York Times, Sept. 20, 1909, p.15, col.7). 19) Extracted from a special report on the hurricane of Sept. 20-21, 1909 on the Louisiana and Mississippi coasts: The center of the hurricane moved inland between the mouths of the Mississippi and the Atchafalaya rivers. The wind at Morgan City backed from the N.W., by the W., to the S. while at New Orleans it veered from the N.E., by the E., to the S.. The center of the disturbance moved northward over eastern Louisiana, passing about halfway between New Orleans and Morgan City. Excessive high tides occurred in the eastern section of the hurricane, flooding all the lowlands on the middle Gulf coast to a depth ranging from 2 to 10 feet. The highest storm tide occurred between the mouth of the Mississippi River and the Mississippi Sound. The occurrence of the highest tide in this part of the storm and so far from the center was, no doubt, due to the fact that the storm was moving N.W. until it reached the Louisiana coast and then curved more to the northward. Reports from Grand Isle, which was near the center of the storm, indicate a tide about 4 feet in that section as the highest water on the island was but 2 ft. From the Atchafalaya River westward, the northerly winds held the tide down; however, the winds were high and dangerous as far west as Galveston, Tx. (Monthly Weather Review, Sept. 1909). 20) Selected observations taken at New Orleans: Oct. 20, 1 A.M., 29.78, N.E. 22; 4 A.M., 29.73, N.E. 26; 7 A.M., 29.68, N.E. 26; 10 A.M., 29.63, N.E. 29; 1 P.M., 29.42, E. 25; 4 P.M., 29.31, E. 29; 5 P.M., 29.27, E. 45; 6 P.M., 29.24, S.E. 49; 7 P.M. 29.23, S.E. 55; 8 P.M. 29.26, S.E. 47; 9 P.M., 29.31, S.E. 42; 10 P.M., 29.34, S.E. 41; Sept. 21, 1 A.M., 29.48, S. 25; 4 A.M., 29.62, S. 14; 7 A.M., 29.71, S. 11; 10 A.M., 29.79, S. 10 (Cline, 1926). Author's note: Times are 90 degrees W meridian; pressures are in inches and wind speeds are in mph. 21) The wind at New Orleans reached an extreme velocity of 68 mph, minimum pressure of 29.22 inches. Property damage in Louisiana and Mississippi was estimated at $ 5 millions. Three hundred and fifty lives were lost (Tannehill, 1938). 22) Table showing an estimated central pressure of 931 millibars (about 27.50 inches) at landfall on the Louisiana coast (Simpson and Riehl, 1981). Author's note: The table was taken from Hurricane Experience Levels of Coastal County Populations- Texas to Maine, NWS Southern Region Tech. Rept. 12, 1975 by P.J. Hebert and G. Taylor. 23) Some maximum velocities associated with the storm were: Pensacola, S.E. 64 mph on Sept. 20; Mobile, S.E. 47 mph on Sept. 21; New Orleans, S.E. 66 mph on Sept. 20; Galveston, N.W. 34 mph on Sept. 20) (Monthly Weather Review, Sept. 1909). Author's note: The Monthly Weather Review, Sept. 1909 also published that the maximum velocity of 66 mph occurred at New Orleans between 6 and 7 P.M. 24) Storm of Sept. 20-21, 1909. Louisiana. Extreme. Tide: 15 feet, 350 killed (Dunn and Miller, 1960). 25) Map showing a track for the storm, starting near 19.5 N., 82 W. in the morning of Sept. 16 and ending over the eastern portion of Lake Superior in the morning of Sept. 22 (Monthly Weather Review, Sept. 1909). Author's note: As the Monthly Weather Review, Sept. 1909 stated that by 8 P.M. Sept. 21 the storm had merged with a barometric depression that had moved eastward over the Plain States and that by the morning of Sept. 22 a trough of low barometer extended from Lake Superior to the Rio Grande Valley, the Sept. 22 morning position was not representative of the tropical system itself. 26) A storm was observed near 15 N., 62 W. on Sept. 10, 1909 and lasted 14 days; it recurved near 35 N., 92 W. and it was last observed near 58 N., 67 W. (Mitchell, 1924). Author's note: Tracks for this storm in Tannehill (1938) and Neumann et al. (1993) were found to be similar to portions of the corresponding track in Mitchell (1924).

