary weather until just after midnight Aug. 25 (Thursday), then began the hurricane which lasted 24 hours, swept away boats, etc. The atmosphere was so thick that the sky could not be seen. On Aug. 27, at lat. 36 22 N., long. 71 W., the "Orpington" passed a sailing vessel painted in black with masts gone and apparently nobody on board. The other three vessels also had

exciting experiences and the "Triumph" lost 2 boats (The New York Times, Aug. 31, 1887, p.5, col.4). 15) Barkentine "Josephine". Aug. 24, barometer continued falling until 19 30 hours in lat. 38 13 N., long. 74 40 W., to 29.65 inches, with light rain, and the wind gradually backed from S.E. to N.E. with increasing sea. Aug. 25, at 3 hours 15 minutes, sky commenced to clear but the wind increased until 4 hours 58 minutes when it blew heavily from N. by W. force 10, with sea heavy from N. by W., after which it moderated gradually (Monthly Weather Review, Aug. 1887). 16) Steamship "Yemassee". Aug. 24, noon, lat. 37 28 N., long. 74 50 W., barometer 29.75 inches and falling steadily, sea swell fast, long and heavy, heavy clouds in E. and S.; 4 P.M., wind backed to E., blowing in heavy gusts, with rain-squalls; 8 P.M., barometer 29.48 inches, wind N.E. a hard gale; 11 P.M. barometer 29.27 inches, lowest, wind a hurricane. Aug. 25, 2:40 A.M., Hatteras west, immense sea; during the day, the barometer rose and wind backed to N. and N.N.W. (Monthly Weather Review, Aug. 1887). 17) Ship "Hudson", which left Philadelphia for Antwerp on Aug. 22, put into this harbor (New York) in distress. The hurricane which caused so much havoc to shipping struck her on Aug. 25. The bowsprit was sprung and several sails were split (The New York Times, Sept. 11, 1887, p.9, col.7). 18) Steamship "Catalonia". Aug. 25-26, between long. 58 W. and 68 W., had a very unsettled weather; wind attained force of a fresh gale, accompanied by a heavy electrical storm, balls of flame being on all extremities aloft, wind backed gradually from S. to E. and W. by N. (Monthly Weather Review, Aug. 1887). 19) Steamship "Umbria". Aug. 26, noon, lat. 42 27 N., long. 59 20 W.; 2 P.M. (Greenwich time), barometer 29.80 inches, wind S., overcast and much rain, barometer falling rapidly and wind increasing, with a high, confused sea; 3 P.M., wind S.E. and a tremendous sea running; wind fell very light; to all appearances in the center of the cyclone; engine slowed; 5:30 P.M., barometer 28.65 inches; during a heavy squall of wind and rain, the wind went to N.N.W. and blew with hurricane force for 2 hours and then gradually moderated to a strong gale from N.W. with high sea (Monthly Weather Review, Aug. 1887). 20) Steamship "Rhaetia" reported a whole gale on Aug. 26, wind backed from N.N.E. to W.; lowest barometer 29.30 inches at 7 A.M., in lat. 41 55 N., long. 65 00 W. (Monthly Weather Review, Aug. 1887). 21) Steamship "La Gascogne" reported a hurricane on Aug. 26 and 27; wind backed from E.S.E. to N.W.; lowest barometer 28.58 inches at 1:30 P.M. Aug. 26 in lat. 42 29 N., long. 62 00 W. (Monthly Weather Review, Aug. 1887). 22) Steamship "Ohio". Aug. 26, 8 A.M., in lat. 41 28 N., long. 62 02 W., encountered a hurricane from S.S.E., barometer 29.51 inches; noon, barometer 28.20 inches, wind hauled to N.W. and storm continued for 4 hours with very high seas (Monthly Weather Review, Aug. 1887). 23) Steamship "Peconia" reported a hurricane on Aug. 26; wind backed from S.S.W. to E. and N.W.; lowest barometer 28.11 inches at 7 A.M. in lat. 39 19 N., long. 64 14 W. (Monthly Weather Review, Aug. 1887). 24) Steamship "Holland" reported a hurricane on Aug. 26; wind backed from S. to N.; lowest barometer 28.52 inches at 9:53 A.M. in lat. 42 41 N., long. 61 47 W. (Monthly Weather Review, Aug. 1887). 25) Steamship "Devonia" reported a storm on Aug. 26; wind veered from S.S.E. to N.W.; lowest barometer 28.44 inches at 7 P.M. in lat. 43 37 N.,

