

## YEAR 1901

Twelve storms were found to have occurred in 1901. Tracks for these storms are presented in Fig. 1.

Storm 1, 1901 (Jun. 11-15), T. S.

The following information was found in relation to this storm:

- 1) Data for 8 A.M. (E.S.T.) extracted from Historical Weather Maps: Jun. 10, Havana, E. f. 2, rain, 29.95; Camaguey, E. f. 4, 29.98; ship near 20 N., 82 W., E.N.E. f. 4, 29.91; Kingston, N. f. 1, 29.97; ship near 21 N., 86 W., S.E. f. 4, 29.88. Jun. 11, ship near Cape San Antonio, N.E. f. 4, 29.91; Havana, E. f. 5, 29.87; ship near 24 N., 83.5 W., N. f. 2, rain, 29.97. Jun. 12, ship near 23 N., 86 W., S. f. 5, (wind direction questionable or perhaps wrong location), showers, 30.00 (pressure too high); Key West, S.S.E. f. 3, 29.88; Havana, S.S.E. f. 4, 29.85; ship near 26 N., 86.8 W., N.E. f. 5, 29.91; ship near 27 N., 86 W., N.E. f. 5, 29.94; Tampa, E. f. 2 (pressure could not be read); Jupiter, S.E. f. 5, 29.93. Jun. 13, Charleston, E. f. 6, 30.01; Jacksonville, S. f. 3, 29.88; Tampa, S.S.E. f. 3, 29.86; Jupiter, S.S.E. f. 4, 29.93; Pensacola, N.N.E. f. 2, 29.90; ship near 28 N., 88 W., N.N.E. f. 2, 29.89; ship near 26 N., 87 W., E.N.E. f. 3. Jun. 14, a small low placed between Montgomery and Atlanta. Jun. 15, a small low over extreme western Kentucky. Jun. 16, low could not be identified any longer (Historical Weather Maps, Jun. 1901). Author's note: Wind forces (f) are on Beaufort scale, pressures are in inches. 2) Maximum velocities that could be associated with this weather system: Jupiter, E. 36 mph on Jun. 12; Savannah, E. 30 mph on Jun. 13; Charleston, S.E. 43 mph on Jun. 13 (Monthly Weather Review, Jun. 1901). 3) Storm of Jun. 13, 1901. Mobile. Minor (Dunn and Miller, 1960). 4) Map showing a track for this system as follows: near Havana in the morning of Jun. 12, near Tampa in the evening of Jun. 12, near Cape San Blas, Fl. in the morning of Jun. 13, near Mobile in the evening of Jun. 13 and near Montgomery in the evening of Jun. 14. Minimum pressure along the track: 29.84 inches (Monthly Weather Review, Jun. 1901). 5) A storm was first observed near 18 N., 83 W. on Jun. 10, 1901 and lasted 4 days; it was last observed at 31 N., 87 W. (Mitchell, 1924). Author's note: Tannehill (1938) showed a similar track but he extended it well into the continent. The tracks in Mitchell (1924) and Tannehill (1938) are quite similar to the one in Neumann et al. (1993).

The information contained in the above items suggested the introduction of some modifications along the track shown for this weather system in Neumann et al. (1993). Based in information for Jun. 11 in item 1), the author of this study decided to start his track for this weather system at 7 A.M. that day by tentatively locating a center of low pressure near 20.7 degrees N., 83.5 degrees W., which is about 75 miles to the S.S.E. of the corresponding position given in Neumann et al. (1993). The fact that the author started his track one day later than Neumann et al. (1993) reflects that he was unable to document any 7 A.M. Jun. 10 position for the center of this very weak system on the basis of information for that day in item 1). While crossing western Cuba on

Jun. 11, the system should have been very weak since M. Gutierrez-Lanza does not mention it in his catalog of Cuban cyclones (Sarasola, 1928) and Martinez-Fortun (1942) does not mention it either. Even on the morning of Jun. 12, the low pressure system seems to have been poorly organized over the southeastern Gulf of Mexico, with reported winds not exceeding force 5 on the Beaufort scale and only one ship report showing a questionable wind from the S. The author's estimated position for Jun. 12 was near 24.0 degrees N., 85.0 degrees W. on the basis of information for that day in item 1); such a position was found to be about 50 miles to the S.S.E. of the one in Neumann et al. (1993). Based on information in item 1), the author of this study estimated the following 7 A.M. positions for the period Jun. 13-15: Jun. 13, near 28.5 degrees N., 84.7 degrees W; Jun. 14, near 32.5 degrees N., 85.0 degrees W.; Jun. 15, near 37.0 degrees N., 88.0 degrees W. The author's 7 A.M. Jun. 13 position was about 120 miles to the E.N.E. of the corresponding one in Neumann et al. (1993) and the author's 7 A.M. Jun. 14 position was about 180 miles to the N.E. of the one shown in the above mentioned publication; no comparison is given for Jun. 15 because Neumann et al. (1993) terminated their track on Jun. 14. The author's track for Storm 1, 1901 is shown in Fig. 1.

In spite of that there were some indications that this weather system was very weak and winds of tropical storm intensity (43 mph) were reported only at Charleston (item 2) far away from the center, the author of this study decided to keep the tropical storm status that Neumann et al. (1993) gave to it. That status was indicated along the author's track until the system left north Florida on Jun. 13, and the status of a dissipating depression was denoted on Jun. 14-15.