On the basis of information in the above items, the author of this study introduced a number of modifications along the track for Storm 7, 1909 in Neumann et al. (1993). As no closed cyclonic circulation was found before Sept. 14 (item 1), the author's track was not started until that day and, by so doing, a significant difference was established with respect to the track in the above publication which began on Sept. 10. The author's 7 A.M. Sept. 14 position was estimated near 19.0 degrees N, 77.0 degrees W. and was based on information in items 1) through 3); this position was about 330 miles to the N.W. of the corresponding one in Neumann et al. (1993). The author's 7 A.M. Sept. 15 position was primarily based on information in items 3) and 4) and space-time continuity and was estimated near 19.3 degrees N., 80.0 degrees W.; this position was about 300 miles to the N.W. of the corresponding one in the above publication. The author's 7 A.M. Sept. 16 position was estimated near 20.3 degrees N., 82.0 degrees W., primarily on the basis of information in item 1); this position was about 130 miles to the N.W. of the one in the

above publication. The author's 7 A.M. Sept. 17 position was based on a detailed analysis of information in item 1) and items 6) through 14) and was estimated near 21.7 degrees N., 83.7 degrees W.; this position was found to be a few miles to the N.W. of the corresponding one in Neumann et al. (1993). Author's 7 A.M. positions for Sept. 18 and Sept. 19 were primarily based on information in item 1) and were estimated near 23.0 degrees N., 85.3 degrees W. and near 25.0 degrees N., 88.0 degrees W., respectively, and were found to differ from the positions in the above publication by just a few miles on Sept. 18 and by about 35 miles on Sept. 19. The author's 7 A.M. Sept. 20 position was estimated near 28.3 degrees N., 90.0 degrees W. on the basis of information in items 1), 19) and 20) and space-time continuity; this position was a few miles to the W.S.W. of the corresponding one in Neumann et al. (1993). The author's 7 A.M. Sept. 21 position was estimated near 33.0 degrees N., 91.5 degrees W.on the basis of information in item 1); this position was about 70 miles to the S.S.E. of the corresponding one in the above publication; the author's track was terminated on Sept. 21 in accordance with information in item 25) and its corresponding author's note. The author's track for Storm 7, 1909 is displayed in Fig. 1.

Information in several of the 26 items above was found to support the hurricane status which Neumann et al. (1993) gave to this storm and, in fact, based on information in items 22) and 24), Storm 7, 1909 was a major hurricane. The hurricane status was introduced along the author's track on Sept. 16 and was kept until the evening of Sept. 20. Tropical storm intensity was denoted on Sept. 14-15 as well as late on Sept. 20 and early on Sept. 21. The depression (dissipation) stage was introduced on Sept. 21.

Storm 8, 1909 (Sept. 25-28), T. S.