long. 56 22 W. (Monthly Weather Review, Aug. 1887). 26) Steamship "Crystal" had a whole gale on Aug. 26; wind backed from N.E. to N.W.; lowest barometer 29.24 inches at 11 A.M. in lat. 42 N., long. 64 12 W. (Monthly Weather Review, Aug. 1887). 27) Steamship "British Princess" reported a hurricane on Aug. 26; wind veered from S.E. to W.; lowest barometer 28.67 inches at 1 P.M. in lat. 43 12 N., long. 60 09 W. (Monthly Weather Review, Aug. 1887). 28) Steamship "Arizona". Aug. 26, 8 P.M. (Greenwich time) in lat. 45 06 N., long. 53 10 W., strong breeze from S. and fog; barometer 29.67 inches and falling rapidly; 10 P.M., barometer 28.70 inches, wind a hurricane from S.E., ship completely enveloped in spray; midnight (Aug. 26-27) in lat. 44 50 N., long. 54 00 W., lowest barometer 28.50 inches, wind began hauling to W. and barometer commenced to rise; wind settled down to hard W.S.W. gale, with tremendous high-breaking sea and barometer continued to rise rapidly (Monthly Weather Review, Aug. 1887). 29) Steamship "Europa" reported a hurricane on Aug. 26; wind veered from S.S.E. to W., lowest barometer 28.80 inches at midnight (Aug. 26-27) in lat. 44 10 N., long. 54 40 W. (Monthly Weather Review, Aug. 1887). 30) Steamship "Charles S. Whitney" reported a hurricane on Aug. 26; wind backed from S.S.E. to N.W., lowest barometer 28.40 inches at 7 P.M. in lat. 42 30 W., long. 60 30 W. (Monthly Weather Review, Aug. 1887). 31) Steamer "Italy" reported a heavy S.W. to W. gale on Aug. 27; lowest barometer 29.01 inches at 1 A.M. in lat. 45 N., long. 50 30 W. (Monthly Weather Review, Aug. 1887). 32) Steamship "Britannic" reported a strong gale from Aug. 28 to Aug. 30; lowest barometer 29.44 inches at lat. 48 40 N., long. 38 30 W. on Aug. 29 (Monthly Weather Review, Aug. 1887). 33) Steamship "La Normandie" reported a whole W.S.W. to N.W. gale from Aug. 29 to Aug. 31; lowest barometer 29.22 inches at 6 A.M. Aug. 30 in lat. 50 15 N., long. 24 W. (Monthly Weather Review, Aug. 1887). 34) Steamship "Leerdam" reported a whole W.S.W. to W.N.W. gale on Aug. 29 and 30; lowest barometer 29.50 inches at 10 A.M. Aug. 29 in lat. 48 05 N., long. 36 03 W. (Monthly Weather Review, Aug. 1887). 35) Steamship "Aller" reported a whole S.W. to W.N.W. gale on Aug. 28 through Aug. 30; lowest barometer 29.33 inches at 4 P.M. Aug. 29 in lat. 49 13 N., long. 35 29 W. (Monthly Weather Review, Aug. 1887). 36) Steamship "Island" reported a whole gale on Aug. 28 and 29; wind veered from S. to N.W.; lowest barometer 29.09 inches at 7 A.M. Aug 28 in lat. 52 06 N., long. 41 20 W. (Monthly Weather Review, Aug. 1887). 37) Cyclone of Aug. 19-30. Recurved E. of Florida (Tannehill, 1938). 38) Map showing a track for the storm. Daily positions along the track are: Aug. 19, 16.8 degrees N., 58 degrees W.; Aug. 20, 21.8 degrees N., 65.8 degrees W.; Aug. 21, 25.5 degrees N., 75.5 degrees W.; Aug. 22, 26.5 degrees N., 76.8 degrees W.; Aug. 23, 29 degrees N., 77 degrees W.; Aug. 24, 32 degrees N., 76.2 degrees W.; Aug. 25, 36.8 degrees N., 69.7 degrees W.; Aug 26, 41 degrees N., 60.8 degrees W. (Monthly Weather Review, Aug. 1887).