#### Storm 2, 1901 (Jul. 1-10), T. S.

The following information was found about this storm: 1) The disturbance appeared in the vicinity of Barbados on Jul. 2, passed thence N. of W. over the Caribbean Sea to the Yucatan Channel by the night of Jul. 7 and reached the Texas coast on Jul. 10. This disturbance had the character of a large shallow depression rather than that of a well-defined hurricane. On Jul. 2, the lightship "Flummense" encountered a gale 60 miles N.N.W. of Barbados and severe rain and wind storms were reported along the southern coast of Haiti. Rough weather was also reported on the south coast of Cuba during Jul. 8 (it should probably read Jul. 7) Beginning on Jul. 9, Texas coast interests were fully informed by the Weather Bureau relative to the advance of the disturbance over the Gulf (Monthly Weather Review, Jul. 1901). Author's note: Similar information was found in Tannehill (1938). 2) On Sunday (Jul. 7) persons living in La Coloma (southern coast of Pinar del Rio province) were scared by weather conditions that reminded those of the 1882 cyclone. Since very early that day the sea rose and the majority of the houses were flooded. The tug steamer "Aguila" went ashore being pushed by the force of the wind and, in addition, some sloops came ashore. About 2 P.M. conditions calmed. The barometer started rising about 10 A.M. as fast as it has dropped and this indicated that the danger had passed (Diario de la Marina, Havana,

Jul. 10, 1901, evening edition, p.2, col.3). 3) Data for 8 A.M. (E.S.T.) extracted from Historical Weather Maps: Jul. 1, ship near 6.7 N., 54 W., S.W. f. 4, rain, 29.91. Jul. 2, Barbados, E.N.E., f. 2, 29.81; ship near 11.7 N., 59 W., N.E. f. 7,; center of a low placed 11.5 N., 58.5 W. Jul. 3, San Juan, E. f. 4, 29.89; St. Kitts, E. f. 4, 29.91; Dominica, W. f. 2, 29.87; ship near 12.7 N., 58.8 W., W.S.W. f. 2, 29.94; Barbados, S.E. f. 1, 29.90; center of a low placed 15.5 N., 65 W., no data in the vicinity. Jul. 4, Port-au-Prince, E. f. 9, 29.81 (not clearly read); Santo Domingo, N.E. f. 2, 29.89; Curacao, S.E. f. 4, 29.80; ship near 15.7 N., 75 W., N.E. f. 2, 29.86; ship near 14.8 N., 74 W., N.E. f. 2, rain, 29.86; ship near 16 N., 69 W., S.E. f. 4, 29.94. Jul. 5, Santiago de Cuba, E. f.3, heavy rain, 29.80; Kingston, N. f. 1, 29.85; ship near 18 N., 75 W., S.S.E. f. 5; Port-au-Prince, E. f.4, 29.89; Camaguey, E. f. 4, 29.86. Jul. 6, ship near 12 N., 82 W., N. f. 4, 29.74 (pressure too low); Cienfuegos, E. f. 4, 29.84; Camaguey, S.E. f. 4, 29.90; center of a low placed 21 N., 83 W. (too far west and probably too far north). Jul. 7, ship near 22 N., 86.7 W., N.E. f. 3; ship near 24 N., 84 W., S.E. f. 7, 29.83; Havana, E. f. 6, 29.82; ship near 16 N., 82.7 W., S.S.E. f. 5, 29.71 (pressure too low). Jul. 8, ship near 23 N., 91 W., N.E. (no speed given), 29.77 (probably too low); Merida, calm; ship near 20 N., 85 W., S.S.E. f. 5; ship near 25 N., 84 W., S.E. f. 6, 29.88; ship near 27 N., 86 W., E.S.E. f. 6, 29.86; center of a low placed over Yucatan (probably too far south). Jul. 9, ship near 27 N., 89 W., E.N.E. f. 11, 29.74; ship near 24 N., 87 W., S.S.W. f. 4, 29.91; ship near 22 N., 92 W., W.S.W. f. 2, 29.83; center of a low placed 25 N., 91.5 W. (probably a little too far west). Jul. 10, Corpus Christi, W.S.W. f. 4, 29.77; Galveston, S.S.E. f. 6, 29.90; center of a low placed just N. of Corpus Christi (Historical Weather Maps, Jul. 1901). Author's note: Wind forces (f) are on Beaufort scale; pressures are in inches. 4) From a press bulletin released at 3:30 A.M. Jul. 10: The barometer is 29.78 (inches), the wind is 34 mph from the E., with occasional shifts to S.E. The east wind for the last 2 days has banked up the water and the tide is running quite high, but no swells are breaking in over the beach. The water is up to Avenue O and Twenty-fifth Street. At 9:30 A.M. the following information was given out: Tide has receded 3 feet and is now stationary. At 3 P.M. the following bulletin was issued: Conditions less threatening, tide 2.5 feet and falling; disturbance apparently moving N. to the west of Galveston. I.M. Cline, Forecast Official, Weather Bureau, Galveston (Monthly Weather Review, Jul. 1901). 5) There are indications of a storm in the western Gulf of Mexico. Its direction and intensity cannot be ascertained but cautionary advices have been distributed along the Gulf coast (The New York Times, Jul. 10, 1901, p.3, col.5). Author's note: The above statement was probably issued in the evening of Jul. 9. 6) Steamship "El Rio" arrived (in New York) from New Orleans yesterday and brought the crew of the brig "L.F. Munson" which wrecked 100 miles N.W. of Dry Tortugas. On last Tuesday (Jul. 9) the crew was rescued by the "El Rio". The gale that wrecked the "Munson" came up on Sunday (Jul. 7). The brig, which was enroute from Mobile to Sagua la Grande, Cuba, sunk Tuesday morning (The New York Times, Jul. 13, 1901, p.2, col.3). 7) Storm of Jul. 10, 1901. Texas Upper