The following information was found in relation to this storm: 1) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Sept. 22, low placed 17.5 N., 78.5 W. on spite of no indication for it because flow was N.E. to E. according to data. Sept. 23, ship near 19 N., 82 W., W. f. 2; Kingston, E. f. 1, 29.81; low placed 16 N., 79.5 W., confidence very low due to light winds. Sept. 24, ship near 20 N., 82 W., N.E. f. 1; ship near 19 N., 83 W., N.W. f. 2; Jupiter, N. f. 1, 29.80 (lowest barometer in the area covered by the system); rather a large broad area of low pressure, very weak E. flow over Florida Straits and western Cuba, with no decent wind anywhere. Sept. 25, Tampa, N.E. f. 4, 29.80; Key West, S. f. 2, 29.76; Jupiter, S. f. 2, 29.80; Havana, S. f. 2, 29.79; ship (or station) near 24.7 N., 83.2 W., S. f. 3, 29.77; low placed 26 N., 84 W., maybe too far W. Sept. 26, Jupiter, N.W. f. 2, 29.73; Key West, S.W. f. 3, 29.72; Tampa, N. f. 3, 29.81; Jacksonville, N.N.E. f. 3, 29.89; ship near 26 N., 77.7 W., S.W. f. 3; ship near 27 N., 72 W., N. f, 2, 29.86; ship near 30 N., 73 W., E. f. 6; ship near 27 N., 72 W., S. f.4, 29.80, showers. Sept. 27, Tampa, N. f. 4, 29.79; Jupiter, N.W. f. 1, 29.70; ship near 27 N., 78.5 W., N.W. f. 8, 29.86; ship near 30 N., 77 W., S.E. f. 7, 29.53. Sept. 28, ship near 32 N., 73.5 W., S.E. f. 4, 29.65; low placed 35 N., 70 W., too far N. and E.. Sept. 29, low no longer identified (Historical Weather Maps, Sept. 1909). Author's note: Wind forces (f) are on Beaufort scale; pressures are in inches. 2) Belen College Observatory (via telephone). The center of the cyclonic perturbation that was more than 38 hours ago S. of Jamaica is now over the N.E. portion of the Gulf of Hunduras and W.S.W. of Grand Cayman. This position could be threatening (Diario de la Marina, Havana, Sept. 24, 1909, evening edition, p.2, col.2). 3) Belen College Observatory, Sept. 26, 4 P.M. Yesterday morning the center of the perturbation was E. of Cozumel and S.W. of Isle of Pines. This morning it was located to the S. and near Cape San Antonio. L. Gangoiti, S.J. (Diario de la Marina, Havana, Sept. 27, 1909, evening edition, p.4, col.2). 4) National Observatory, Sept. 27, 10 A.M. From the observations within the area limited by New Orleans to the W., Jupiter to the N. and Santiago de Cuba to the E. it can be inferred that we are in an area of minimum pressure centered near this capital (Havana). This disturbance does not represent the danger of a cyclone to us, although showers are abundant along its periphery, with occasionally strong gusts (Diario de la Marina, Havana, Sept. 27. 1909, evening edition, p.4. col.2). 5) National Observatory, Sept. 28, 10 A.M. Observations. including those of clouds, from various places of the Republic confirm the center that has remained over the South Sea (Caribbean

Sea) lately. The center passed over the western portion of Santa Clara province last night, causing abundant rains and some heavy winds, although it is unlikely that they have caused damage at Jucaro, the capital (city of Santa Clara) and other places along the periphery of the low pressure area (Diario de la Marina, Havana, Sept. 28, 1909, evening edition p.2, col.2). 6) Map showing a track for this storm. The track was started between Havana and Key West in the morning of Sept. 25 and ended over Nova Scotia in the morning of Sept. 30 (Monthly Weather Review, Sept. 1909). 7) A storm was first observed near 11 N., 80 W. on Sept. 22, 1909 and lasted 11 days; it recurved near 22 N, 84 W. and it was last observed near 34 N., 64 W. (Mitchell, 1924). Author's note: Tracks for this storm in Tannehill (1938) and in Neumann et al. (1993) were found to be quite similar to the track in Mitchell (1924).

Information in items 1) through 4) show the very weak and extensive character of this weather system, particularly before Sept. 25. Therefore, the author's track was not started until that day when a 7 A.M. Sept. 25 position was estimated near 25.3 degrees N., 83 degrees W., showing that the author's track was begun 3 days later than the track in Neumann et al. (1993). Author's 7 A.M. positions for the period Sept. 26-28 were based on information in item 1) and were estimated as follows: Sept. 26, near 27.5 degrees N., 79.5 degrees W.; Sept. 27, near 29.5 degrees N., 77.0 degrees W.; Sept. 28, near 31.5 degrees N., 68.7 degrees W. The difference between the author's positions and the corresponding ones in Neumann et al. (1993) ranged from about 220 on Sept. 25 to about 100 miles on Sept. 27-28. Based on information in item 1), the author's track was terminated on Sept 28, which was 2 days earlier than in the above publication. The author's track for Storm 8, 1909 is shown in Fig. 1.

A ship report showing a N.W. f. 8 wind and a second ship showing a pressure as low as 29.53 inches (item 1) supported the tropical storm status that Neumann et al. (1993) gave to this weather system. Tropical storm status was denoted along the author's track for the entire period Sept. 25-28, although, in reality, tropical storm intensity is likely to have occurred only on Sept. 27-28. The depression (dissipation) stage was introduced late in the morning of Sept. 28.

Storm 9, 1909 (Oct. 6-13), H.