Many of the items above suggested some modifications to be applied to the track shown in Neumann et al. (1993) as for Storm 5, 1887. The author of this study estimated 7 A.M. positions for the days in the period Aug. 18-27 which allowed him to produce a track somewhat different from the one mentioned above, primarily in regard to the timing along the track. The author's 7 A.M.

positions for the period Aug. 18-20 were obtained from backwards extrapolation in time along practically the same curve in Neumann et al. (1993), starting from the author's 7 A.M. Aug. 21 position (which was the first one the author could estimate with some degree of accuracy on the basis of the available data) and after assuming a constant motion of about 18 mph. These positions were as follows: Aug. 18, near 16.0 degrees N., 55.0 degrees W., which is about 200 miles to the E.S.E. of the corresponding position in Neumann et al. (1993); Aug. 19, near 19.5 degrees N., 62.0 degrees W., which is roughly the same position given in the above publication; Aug. 20, 24.0 degrees N., 68.3 degrees W., which is about 150 miles to the N.W. of the position given in Neumann et al. (1993). Obviously, the confidence the author has concerning the trajectory for this early period is fairly low, but much more accurate estimates were obtained by him from Aug. 21 on. The author's 7 A.M. position for Aug. 21 was near 26.3 degrees N., 76.0 degrees W. and was based on the content of items 2), 3), 4), 6), 8) and 11). The author's 7 A.M. Aug. 22 position was near 27.0 degrees N., 78.3 degrees W. and was based on information in items 8) and 11). It should be mentioned that the positions for Aug. 21 and 22 are about 75 and 100 miles to the S.W. of the corresponding ones in Neumann et al. (1993); these new positions brought the center of the storm over the N.W. Bahamas as suggested in item 8). The author's 7 A.M. Aug. 23 position was estimated near 30.0 degrees N., 78.5 degrees W. on the basis of information in items 7), 9) and 12). The author's 7 A.M. Aug. 24 position was near 32.3 degrees N., 77.7 degrees W., allowing from a smooth turn to the N.N.E. at a slightly slower forward speed prior to a northeastward acceleration which started during the next 24 hours. The author's 7 A.M. Aug. 25 position was estimated near 35.7 degrees N., 73.3 degrees W. on the basis of information in items 15) and 16) and, to a lesser extent, in item 13). The author's 7 A.M. position was near 40.0 degrees N., 64.0 degrees W. and was primarily based on a careful analysis of all data for that day and, in particular, on items 20) and 23). The author's 7 A.M. Aug. 27 position was near 48.0 degrees N., 47.0 degrees W. and was primarily based on space-time continuity using information in items 28) and 29) and, particularly, in item 31). The author's track was terminated on Aug. 27 because information in items 32) through 36) for the next few days was found to be insufficient for track purposes and, furthermore, the author believes that merging of the storm with a vast low pressure area at high latitudes in the eastern Atlantic might have occurred after Aug. 27. The author's track for Storm 7, 1887 is shown in Fig. 1.

The hurricane status which Neumann et al. (1993) attributed to this storm (Storm 5, 1887 in their publication) was fully verified by the content of many of the items above. Furthermore, barometer readings equal or below 28.50 inches reported by several vessels, the lowest being 28.11 inches by the "Peconia" (item 23), indicated that Storm 7, 1887 was a major hurricane.