coast. Minor (Dunn and Miller, 1960). 8) Maximum wind velocities associated with this storm: Galveston, 40 mph; San Antonio, N.E. 42 mph and Corpus Christi, W. 28 mph, all of them being recorded on Jul. 10 (Monthly Weather Review, Jul. 1901). Map showing a track for this storm. Morning positions along the track are: Jul 5, near 19 N, 77.5 W.; Jul. 6, near 21 N., 82 W.; Jul. 7, near 21.5 N., 84.5 W.; Jul. 8, near 22 N., 87 W.; Jul. 9, near 24.5 N., 91.7 W.; Jul. 10, near 27 N., 95 W. (Monthly Weather Review, Jul. 1901). 10) A storm was first observed near 13 N., 61 W. on Jul. 2, 1901 and lasted 8 days; it was last observed near 29 N., 96 W. (Mitchell, 1924). Author's note: Tannehill (1938) showed a track which is similar to the one displayed in Mitchell (1924). Both tracks are also similar to the one in Neumann et al. (1993).

On the basis of information in the above items a series of modifications was introduced along the track for Storm 2, 1901 in Neumann et al. (1901), which was started on Jul. 2. Based on information for Jul. 1 and 2 (item 3), the track in Neumann et al. (1993) was extended backwards to Jul. 1 and adjusted to the south early on Jul. 2. The author's 7 A.M. estimated positions were near 9.0 degrees N., 54.0 degrees W. and near 11.5 degrees N., 58.7 degrees W. for Jul. 1 and Jul. 2, respectively. Based on information for Jul. 3 in item 3), the author's 7 A.M. Jul. 3 position was estimated near 15.3 N., 65.7 W., which is about 130 miles to the N. of the corresponding position in Neumann et al. (1993). Based on information in items 1) through 3) and item 9), the track over the western Caribbean Sea was adjusted northward by roughly 200 miles over the period Jul. 4-7. As a result of a careful analysis of the content of the above mentioned items, the author of this study estimated the following 7 A.M. positions: Jul. 4, near 17.0 degrees N., 72.5 degrees W.; Jul. 5, near 18.7 degrees N., 76.5 degrees W.; Jul. 6, near 19.7 degrees N., 80.3 degrees W.; Jul. 7, near 21.5 degrees N., 83.5 degrees W. The author's estimated positions were 23.0 degrees N., 87.0 degrees W. and 25.3 degrees N., 90.5 degrees W. for Jul. 8 and Jul. 9, respectively; these positions were based on information in item 3) and were found to be about 90 miles to the N.N.E. of the position in Neumann et al. (1993) for Jul. 8 and about 50 miles to the E.N.E. of the position for Jul. 9 in the above publication. The 7 A.M. Jul. 10 position in Neumann et al. (1993) was found to be reasonable and was kept unmodified. The author's track for Storm 2, 1901 is displayed in Fig. 1.

The tropical storm status which Neumann et al. (1993) gave to this storm was found to be supported by the gale reported by the lightship "Flummense" (item 1), the wind E. f. 9 reported at Port-au-Prince on Jul. 4 (item 3), a ship observation reporting a wind E.N.E. f. 11 in the Gulf of Mexico (item 3) and the maximum wind velocities of E. 40 mph at Galveston and N.E. 42 mph reported on Jul. 10. The characterization of the weather system as a shallow depression might have been correct while it was moving over the eastern Caribbean Sea but might have underestimated the storm structure over the northwestern Caribbean Sea and, particularly, over the Gulf of Mexico, where a fully developed storm causing a wind E.N.E. f. 11 and a central pressure lower than 29.74 inches (item 3) was reported.

Storm 3, 1901 (Jul. 4-13), H.

The following information was found in connection with this storm: 1) It appeared over the eastern Caribbean on Jul. 6, passed on a N.W. course S. of Puerto Rico on Jul. 7, causing a wind velocity of 56 mph at San Juan, skirted the eastern Bahamas on Jul. 8-9, arrived off the North Carolina coast on Jul. 10 and acquired marked intensity during the night of Jul. 10 when a maximum velocity of 64 mph was reported at Hatteras, N.C. After the morning of Jul. 11 the storm diminished rapidly in energy (Monthly Weather Review, Jul. 1901). Author's note: A shorter version of the above statement was reproduced in Tannehill (1938). 2) According to Edwin C. Thompson, director of the Weather Bureau Office at San Juan, "between the days Jul. 6-7 passed the island (of Puerto Rico) a thunderstorm accompanied by strong winds and rain". As referred to in the works of C.L. Mitchell and I. Tannehill, "it appeared to the N.W. of Barbados on Jul. 5, it took the normal direction to the N.W., passing between St. Lucia and Martinique and, while crossing over the N.E. Caribbean Sea, its effects were felt to the S.W. of the other Leeward Islands, causing considerable damage at St. Kitts; then turned more to the west, passing to the south and near Puerto Rico in the direction of the Mona Passage". According to records of the Weather Bureau Office at San Juan, the maximum velocity was N.E. 52 mph between 2 and 3 P.M. Jul. 7 (?) and the barometric pressure was 29.60 inches. La Democracia, a newspaper published in Caguas, said on Jul. 8 that "yesterday (Jul. 7) we had a rainy day with heavy showers since the early morning to about 9 P.M." and on Jul. 10 stated that "after passing to the west of Puerto Rico, (the bad weather) moved toward the N.E. portion of the Dominican Republic, passing near its coast. The storm in Puerto Rico was not mentioned by most newspapers and apparently it did not even reach the category of "una tormenta platanera", a rather weak storm (Salivia, 1972). Author's note: This storm is known in Puerto Rico as the one of San Cirilo. The time of occurrence of the maximum wind of 52 mph at San Juan in the afternoon of Jul. 7 is questionable because it contradicts other data about the storm passage over and near Puerto Rico, including the one indicating that "it passed over the island between the days Jul. 6-7". 3) Storm of Jul. 7, 1901 in the Dominican Republic, known as San Cirilo (Garcia-Bonnely, 1958). 4) During Saturday night (Jul. 6) a storm of fair proportions passed over Puerto Rico, causing a maximum velocity of 56 mph from the S.E. and advisory notices thereto were distributed in the Bahamas, the Lesser Antilles and Florida (The New York Times, Jul. 8 1901, p.2, col.6). Author's note: The above statement suggests that the maximum wind from the S.E. was recorded at San Juan during the night of Jul. 6-7 or during the early part of Jul. 7, which is in contradiction with information in item 2). 5) Belen College Observatory, Jul. 8, 9 A.M. According to a cablegram from our distinguished friend Mr. Mason, there was a tempest at St. Thomas last Saturday (Jul. 6). The barometer has dropped from yesterday to today at Santiago de Cuba; calm and quiet seas were reported from Holland Bay (Jamaica). The center of the tempest will probably pass at a considerable