The following information was found in relation to this storm: 1) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Oct. 6, Puerto Limon (or ship nearby), N.W. f. 3, 29.91; ship near 11 N., 76 W., E.N.E. f. 6, 29.86; Kingston, N, f. 2, 29.91; ship near 19 N., 81 E.N.E. f. 4, 30.03 (probably too high); center probably a short distance N. of the Colombian coast near 76 W. Oct. 7, ship near 14 N., 79 W., N. f. 4, 29.80, showers; Kingston, S.S.E. f. 2, 29.84. Oct. 8, ship near 17 N., 81 W., N.W. f. 5, 29.77, showers; Kingston, S.S.E. f. 3, 29.83; center placed 17 N., 79.5 W.. Oct. 9, Havana, E. f. 4, 29.91; ship near 19 N., 84 W., N. f. 6, 29.74, showers; ship near 21 N., 84 W., no wind, 29.86; ship near 13 N., 83 W., W. f. 3, 29.86; center of low 18.3 N., 82.5 W., maybe a bit S. Oct. 10, ship near 21 N., 83 W., S.S.E. f. 8, 29.77; ship near 17 N., 84 W., S.W. f. 2, 29.83; Havana, E. f. 2, 29.89; center placed 20 N., 85 W. Oct. 11, ship near 23 N., 85 W., N.N.W. f. 8, 29.71; ship near 23 N., 86 W., N. f. 4, 29.77; Key West S.E. f. 8, 29.42, rain; Havana, S.W. speed could not be read, 29.34; center placed 24 N., 83 W., maybe a bit N. Oct. 12, ship near 26.5 N., 79 W., N.N.W. f. 4, 29,83; ship near 25.7 N., 76 W., W.S.W. f. 11, 30.00 (too high); Jupiter, N.N.W. f. 4, 29.77; ship near 29.7 N., 79 W., N.W. f. 5; ship near 27.7 N., 72 W., S.S.E. f. 4; center placed 29.5 N., 75 W. Oct. 13, ship near 32 N., 65 W. or Bermuda, W. f. 6, 29.56; ship near 28.7 N., 70 W., N.W. f. 6, 29.80; center near Bermuda (too far S.); cold front 42 N., 65 W. to 33 N., 71 W. Oct. 14, center apparently absorbed in cold front (Historical Weather Maps, Oct. 1909). Author's note: Wind forces (f) are on Beaufort scale; pressures are in inches. 2) National Observatory, Oct. 7. The cyclonic perturbation to the S. of Camaguey appeared to have advanced to near Isle of Pines on a N.W. course. Warnings of storm from the N.E. were issued at various places in Florida according to a cablegram received from the Weather Bureau of Washington at 4 P.M. (Diario de la Marina, Havana, Oct. 8, 1909, morning edition, p.10, col.2). 3) National Observatory, Oct. 8, 10 A.M. The perturbation which using data from the observer at Camaguey, Dr. Florentino Romero, was announced to the S. of Camaguey on Oct. 5, has moved W. over the Caribbean Sea and is