Storm 8, 1887 (Sept. 1-6), H.

This is the same storm that Neumann et al. (1993) identify as Storm 6, 1887.

The following information was found about this storm: 1) The system was central on Sept. 1 about lat. 29 N., long. 55 W., whence it had apparently advanced from the tropics. By Sept. 2, the center had moved to about lat. 33 N., long. 58 W. and then circled northwards to the Banks of Newfoundland by Sept. 3; the center passed rapidly northeastward and reached the vicinity of lat. 56 N., long. 23 W. by Sept. 5; during the next 24 hours it pursued an E.S.E. course to the Irish coast and by Sept. 7 had advanced eastward beyond the region of observation (Monthly Weather Review, Sept. 1887). 2) Storm of Sept. 1-7, 1887. Far out in the Atlantic (Tannehill, 1938). 3) Ship "Inflexible". Sept. 1, noon, lat. 33 34 N., long. 56 W.; wind refreshed and barometer falling; wind backing to E.S.E. and E. blowing a stiff breeze, heavy S.E. seas; 10 P.M., barometer falling rapidly, sea E.S.E. with long roll; Sept. 2, 1 A.M., barometer falling, wind increased to a gale and backing to N.E.; 4 A.M., wind backing, barometer falling; rain and terrific squalls; the sea one mass of foam; 10 A.M., moderating, wind N.W.; position at noon Sept. 2: lat. 32 21 N., long. 60 10 W. (Monthly Weather Review, Sept. 1887). 4) Bark "Hermon". Sept. 2, noon, lat. 43 56 N., long. 51 29 W., S. and S.S.E. wind and rapidly falling barometer; Sept. 3, noon, lat. 42 02 N., long. 53 48 W., wind drawing to N.E. with heavy rain; 4 A.M., wind N. force 10; very heavy S.W. sea; barometer commenced to rise and wind moderated and drew to W.N.W. (Monthly Weather Review, Sept. 1887). Author's note: The N.E. wind at noon Sept. 3 and the 4 A.M. observation and remarks which follow show some inconsistencies and look suspicious. 5) Steamship "Geiser". Sept. 1, 7 A.M., lat. 43 26 N., long. 59 22 W., entered a fog bank which continued without clearing until Sept. 3, when it was dispersed by a cyclone which passed to the southward of the vessel. Sept. 3, 8 A.M., lat. 45 50 N., long. 49 45 W., barometer 29.53 inches wind S. by E. force 5; 10 A.M., barometer 29.39 inches, wind S.S.E. force 6, dense fog; noon, lat. 46 20 N., long. 48 58 W., barometer 29.29 inches, wind S.E. force 6, heavy rain; 1 P.M., wind E.S.E. force 7, heavy rain; 2 P.M., wind N.E. by E. force 7, heavy rain; 3 P.M., wind N.E. force 9, heavy rain; 4 P.M. lat. 46 46 N., long. 48 14 W., barometer 28.86 inches, wind N.E. by N. force 9, heavy rain; 4:30 P.M., barometer 28.86 inches, wind N.N.E. force 10, rain moderating; 5 P.M., barometer 28.92 inches, wind N.N.E. force 10; 6 P.M., barometer 28.96 inches, wind N. by E., hurricane; 7 P.M., barometer 29.06 inches. wind N. by W. force 10. After this the clouds broke and the barometer rose rapidly and the wind settled into an ordinary gale from N.W. by N. that continued 2 days with a heavy sea (Monthly Weather Review, Sept. 1887). 6) Bark "Seudesnaes", from Trieste, met a terrific hurricane from S.S.W. on Sept. 3 at lat. 42 54 N., long. 54 45 W. The jibboom, topmast, rigging and bulwarks were carried away and other damage sustained (The New York Times, Dec. 2, 1887, p.3, col.4). Author's note: If the position given were correct, the "hurricane from S.S.W." statement would likely be in error. 7) Steamship "De Ruyter" reported a hurricane on Sept. 3; wind backed from S.E. to E., N.E. and N.W.; lowest barometer 29.10 inches at 7:40 A.M. in lat. 41 16 N., long. 54 54 W. (Monthly Weather Review, Sept. 1887). 8) Steamship "Pieter de Conick" reported a storm on Sept. 3, wind veered from S.S.E. to S.W.; lowest barometer 28.48