distance E. of the Bahamas. L. Gangoiti, S.J. (Diario de la Marina, Jul. 8, 1901, evening edition, p.2, col.2). Author's note: Father Lorenzo Gangoiti was the director of the Observatory and Mr. Mason was the weather observer at Santiago de Cuba. 6) Data for 8 A.M. (E.S.T.) extracted from Historical Weather Maps: Jul. 4, Barbados, N.N.E. f. 2, 29.88; ship near 11 N., 56 W., S.S.E. f. 3, 29.88; ship near 9.7 N., 52 W., S.S.W. f. 2, rain; ship near 8 N., 53 W., S.S.W. f. 3, 29.86. Jul. 5, Barbados, S.W. f. 3, 29.82; ship near 13.8 N., 58.8 W., S.E. f. 8, 29.83. Jul. 6, Dominica, S.E. f. 5, 29.87; St. Kitts, S.E. f. 6, 29.92; San Juan, E. f. 4, 29.93; Santo Domingo, N. f. 2, 29.95. Jul. 7, San Juan, S.E. f. 5, rain, 29.92; Santo Domingo, N. f. 3, 29.88; Turk Is., E. f. 4, 29.96; ship near 15 N., 64.7 W., S.S.E. f. 5, 29.88 (position questionable). Jul. 8, Turk Is. S.S.E. f. 5, 29.96; Port-au-Prince, E.N.E. f. 8 (?), 29.87; ship near 24 N., 93.8 W., W.N.W. f. 6; ship near 27 N., 73 W., E. f. 5, 29.97; ship (or station) near 25 N., 76 W., E.N.E. f. 4, rainshowers, 29.88; center of a low placed 15.5 N., 74.5 W. (wrong position; the right position seems to be near 24.5 N., 73.3 W.). Jul. 9, ship near 28 N., 77.7 W., W. f. 4., 29.88; ship near 30 N., 79 W., N. f. 5; ship near 31 N., 75 W., S.E. f. 6, 30.03 (pressure probably too high); ship near 32 N., 76 W., E.S.E. f. 6, rain, 29.68 (probably too low); center of a low placed 30.5 N., 77 W. Jul. 10, Hatteras, N.N.W. f. 9, 29.84; Norfolk, N.N.E. f. 4, 30.00; ship near 37 N., 71 W., E. f. 6, drizzle, 30.03; ship near 34 N., 71 W., S. f. 8, 29.91; center of a low placed 35 N. 73.3 W. (maybe a little bit far E.). Jul. 11, Hatteras, S.S.E. f. 5, 29.44; Norfolk, N.E. f. 5, 29.77; Wilmington, W. f. 4, 29.84; ship near 33 N., 76 W., W.S.W. f. 7, 29.83; center of a low placed just W. of Hatteras. Jul. 12, Wilmington, N.N.E. f. 4, 29.66; Hatteras, S.E. f. 4, 29.82; ship near 32 N., 77 W., S.W. f. 8, 29.80; ship near 34 N., 74.8 W., S. f. 8, 29.83; center of a low placed 33 N., 77.5 W. Jul. 13, Wilmington, S. f. 4, heavy rain, 29.76 (pressure not clearly read off the map); center placed just W. of Wilmington. Jul. 14, center could not be identified (Historical Weather Maps, Jul. 1901). Author's note: Wind forces (f) are on Beaufort scale and pressures are in inches. 7) Minimum pressure at Hatteras was 29.43 inches and the maximum wind velocity was 62 mph from the W. (Weather Bureau, 1902). Author's note: The above parameters occurred on Jul. 11. 8) Other maximum velocities were as follows: Raleigh, S.E. 24 mph on Jul. 13; Wilmington, 30 mph on Jul. 13; Charleston, S.W. 32 mph on Jul. 14; Columbia, S.W. 36 mph on Jul. 14 (Monthly Weather Review, Jul. 1901). 9) Quoting from works by C.L. Mitchell and I. Tannehill, the storm "entered North Carolina on Jul. 11 and on Jul. 12 recurved towards the S., against normalcy, and then turned to the W. over that State. The curve that it described from Jul. 10 to Jul. 13 was rare and has called much attention" (Salivia, 1972). 10) Storm of Jul. 10, 1901. North Carolina. Minimal. Minor damage (Dunn and Miller, 1960). Author's note: The storm also affected North Carolina during the next few days. 11) Map showing a partial track for this storm. Morning positions along the track were: Jul. 8, near 21 N., 73.5 W.; Jul. 9, near 25.3 N., 76 W.; Jul. 10, near 33.5 N., 75.5 W. (Monthly Weather Review, Jul. 1901). Author's note: Positions for Jul. 8-9 were found to be in serious error. 12) A storm was first observed

near 14 N., 61 W. on Jul. 5, 1901 and lasted for 8 days; it recurved near 30 N., 76 W. and it was last observed near 34 N., 79 W. (Mitchell, 1924). Author's note: The track displayed in the above publication is quite similar to those in Tannehill (1938) and Neumann et al. (1993).