now towards the S.W. of the capital (Havana) and appears to be getting better organized (Diario de la Marina, Havana, Oct. 8, 1909, evening edition, p.4, col.1). 4) Belen College Observatory, Oct. 9, 9 A.M. The center of the cyclonic perturbation was at 7 A.M. this morning to the N.W. of Grand Cayman and S.S.W. of Isle of Pines, and about 150 miles. It will probably cross western Cuba between today and all day tomorrow, as we cabled to Washington. We believe that its intensity is weak in spite of the abundant cirrus clouds that emerged from the storm in the morning hours. L. Gangoiti (Diario de la Marina, Havana, Oct. 9, 1909, evening edition, p.4, col.1). 5) National Observatory, Oct. 9, 7 P.M. Based on observations from Pinar del Rio, Batabano and the local ones (Havana), it is inferred that the perturbation that was to the S.W. of Havana yesterday has continued towards the fourth quadrant, heading to the Gulf of Mexico. A cablegram from the Weather Bureau of Washington said: "We advise that at 4 P.M. the center of the tropical perturbation was apparently near the Yucatan Channel moving N.W. and with weak intensity" (Diario de la Marina, Havana, Oct. 1909, morning edition, p.10, col.4). 6) National Observatory, Oct. 11, 5 P.M. The cyclone reached a position to the W.S.W. of Pinar del Rio yesterday (Oct. 10) as we notified the Dept. of Agriculture of that province by telegram. From that position the hurricane recurved to the N.E., increasing in intensity. The storm center passed about 50 miles N.W. of Havana around 6 A.M. today. A cablegram from the Weather Bureau of Washington located the center to the W. of Key West at 9:30 A.M., moving N. L. G. y Carbonell (Diario de la Marina, Oct. 12, 1909, morning edition, p.8, col.1). 7) Extracted from an article by M. Gutierrez-Lanza, S.J. of the Belen College Observatory, dated on Oct. 13, 1909: During Oct. 7-9, the cyclone evolved slowly to the W., N.W., N. and N.N.E., recurving S. of the extreme western Cuba; during Oct.10 it started moving fast, passing the vortex along the province of Pinar del Rio moving between N.E. and N.N.E. towards Key West and Florida. On Sunday evening, without communication with our observer in Remates (de Guane), Dr. Wenceslao Camejo and with observations that were not alarming received from Pinar del Rio, and guided by our own observations (at Havana), we gave to the press the following note: "The center of the perturbation is about to finish crossing over Pinar del Rio province. Its intensity has increased during the whole day and the cyclone is apparently entering the second branch of the parabola at the present time. This is why the vortex has been approaching to this city since yesterday..." (Diario de la Marina, Havana, Oct. 14, morning edition, p.8, cols. 1-2). 8) Sabalo, Oct. 11. After 24 hours of continuous rains, the wind began to increase about 5 P.M. (Oct. 10), and it blew so hard that the inhabitants were in panic for 12 hours (Diario de la Marina, Havana, Oct. 13, 1909, morning edition, p.8, cols. 3-5). Author's note: Sabalo is located near the S.W. coast of Pinar del Rio province. 9) The (Cuban gunboat) "Cespedes" took refuge at the harbor of Guadiana. The towns of La Fe and Cayuco were completely wrecked. The tide reached 20 feet; the barometer dropped to 724 millimeters or 28.50 inches (Diario de la Marina, Havana, Oct. 15, 1909, p.10, col.3). Author's note: Guadiana is a bay on the western coast of Pinar del Rio province, and La Fe and Cayuco are nearby towns. 10) Guane, Oct. 11. A horrible hurricane struck this town. The barometer dropped more than when the hurricane of Aug. 27, 1856. Considerable losses were caused. The storm lasted for 6 to 7 hours, roughly from 6 A.M. (Oct. 10) to midnight (Oct. 10-11). Incessant lightning was observed to the N. and S. Telegraph lines are down (Diario de la Marina, Havana, Oct. 14, 1909, evening edition, p.4, cols.1-2). 11) Pinar del Rio, Oct. 11, 9:30 A.M. Approximately at 3 last night (it should read "early this morning") the bad weather abated. Conditions were calm by daybreak. Tremendous damage has been done by the terrible storm (Diario de la Marina, Havana, Oct. 12, 1909, evening edition, p.4, col.4). 12) Puerto Esperanza, Oct. 11. After incessant rains for 4 days, the cyclone began about 9 P.M. last night, with a terrible wind; strong gusts made houses to collapse and destroyed everything on their way. This lasted to about midnight, when there was some calm, which allowed us to save two sailors which were embracing the mast of their sunk vessels. The rescue was barely completed when the wind returned so furiously that no house or tree was left without damage. The wind began to abate at 4 A.M. (Diario de la Marina, Havana, Oct. 14, 1909, evening edition, p.3, col.6). Author's note: Puerto Esperanza is located on the northwestern coast of Pinar del Rio province. 13) Artemisa, Oct. 11. The cyclone struck this municipality, doing much damage. The barometer dropped to 740 millimeters (29.13 inches) at 3 A.M. (Diario de la Marina, Havana, Oct. 13, 1909, morning