inches at 3 P.M. in lat. 44 48 N., long. 48 08 W. (Monthly Weather Review, Sept. 1887). 9) Steamship "Taormina" reported a hurricane on Sept. 3; wind veered from S.E. to N.W.; lowest barometer 28.44 inches at 5:15 P.M. in lat. 43 48 N., long. 48 17 W. (Monthly Weather Review, Sept. 1887). 10) Steamship "City of Rome" encountered a whole W. to N.W. gale on Sept. 4, lowest barometer 29.08 inches at noon in lat. 50 37 N., long. 55 11 W. (Monthly Weather Review, Sept. 1887). 11) On Sept. 5 and 6 the depression was accompanied by heavy gales E. of the 35 degrees W. meridian (Monthly Weather Review, Sept. 1887).

The content of the above items supported the introduction of some modifications along the track in Neumann et al. (1993) for the period Sept. 1-4 and as for Storm 6, 1887 in their publication. Therefore, the author of this study estimated new 7 A.M. positions as follows: Sept. 1, near 29.0 degrees N., 55.0 degrees W., based on item 1) and on a better space-time continuity with the author's estimated position for the next day; Sept. 2, near 32.0 degrees N., 58.5 degrees W., based on information in item 3); Sept. 3, near 41.0 degrees N., 54.0 degrees W., based on the entire analysis of the information in items 4) through 9), in general, and on item 7), in particular; Sept. 4, near 52.0 degrees N., 35.0 degrees W., based on information in item 10). The positions shown in Neumann et al. (1993) for the period Sept. 5-6 (Storm 6, 1887 in their publication) were kept unchanged on the ground that they seemed to be reasonable in the light of information in items 1) and 11). The author's track for Storm 8, 1887 is displayed in Fig. 1.

Barometer readings reported by several vessels, particularly on Sept. 3, fully supported the hurricane status that Neumann et al. (1993) attributed to this storm (Storm 6, 1887 in their publication. Barometer readings below 28.50 inches reported by the "Pieter de Conick" (item 8) and the "Taormina" (item 9) suggest the possibility that the storm might have even reached major hurricane status.

Storm 9, 1887 (Sept. 11-22), H.

This is the same storm which Neumann et al. (1993) identify as Storm 7, 1887.

The following information was found about this storm: 1) This cyclone was first reported in a telegram to the Chief Signal Officer on the morning of Sept. 16 as a cyclonic disturbance to the S.W. of Cuba. By the courtesy of Padre Benito Vines, S.J., director of the Belen College Observatory of Havana, the Chief Signal Officer was notified of the presence of the cyclone and its subsequent progress through the Gulf (Monthly Weather Review, Sept. 1887). Author's note: The New York Times, Sept. 17, 1887, p.5, col.2, also published the statement from Havana, dated on Sept. 16, saying that there were indications of a cyclone S.W. of that city. 2) Reports received from marine observers by mail showed, however, that the storm was first observed in lat. 13 N., long. 57 W. Cwing to the limited number of reports received from the region traversed by the storm, its chartered track over the Caribbean is only approximately correct and no accurate data about its intensity could be given (Monthly Weather Review, Sept. 1887). 3) Storm of