The information contained in the above items suggests that some modifications along the storm track in Neumann et al. (1993) were in order. Based on information for Jul. 4 in item 6), the author of this study decided to start his track with a position near 11.0 degrees N., 56.3 degrees W. at 7 A.M. Jul. 4, which is one day earlier than along the track in Neumann et al. (1993). Based on information for Jul. 5 in item 6), the 7 A.M. Jul. 5 position in the above publication was adjusted to the E. by about 75 miles to near 13.7 degrees N., 59.7 degrees W.; however, the 7 A.M. Jul. 6 position in said publication was found to be reasonable and, therefore, was kept unchanged. On the basis of data for Jul. 7 in item 6) and after taking into account information in items 2) through 5), the author decided to adjust the 7 A.M. Jul. 7 position in Neumann et al. (1993) by about 180 miles to the N.W. to near 19.0 degrees N., 69.0 degrees W. The author's 7 A.M. Jul. 8 position was estimated near 24.5 degrees N., 73.3 degrees W., based on a ship reporting a W.N.W. wind force 6 on the Beaufort scale a short distance to the S.W. of that location in the morning of Jul. 8 (item 6) and also on space-time continuity; this position was found to be about 50 miles to the N.W. of the corresponding one in Neumann et al. (1993). On the basis of information for Jul. 9 in item 6), the author adjusted the 7 A.M. Jul. 9 position in the above publication by about 70 miles to the W.N.W. to near 30.5 degrees N., 76.7 degrees W.; the 7 A.M. Jul. 10 position was also slightly adjusted to the N. to near 35.0 degrees N., 73.7 degrees W. on the basis of information in item 6). Positions for 7 A.M. Jul. 11 and 7 A.M. Jul. 12 in Neumann et al. (1993) were kept unmodified, but their 7 A.M. Jul. 14 position was adjusted northward by about 45 miles to near 34.5 degrees N., 79.5 degrees W. in order to fit the S. f. 4 wind reported at Wilmington (item 6) and, in addition, information in item 9) indicating that the storm turned to the west over North Carolinas and not over South Carolina. The author's track for Storm 3, 1901 is shown in Fig. 1.

The hurricane status that Neumann et al. (1993) gave to this storm could not be rigorously verified, but the maximum winds ranging from 62 to 64 mph from the W. at Hatteras (items 1 and 7) allowed one to infer the existence of winds reaching hurricane intensity to the N. of the westward-moving center. However, indications are that the wind reached hurricane force only on Jul. 10 and early Jul. 11 and, consequently, the author of this study indicated hurricane status along the track only on those days. This treatment was found to differ from the one in Neumann et al. (1993) which carried the storm as a hurricane from the time it was still to the S. of Puerto Rico. Most likely, the Gulf Stream played a crucial role in causing a very significant intensification as the storm approached the North Carolina coast.

Storm 4, 1901 (Aug. 2-18), H.

The following information was found in relation to this storm:

1) It was chartered far to the N.E. of Puerto Rico, whence it moved in a direction slightly S. of due W., reaching Florida on Aug. 10. It passed into the Gulf S. of Tampa on the early morning of Aug. 11 and moved slowly through the N.E. Gulf. In Florida the storm was of slight intensity; it increased while crossing the Gulf and was attained by hurricane winds on the Louisiana coast. At Port Eads the wind reached a velocity of 72 mph. The anemometer cups were blown away and the anemometer support thrown down. High tides accompanied the storm. The storm warning displayman at Pilottown, La. reported that the tide on Aug. 14 rose 4 feet in 10 minutes (Tannehill, 1938). Author's note: In contrast with the early description of the disturbance stated above, the Monthly Weather Review, Aug. 1901 indicated that it first appeared as a feeble disturbance in the subtropical region N. of Cuba and that by the morning of Aug. 10 had advanced to the extreme S. of the Florida peninsula. 2) Information extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Aug. 2, ship near 32 N., 42 W., N.N.W. f. 4; ship near 33 N., 35 W., S.E. f. 4, 30.12; possible center (not drawn) 32 N., 40 W. Aug. 3, ship near 29 N., 47 W., W. f. 4, rain; possible center 30 N. 45 W., inferred from curvature of isobars. Aug. 4, ship near 26 N., 50.7 W., S.W. f. 4; ship near 28 N., 48 W., N.E. f. 4, 29.94; ship near 30 N., 50 W., S.S.E. f. 1, 29.91 ( position was probably wrong because a temperature of 60 degrees F. was reported); possible center 27 N., 50 W., inferred from curvature of isobars. Aug. 5, ship near 23 N., 56 W., S.W. f. 4; possible center 24.5 N., 56.5 W., inferred from curvature of isobars. Aug. 6, ship near 20 N., 60 W., S. f. 4; ship near 22 N., 58 W., S.E. f. 6, 30.06; center (not drawn) might have been near 23 N., 61.5 W. Aug. 7, ship near 25 N., 69 W., S. f. 1, 30.00; ship near 24.8 N., 68 W., S.W. f. 2, 30.09; ship near 27 N., 68 W., E. f. 4, 30.06; ship near 26 N., 73 W., N.E. f. 2; ship near 27 N., 72 W., E.N.E. f. 2, 30.03; weak center inferred near 25 N., 69 W. Aug. 8, ship near 25 N., 76.7 W., N.W. f. 2, 29.94; ship near 24 N., 74 W., S.W. f. 4, 30.00; ship near 28.7 N., 73.7 W., N.E. f. 4, 30.09; ship near 26 N., 70 W., S. f. 2, 30.00; ship near 29 N., 69 W., S.E. f. 3, 30.09; center placed 25.5 N., 74.5 W. Aug. 9, Jupiter N.E. f. 3, 30.02; ship near 25 N., 80 W., N. f. 4, 30.06; Key West, N.N.E. f. 2, 30.03; ship near 29 N., 79 W., N.E. f. 2; ship near 28 N., 74 W., S.E. f. 4, 30.06; ship near 24 N., 74 W., S.S.E. f. 5, 30.06; center placed 24.5 N., 77 W., just S.E. of Nassau. Aug. 10, ship 24 N., 74 W., S.S.W. to S. f. 6, 30.06; Jupiter, N.E. f. 4, 29.93; Key West, S.W. f. 4, 29.99; Tampa, N. f. 3, 30.01; ship near 25 N., 84 W., N.W. f. 2, 30.06; center placed near Miami. Aug. 11, ship near 25 N., 85 W., S.W. f. 6, 29.97; Key West, S. f. 3, 29.97; Jupiter, S.S.E. f. 5, heavy rain, 29.96; ship near 27 N., 79 W., S.S.E. f. 5, 30.00; Tampa, N.N.E. f. 3, 29.89; center placed 27 N., 82 W. Aug. 12, Tampa, E. f. 4, 29.91; Jupiter, S. f. 2, 29.97; Key West, S. f. 3, 29.96; Port Eads, N. f. 3, 29.92; Pensacola, N.E. f. 2, 29.94; ship near 24 N., 87 W., N.W. f. 5, 29.86; ship near 28 N., 89 W., N.N.W. f. 7, lightning; center placed 26 N., 85 W. Aug. 13, Port Eads, N.E. f. 3, 29.83; Pensacola, N.E. f. 3, 29.90; Tampa,



S.E. f. 3, 29.94; Key West, S. f. 3, 29.97; ship near 25 N., 85 W., S. to S.S.W., f. 7, 29.68; ship near 27.8 N., 88 W., N. f. 7, 29.71; center placed 26.3 N., 86 W. (maybe a bit too far E.). Aug. 14, Port Eads, S.E. f. 9, 29.51; New Orleans, N.E. f. 3, rain, 29.72; Pensacola, S.S.E. f. 5, 29.85; ship near 27 N., 87.7 W., S. f. 8, 29.59; center just S.W. of Port Eads. Aug. 15, data difficult to read; however, N.E. wind very strong at New Orleans and S.E. at Pensacola; center probably S.E. of New Orleans. Aug. 16, center over S.W. Alabama. Aug. 17, center over extreme N. Arkansas. Aug. 18, center (extratropical low) near 39 N., 88 W. (Historical Weather Maps, Aug. 1901). Author's note: Wind forces (f) are on Beaufort scale; pressures are in inches. 3) The gale of Sunday (Aug. 11), while the severest in several months, dealt lightly with the West coast (of Florida). Reports from Miami, however, indicate that considerable damage was done by the wind along the East coast. Boats remained at their berths along both coasts yesterday, with few exceptions, as there was warning of continued storm (The Morning Tribune, Tampa, Aug. 13, 1901, p.1, col.2). 4) Belen College Observatory, Aug. 12, 11:40 A.M. According to our observations and cablegrams (received), a moderate depression was over the Bahamas on Saturday (Aug. 10). The upper and mid-level currents were then weak, but today they are more intense. The center of circulation is now apparently to the N.W. (of Havana) over the Gulf and its influence extends from the central Gulf of Mexico to the southern States of the continent, which will suffer its effects. L. Gangoiti, S.J. (Diario de la Marina, Havana, Aug. 12, 1901, evening edition, p.2, col.2). 5) Belen College Observatory, Aug. 14, noon. The cyclonic perturbation is almost stationary to the S. of New Orleans and Galveston, with an increase in intensity since yesterday and it is probably getting ready for its recurvature. L. Gangoiti, S.J. (Diario de la Marina, Havana, Aug. 14, 1901, evening edition, p.2, col.2). 6) The captain of the steamship "Espana" reported that he first encountered the storm in the Gulf Monday Aug. 12 at 2:30 P.M. with 20-30 mph winds which gradually increased through Thursday (Aug. 15), the barometer falling all the while. The maximum was reached between 2 and 7 P.M. Thursday, with estimated winds of 60-70 mph from the S.E. The Gulf was very rough and waves broke over the funnels and it was so much spray that it was impossible to see where the boat was going. The boat reached Mobile Friday morning, Aug. 16 (Monthly Weather Review, Aug. 1901). 7) At New Orleans at 8 P.M. Aug. 14 the barometer was 29.65 inches and the wind blew at 24 mph from the N.E. From midnight Aug. 14-15 to 8 A.M. Aug. 15 the wind blew 20-35 mph from the N.E., the barometer reaching a minimum of 29.41 inches at 9 A.M., and by 8 P.M. had risen to 29.57 inches. About 10 A.M. Aug. 15 the wind backed to N. with occasional wind gusts from N.E. until about midday; then blew from N.N.W. until about 3:45 P.M. and the remaining of the day from the N.W. There was a severe squall at 9:35 A.M. during which the wind reached a velocity of 49 mph from the N.E. By 7 A.M. Aug. 14 the wind at Port Eads had changed from N.E. to S.E. by the way of E., indicating that the storm has moved westward from that place. At 8 P.M. Aug. 14, a report was filed at the telegraph office by the displayman but was never sent. The message showed that the barometer was 29.50 inches, the wind 60 mph