edition, p.8, col.4). 14) Mariel, Oct. 11. The cyclone began around 12:30 A.M.; S.E. wind veering to S. at 4 A.M. It changed to N.W. at 5:30 A.M., with less force (Diario de la Marina, Oct. 12, 1909, morning edition, p.8, col.1). 15) Guanajay, Oct. 11, 5 P.M. Some observations taken by Mr. Pedro Nunez Lostrado: Oct. 10, 10 P.M., 759 millimeters or 29.88 inches; 11:30 P.M., 754 millimeters or 29.69 inches. Oct. 11, 1 A.M., 748 millimeters pr 29.45 inches; 2:30 A.M., 743 millimeters or 29.25 inches; 3:30 A.M., 741 millimeters or 29.17 inches; 5 A.M., 740 millimeters or 29.13 inches (Diario de la Marina, Havana, Oct. 13, 1909, evening edition, p.4, col.4). 16) Taken from an article by M. Gutierrez-Lanza, S.J. of the Belen College Observatory, dated on Oct. 13, 1909: The hurricane reached its maximum intensity at Havana between 5 and 6:15 A.M. (Oct. 11). The barometer read 739.4 millimeters (29.11 inches) at 6:15 A.M. and the wind velocity of 60 meters per second (130 mph) was recorded at 5:30 A.M. (Diario de la Marina, Havana, Oct. 14, 1909, morning edition, p.8, col.1). 17) Map showing a track of the storm center over western Cuba. At 6 P.M. Oct. 10 the center was located just off the southwestern coast of Pinar del Rio, about midway between Cape Corrientes and Cape Frances. At midnight (Oct. 10-11) the center was placed on the northern coast of Pinar del Rio province, a short distance to the S.W. of Puerto Esperanza (Diario de la Marina, Havana, Oct. 18, 1909, morning edition, p.6, cols.3-5). 18) A second map showing a storm track over western Cuba. This second track showed the storm to have made landfall on the southern coast of Cuba near Cape Frances, or a short distance to the E. of the previous track. However, the center of the hurricane was shown to have emerged from the northern Cuban coast near Puerto Esperanza, which is about the same location shown by the previous track (Diario de la Marina, Havana, Oct. 19, 1909, evening edition, p.2, cols. 3-5). 19) Oct. 10-11, 1909. Destructive hurricane over the provinces of Pinar del Rio and Havana, reaching its effects to Matanzas and Santa Clara. Terrible damage, a great number of casualties and loss of vessels at Pinar del Rio and Havana (Sarasola, 1928). Author's note: Actually taken from the catalog of Cuban cyclones by M. Gutierrez-Lanza which is included in Sarasola (1928). 20) Cyclonic weather at Las Villas due to the cyclone of Oct. 11 (1909) at Pinar del Rio and Havana, which continued to Florida (Martinez-Fortun, 1942). 21) Attending the presence of the storm over the western Caribbean Sea on Oct. 9 a tidal wave swept from the Gulf of Mexico over low-lying islands and sea coasts along the Yucatan Peninsula, drowning, it is reported, a large number of fishermen and their families (Monthly Weather Review, Oct. 1909). 22) On Oct. 10 storm warnings were ordered on the southern Florida coast, and at 6 A.M. Oct. 11, storm warnings were changed to hurricane warnings at Sand Key and Key West, Fl. Following this action, Florida Weather Bureau stations were telegraphed as follows: Hurricane now central near Key West promises to be destructive to life and property over a large portion of the Florida Peninsula. You are authorized to incur any necessary expense and to adopt any reasonable measure to disseminate warnings to the islands, coast cities and even the interior of the State (Monthly Weather Review, Oct. 1909). 23) The following notes by Mr. Dague, Weather Bureau Observer, are
descriptive of the action of the storm at Sand Key: The office was abandoned at 8:30 A.M. (Oct. 11) and the barograph and supplies were carried to the lighthouse... At 9:15 A.M. the anemometer cups were blown away. At this time the wind was estimated at 100 mph with gusts that exceeded that velocity... At 10:30 A.M. the Weather Bureau building went over and was immediately washed out to sea... The barometer fell rapidly from 4 until 11:30 A.M. when the minimum reading, 28.37 inches, was registered. A rise then set in and continued until 6 P.M. at which time the weather had moderated (Monthly Weather Review, Oct. 1909). 24) Extracted from a report made by the Weather Bureau observer at Key West, Fl.: From 9 P.M. Oct. 10 to 6 A.M. Oct. 11, the barometer fell steadily to 29.52 inches From 6 A.M. to 11:40 A.M. Oct. 11, the barometer fell to 28.50 inches, the lowest reading ever recorded at this station. At 11:40 A.M. the wind shifted from the N.E. to the N.W. and in 30 minutes the barometer rose one-half inch. At 7 P.M. it had risen to 29.61 (inches). The wind increased from 2;30 to 8:50 A.M. and from the latter hour it continued at hurricane force until 1:05 A.M., with maximum velocity 83 mph from the N.E. between 10;05 and 10:10 A.M. and an extreme velocity at a rate of 94 mph at 10:07 A.M. From 4 to 11:45 A.M. 8.02 inches of rain fell and between 8:45 and 11 A.M. there was a downpour of 6.13 inches (Monthly Weather Review, Oct. 1909). Author's note: Hourly observations taken at