Sept. 11-21, 1887. Dominica, Yucatan, Brownsville. Moving very slowly on passing inland at Brownsville on Sept. 21-22. Barometer 28.93 inches, was below 29 inches for several hours. Wind N. 78 mph (Tannehill, 1938). 4) Steamer "Colorado" left Galveston on Sept. 17. E. gales were encountered up to the Tortugas. The day after leaving Galveston she was caught in a tremendous squall and waves broke over the deck. The squall was of short duration (The New York Times, Sept. 26, 1887, p.8, col.2). 5) New Orleans, Sept. 20. The wind still blows from the E. and harder since 6 P.M.. Tonight the rise of the basins has been 4.51 inches in the past 24 hours. Below the city, half of the parish of Plaquemines and all of the rear of St. Bernard are under water (The New York Times, Sept. 21, 1887, p.4, col.6). 6) Report by the Signal Service observer at Corpus Christi, Tx.: Brisk to high N. wind prevailed on Sept. 19 until 5 P.M. when the wind veered to N.E.; it backed to N. at 8:15 P.M. and attained a maximum velocity of 33 mph from N. at 9:17 P.M. High N. winds prevailed on Sept. 20, attaining a maximum velocity of 36 mph. Heavy rain fell during the early morning of Sept. 21, and light to heavy rain continued until 9 P.M. The wind veered to N.E. and attained a velocity of 40 mph at 1:10 A.M., backing to N. at 6:30 A.M. and then veering to N.E., its reached its maximum velocity of 45 mph at 12:25 P.M.; brisk to high winds continued during the remainder of the day. The water in Corpus Christi Bay rose about 2.5 feet from Sept. 19 to Sept. 21 (Monthly Weather Review, Sept. 1887). 7) Record of observations taken at Point Isabel, Tx. by Mr. Egan and furnished through the observer at Brownsville: Sept. 20, 7:10 P.M. barometer 29.73 inches, N.W. wind, water high, drizzling rain; Sept. 21, 7:30 A.M., barometer 29.12 inches, N.W. wind, hurricane since 4 A.M; 9:50 A.M., barometer 28.76 inches, N. wind, hurricane; 10:45 A.M., barometer 28.74 inches, N.E. wind, weakening; 11 A.M., barometer 28.74, N.E. wind, very light; 11:45 A.M., barometer 28.77 inches, N.E. by E. wind, very light; 12:30 P.M., barometer 28.79 inches, E. by S. wind; 12:40 P.M., barometer 28.82 inches, S.E. wind, fresh, water falling fast; 1:45 P.M., barometer 28.98 inches, S.E. wind, fresh; 2:30 P.M., barometer 28.98 inches, S.E. wind, fresh; 3:10 P.M., barometer 29.00 inches, S.E. wind, fresh; 4:30 P.M., barometer 29.12 inches, wind S.E., fresh; 6:40 P.M., S.E. wind, fresh; 8:10 P.M., barometer 29.40 inches, S.E. wind, fresh; 8:55 P.M., barometer 29.44 inches, wind S.E., fresh; 11:40 P.M., barometer 29.56 inches, fresh S.E. wind, stronger; Sept. 22, 7:30 A.M., barometer 29.76 inches, S. wind, moderate; very heavy rain; 8:30 A.M., barometer 29.83 inches, S. wind, moderate; 11 A.M., barometer 29.88, S. wind, moderate (Monthly Weather Review, Sept. 1887). Author's note: Point Isabel is located 23 miles N.E. of Brownsville. Times are expressed in Eastern Standard Time (75 degrees W. meridian). The wind intensity reported during the afternoon and evening of Sept. 21 appears to be underestimated, the persistent "fresh" wind being suspicious. 8) Record of observations taken at Brownsville as reported by Sergeant A.B. Crane, Signal Corps: Sept. 20, 10 P.M., barometer 29.92 inches, wind N.W. 15 mph; Sept. 21, 7 A.M., barometer 29.45 inches, wind N.E. 25 mph; 1 P.M., barometer 29.08 inches, wind N. 78 mph; 1:15 P.M., barometer 28.97 inches, wind N. 50 mph; 1:30 P.M., barometer 28.94 inches,