from the S.E. and that sometime during the day the wind had reached a maximum velocity of 72 mph from the N.E. (Monthly Weather Review, Aug. 1901). Author's note: The above information was extracted from reports by I.M. Cline and H.F. Alciatore of the New Orleans office of the Weather Bureau. 8) At Mobile the barometer read 29.74 inches at 8 A.M. Aug. 15, 29.65 inches at noon, 29.50 inches at 4 P.M., 29.34 inches at 6 P.M., 29.32 inches from 6:30 to 8 P.M. and 29.33 inches at 9 P.M. The storm was most severe from 5:15 to 6:30 P.M. and the time of highest velocity was 5:50 P.M. when a maximum of 60 mph from the S.E. and an extreme of 78 mph occurred. The wind averaged 50-60 mph from 5 to 7 P.M., when the wind shifted to S. and showed as gradual decrease to S.W. 22 mph at midnight Aug. 15-16. At 3:30 P.M. the water was 5 feet above the wharf and continued to rise until 7 P.M. and then fell at a rate of about 1 foot an hour (Monthly Weather Review, Aug. 1901). Author's note: The above information was extracted from a report by William M. Dudley of the Mobile office of the Weather Bureau. 9) New Orleans, Aug. 15. The storm which has been sweeping the Gulf coast westward from Pensacola the last 2 days has prostrated telegraph and telephone wires but the Picayune had a statement from a man who left here at 2 o'clock yesterday. He is at Buras, 60 miles down the river from here, and described the storm which swept Port Eads as a tidal wave similar to the one of 1893. A house of a man named Cofden, half a mile above the Quarantine Station, was swept away and 15 members of his family were drowned (The New York Times, Aug. 16, 1901, p.1, col.5). Author's note: The above dispatch mentioned, in addition, that several boats were lost. 10) New Orleans, Aug. 17. Dr. Isaac Cline of the Weather Bureau received today from the weather observer at Port Eads a report stating that the wind on Wednesday (Aug. 14) carried away the anemometer cups. The highest velocity, taken before the anemometer malfunctioned, was 72 mph (The New York Times, Aug. 18, 1901, p.1, col.3). 11) Atlanta, Ga. The tropical storm has tonight (Aug. 15) completely cut off Mobile from the world. At 6 P.M. a communicate was obtained with Mobile for a few minutes. The Associated Press operator made his way to the office in a boat. He took up a position on top of the switchboard and sent a message indicating that the water was 3 feet deep in the room and that was still rising (The New York Times, Aug. 16, 1901, p.1, col.5). 12) Mobile, Aug. 17. The front advices from the lower bay and Fort Morgan came today by the U.S Quartermaster's ship "Poc". For 3 hours the wind blew at a rate of 60 mph at the fort (The New York Times, Aug. 18, 1901, p.1, col.3). 13) Minimum pressure at New Orleans was 29.37 inches and the maximum wind velocity was N.E. 49 mph on Aug. 15. At Mobile, the minimum pressure was 26.26 inches and the maximum wind velocity was S.E. 60 mph on Aug. 15 (Weather Bureau, 1902). Author's note: The above pressure values were apparently taken at station level, without making the standard reduction to sea level. This is probably why they are lower than the respective values of 29.41 inches and 29.32 inches given for New Orleans and Mobile in items 7) and 8). 14) Pensacola reported a maximum velocity of S.W. 70 mph on Aug. 15 (Monthly Weather Review, Aug. 1901). 15) Storm of Aug. 10-15. Minor in the Straits of Florida and N.W. Florida; wind 70 mph at Pensacola. Minimal from the Mississippi delta to Mobile; considerable loss of life (Dunn

and Miller, 1960). 16) Map showing a track for this storm, starting near Camaguey (Cuba) in the morning of Aug. 9 and displaying positions near Jupiter and Tampa on Aug. 10 and Aug. 11, respectively, off the Louisiana coast near the 90 degrees W. meridian on Aug. 14 and just E. of New Orleans on Aug. 15. The track ended over the lake region on Aug. 19 (Monthly Weather Review, Aug. 1901). 17) A storm was first observed near 26 N., 50 W. on Aug. 4, 1901 and lasted 14 days; it recurved near 26 N., 90 W. and it was last observed near 42 N., 83 W. (Mitchell, 1924). Author's note: The corresponding track in Mitchell (1924) was found to be similar to the ones in Tannehill (1938) and Neumann et al. (1993).