Key West during the storm passage are included in Cline (1926). These observations show that the wind velocity did not exceed 20 mph until 2 A.M. Oct. 11 and did not exceed the same speed after 3 P.M. The maximum velocity indicated in Cline (1926) was 74 mph at 11 A.M. Weather Bureau (1911) and Tannehill )1938) also described meteorological aspects of the storm in Florida. 25) The passengers and most of the crew of the steamship "Antilles" which went ashore a week ago on the Great Bahama Bank in the hurricane which devastated the southern coast arrived yesterday on the steamship "Comus". The "Antilles" sailed from New Orleans on Oct. 9. By Monday night (it should read Sunday night, Oct. 10) she had crossed the Gulf of Mexico and was rounding the end of Florida when at daybreak (Oct. 11) she ran into the first of a hurricane and that day she labored through a building rainstorm. By 11:30 A.M. the glass had dropped to 28.35 (inches) and the vessel was floundering in the head seas. At noon the vessel finally passed into the center of the storm area. For half an hour she ran through a rough sea but a dead calm. Then she plunged again into the midst of storm-tossed seas. As soon as the "Antillles" grounded, Branwell, the United wireless operator, began to send out a call for help (The New York Times, Oct. 19, 1909, p.4, col.4). Author's note: It is obvious that the "Antilles" went through the eye of the hurricane around noon Oct. 11, with barometer lower than 28.35 inches. 26) Key West, Oct. 11. Of 100 vessels in the harbor this morning, 5 remained at anchor; others having either gone to sea or washed upon the beaches. The storm reached its highest at 1 o'clock this afternoon when the wind had an estimated velocity of 100 mph. There was a hard, steady blow from 8 A.M. to 3 P.M. when the wind began to die down and by 4 P.M. the center had passed this point (The New York Times, Oct. 12, p.1, col.1). Author's note: The height of the storm occurred at Key West much earlier than 1 P.M. and the storm center passed near Key West around 11:40 A.M. Oct. 11 and not near 4 P.M. as indicated in the above item. 27) Key West, Oct. 14. The steamer "Pieroma" has arrived bringing the crew of the schooner "Florence R. Hewson". The schooner encountered the storm off Havana 25 miles. Her decks were swept clean and her rigging washed away. The crew managed to embark in sailboats, keeping afloat until being picked up by the "Pieroma" (The New York Times, Oct. 15, 1909, p.1, col.4). 28) Jupiter, Oct. 12. The hurricane did not extend N. of Miami. with any force. No damage is reported N. of this point and the lowest barometer here was 29.55 inches; the highest wind was 36 mph. The storm recurved S. of Miami and passed eastward at 50 miles of Nassau, but no damage was done in that city so far as can be learned (The Miami Metropolis, Oct. 12, 1909, p.1, col.7). Author's note: The Monthly Weather Review, Oct. 1909, stated that at Nassau, Bahamas, the storm was felt in the night of Oct 11 when the barometer fell to 29.37 inches and the wind reached a velocity of 50 mph from the S.W. 29) Oct. 14 is another day given in some meteorological lists as that of a hurricane striking Bermuda. Key West, Florida, experienced the full force of this hurricane on Oct. 12 (it should read Oct. 11), but the disturbance was merely felt in these islands (Bermuda) as strong winds on Oct. 13 (Tucker, 1982). 30) Table showing a minimum pressure of 957 millibars (28.26 inches) as the storm passed the Florida Keys (Simpson and Riehl, 1981). Author's note: The table was taken from Hurricane Experience Levels of Coastal County Populations- Texas to Maine. N.W.S. Southern Region Tech. Rept. 12, 1975 by P.J. Hebert and G. Taylor. 31) Maximum wind velocities associated with this storm were: N.E. 83 mph at Key West and E. 36 mph at Jupiter, both on Oct. 11 (Monthly Weather Review, Oct. 1909). 32) Storm of Oct. 11, 1909. Florida Keys. Major, 15 killed, damage $ 1 million (Dunn and Miller, 1909). 33) Map showing a track for this storm. The storm was placed S.W. of Isle of Pines in the morning of Oct. 10, just to the N.W. of Havana in the morning to Oct. 11, near 25 N., 80.5 W. in the evening of Oct. 11 and near 28 N., 77 W. in the morning of Oct. 12 (Monthly Weather Review, Oct. 1909). 34) A storm was first observed near 11 N., 80 W. on Oct. 6, 1909 and lasted 12 days; it recurved near 21 N., 83 W. and it was last observed near 53 N., 5 W. (Mitchell, 1924). Author's note: The track for this storm in Tannehill (1938) was very similar to a portion of the corresponding one in Mitchell (1924), which erroneously brought the storm to the southern coast of Havana province in the morning of Oct. 10 and then very slowly northward into the Florida Straits by the morning of Oct. 11. The track in Neumann et al. (1993) showed some differences with the two tracks just mentioned; it was some farther E. over the period Oct. 6-8 and by the morning of Oct. 10 showed the center to the S.W. of Isle of Pines and then moved it northward and northeastward over the eastern portion of Pinar del Rio province.