wind N.W. 40 mph; 1:45 P.M., barometer 28.93 inches, wind N.W. 53 mph; 2 P.M., barometer 28.95 inches, wind N.W. 43 mph; 2:15 P.M., barometer 28.96 inches, wind N.W. 40 mph; 2:30 P.M., barometer 28.95 inches, wind N.W. 37 mph; 2:45 P.M., barometer 28.95 inches, wind N.W. 45 mph; 3 P.M., barometer 28.95 inches, wind N.W. 38 mph; 3:15 P.M., barometer 28.96 inches, wind N.W. 36 mph; 3:30 P.M., barometer 28.94 inches, wind N.W. 36 mph; 4 P.M., barometer 28.93 inches, wind N.W. 18 mph; 4:30 P.M., barometer 28.94 inches, wind N.W. 12 mph; 5 P.M., barometer 28.96 inches, wind N.W. 11 mph; 5:30 P.M., barometer 28.98 inches, wind W. 9 mph; 6 P.M., barometer 29.03 inches, wind W. 12 mph; records showed that the wind decreased in force until 4:10 P.M. when a lull occurred and all appearances of the storm seemed to be over; between 4:10 and 5 P.M., the wind became variable, swinging in all directions and by 6:45 P.M. it had backed to the S.W. and began blowing at a high rate, increasing in force to 60 mph; 10 P.M., barometer 29.37 inches, wind S.E. 24 mph; Sept. 22, 2 A.M., no barometer reading, wind S. and S.E. 60 mph; 7 A.M., barometer 29.74 inches, wind S.E. 17 mph. Rainfall at Brownsville was 0.02 inches on Sept. 20, 8.50 inches on Sept. 21 and 2.26 inches on Sept. 22 (Monthly Weather Review, Sept. 1887). Author's note: Times are expressed in Eastern Standard Time (75 degrees W. meridian). 9) Description of the storm at Matamoros, Mexico, extracted from the Chicago Times, Sept. 24. The great storm of Wednesday night (Sept. 21) and the morning of Sept. 22 did extensive damage in Matamoros and for 20 miles S. of here and 40 miles W. along the Rio Grande. The hurricane drove the sea into the mouth of the Rio Grande, causing it to overflow its bank on the Mexican side for a distance of about 100 miles from its mouth. The principal streets of the city were submerged to a depth of 3 feet. The hurricane was so powerful that not a single metal roof remains here. All fences in the city and for miles surrounding have disappeared. It is thought that every frame house was moved more or less from its foundation or otherwise damaged. The rain poured down in blinding sheets for several hours, adding terror to the hurricane and the raging river (Monthly Weather Review, Sept. 1887). 10) Map showing a track for this storm. Daily positions along such a track are: Sept. 11, lat. 13 N., long. 57 W.; Sept. 12, lat. 14.8 N., long. 62 W.; Sept. 13, lat. 15 N., long. 65 W.; Sept. 14, lat. 14.7 N., long. 74 W.; Sept. 15, lat. 15 N., long. 80 W.; Sept. 16, lat. 18.8 N., long. 84.2 W.; Sept. 17, lat. 20 N., long. 87.2 W.; Sept. 18, lat. 22.2 N., long. 89 W.; Sept. 19, lat. 25 N., long. 91 W.; Sept. 20, lat. 26 N., long. 94 W.; Sept. 21, lat. 26.2 N., long. 96.8 W.; Sept. 22, lat. 25.5 N., long. 98.5 W. (Monthly Weather Review, Sept. 1887).

With the exception of a slight adjustment made for Sept. 21, the track in Neumann et al. (1993) as for Storm 7, 1887 was accepted as satisfactory in the light of the information contained in the above items. For Sept. 21, a slight adjustment of the track by a few miles to the north was introduced and a new 7 A.M. position near 26.2 degrees N., 96.8 degrees W. was estimated by the author of this study on the basis of information in items 7), 8) and 10). All other positions along the track shown by the above mentioned authors were kept unchanged in the process of preparing the track for Storm 9, 1887 which is displayed in Fig. 1.