Information in the above items allowed the author of this study to introduce some modifications along the track for Storm 4, 1901 which is displayed in Neumann et al. (1993). The track, which these authors started on Aug. 4, was extended backwards to Aug. 2 and new estimates for 7 A.M. positions were made for the period Aug. 4-8. The author's 7 A.M. positions for Aug. 2-8 were as follows: Aug. 2, near 32.0 degrees N., 40.0 degrees W.; Aug. 3, near 30.0 degrees N., 45.0 degrees W.; Aug. 4, near 27.0 degrees N., 50.0 degrees W.; Aug. 5, near 24.5 degrees N., 56.5 degrees W.; Aug. 6, near 23.7 degrees N., 62.3 degrees W.; Aug. 7, near 25.0 degrees N., 69.0 degrees W.; Aug. 8, near 25.5 degrees N., 74.0 degrees W. The above positions were based on information in item 2) and on space-time continuity which, in some cases, helped obtaining a smooth track. Differences between positions along this track and the respective ones in Neumann et al. (1993) were found to range from about 140 miles on Aug. 6 to just a few miles on Aug. 7. 7 A.M. positions for Aug. 9-10 in Neumann et al. (1993) were kept unchanged, but the 7 A.M. Aug. 11 position was slightly adjusted to the W.N.W. to fit better information in items 1) and 2). The 7 A.M. Aug. 12 position in Neumann et al. (1993) was kept unchanged, but their 7 A.M. Aug. 13 position was adjusted eastward by about 40 miles to near 27.5 N., 86.7 W in order to fit better information in item 2). Similarly, the 7 A.M. Aug. 14-16 positions in Neumann et al. (1993) were adjusted to near 28.7 degrees N., 89.7 degrees W., to near 30.0 degrees N., 89.0 degrees W. and to near 32.0 degrees N., 88.0 degrees W. to fit better information in items 2) and 7), in items 7) and 8) and in item 2), respectively. Finally, 7 A.M. positions in Neumann et al. (1993) for the period Aug. 17-18 were kept unchanged. The author's track for Storm 4, 1901 is shown in Fig. 1.

The hurricane status that Neumann et al. (1993) gave to this storm was verified by the content of several of the items above. As in Neumann et al. (1993), such hurricane intensity was denoted along the track starting on Aug. 12; prior to that day a tropical storm status was indicated in spite of that the author believes that it is likely that storm status was not reached until Aug. 9 when the weather system was over the Bahamas. Once the system was over land over extreme western Alabama, the hurricane status was changed back to the one of tropical storm on Aug. 16, and the extratropical stage was introduced on Aug. 17.

The place or origin and early track of this storm were unusual for Aug. and suggested that it evolved from an initially

subtropical or extratropical system.

Storm 5, 1901 (Aug. 18-22), T. S.

This is a new storm case which the author of this study has recently documented and that, of course, is not included in Neumann et al. (1993). Strictly speaking, however, it is not a new case since its existence as a gale in the Lesser Antilles has been published in newspapers before and even shown on weather maps.

Documentation of this case was based on the following information: 1) New York, Aug. 21. According to intelligence from St. Thomas, a severe gale has been raging at Barbados and other islands. At St. Vincent the jetties and the vessels lying there are reported to have been destroyed (The Times, London, Aug. 22, 1901, p.3, col.3). 2) The Press Association states that with reference to the reported hurricane in the West Indies, the West Indian Committee has a reassuring telegram from Barbados to the effect that there has been no damage, but there has been a gale of wind and heavy rain throughout the islands (The Times, London, Aug. 23, 1901, p.3, col.2). 3) Lloyd's agent at Barbados telegraphs under date Aug. 22. Severe storms on the coasts but no serious harm has been done to shipping. No damage on land. Schooner "Myosettis" has been totally lost, all on board saved. Three lighters with cargo from steamer "Para" have gone ashore and become wrecks (The Times, London, Aug.23, 1901, p.3, col.2). 4) Telegram from the Governor of the Windward Islands: "Heavy gale passed Grenada and St. Vincent. No damage Grenada, no lives lost. No news from St. Lucia" (The Times, London, Aug. 27, 1901, p.3, col.4). 5) Information extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Aug. 18, Barbados, N.E. f. 3, 29.96; ship near 13 N., 58 W., E. f. 3, 29.97; ship near 9 N., 53 W., S.W. f.2, 29.97; ship near 8 N., 54 W., calm, 29.97. Aug. 19, Barbados, N.E. f. 2, 29.90; ship near 12 N., 58 W., N.N.W. f. 3, 29.86; ship near 8 N., 54 W., S. f.3, 29.91. Aug. 20, Barbados, S.E. f. 7, heavy rain, 29.83; Martinique, E.S.E. f. 8, 29.88; Dominica, E. f. 4, 29.87; Trinidad, S.W. f. 3, 29.90; ship near 9 N., 57 W., S.S.E. f. 4, thunderstorm; Curacao, E. f. 2, 29.90. Aug. 21, Barbados, S.S.E. f. 2, 29.89; Trinidad, S.S.E. f. 2, 29.90; Dominica, S.E. f. 4, 29.83 (probably too low); Curacao, S.E. f.3, 29.81. Aug. 22, Curacao, S. f. 1, 29.79 (Historical Weather maps, Aug. 1901). Author's note: Wind forces (f) are on Beaufort scale, pressures are in inches.

On the basis of information in the above items, item 5) in particular, the author of this study prepared a track for Storm 5, 1901. In obtaining such a track, the author also made use of space-time continuity, specially over the period Aug. 21-22. The following 7 A.M. positions were estimated along the author's track: Aug. 18, near 11.5 degrees N., 53.0 degrees W., Aug. 19, near 12.0 degrees N., 56.7 degrees W.; Aug. 20, near 12.3 degrees N., 60.3 degrees W.; Aug. 21, near 12.5 degrees N., 64.5 degrees W.; Aug. 22, near 12.7 degrees N., 69.5 degrees W. The author's track is displayed in Fig. 1.

The author of this study attributed the status of a tropical storm to this weather system. Such a classification was kept along the track over the period Aug. 18-20, although tropical storm winds