Based on information contained in the above items, the author of this study introduced some modifications along the track for Storm 9, 1909 which is shown in Neumann et al. (1993). Author's 7 A.M. positions for Oct. 6 and Oct. 7 were estimated near 10.7 degrees N., 76.0 degrees W. and near 13.7 degrees N., 77.7 degrees W., respectively, on the basis of information in item 1); these positions were about 120 miles to the S.E. and a few miles to the S.E. of the respective ones in the above publication. 7 A.M. positions for the period Oct. 8-9 in Neumann et al. (1993) were kept unchanged because they were found to satisfy information in item 1). The author's 7 A.M. positions for Oct. 10 and Oct. 11 resulted from a detailed study of information for those days contained in many of the 34 items above; his positions were estimated near 20.5 degrees N., 84.5 degrees W. and near 23.7 degrees N., 83.0 degrees W., respectively; the 7 A.M. Oct. 10 position was about 80 miles to the S.W. of the one in Neumann et al. (1993) and the 7 A.M. Oct. 11 position was about 70 miles to the W.S.W. of the corresponding one in the same publication. The author's 7 A.M. Oct. 12 position was estimated near 29.0 degrees N., 75.0 degrees W. on the basis of information in item 1); this position was about 120 miles to the N.E. of the corresponding one in Neumann et al. (1993). The author's 7 A.M. Oct. 13 position was estimated near 34.0 degrees N., 65.0 degrees W. on the basis of information in items 1) and 29); this position was found to be about 240 miles to the N.E. of the corresponding one in the above publication. The author's track for storm 9, 1909 is displayed in Fig. 1.

The hurricane status which Neumann et al. (1993) gave to this storm was found to be supported by information contained in many of the 34 items above. The lowest pressure of 28.37 inches reported at Sand Key (item 23), a pressure as low as 29.35 inches reported by the "Antilles" before entering the eye of the hurricane around noon Oct. 11 (item 25) and the estimated minimum pressure of 28.26 inches given in item 30) revealed that the storm was a major hurricane in the Florida Keys. The pressure reading of 28.50 inches and tides of 20 feet reported by the "Cespedes" to have occurred in the Bay of Guadiana area (item 9) and reported winds of 130 mph at Havana (item 16) indicated that the storm was also a major hurricane in western Cuba. Hurricane status was introduced along the author's track early on Oct. 9 and was maintained until around midday Oct. 12. Tropical storm status was shown for the track over the period Oct. 6-8, although it is almost certain that the system was a tropical depression in its formative state on Oct. 6. Tropical storm intensity was reinstated along the author's track in the afternoon of Oct. 12 and the depression (dissipation) stage was introduced late on Oct. 13.

Storm 10, 1909 (Nov. 8-14), T. S.

The following information was found in relation to this storm: 1) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Nov. 8. ship near 11 N., 82 W., E.N.E. f. 3, 29.68; two ships S. of Panama with S.W. wind f. 6. Nov. 9, ship near 17 N., 77 W., E. f. 3, 29.71 (too low); Kingston, N.W. f. 2; ship near 19 N., 76 W., E.N.E. f. 8, 30.00; ship off Inagua, E. f. 8, 30.03; Turks Is., N.E. f. 5, 30.09; low placed 13 N., 76.5 W.;which is too far E. Nov. 10, Turks Is., N.E. f. 5, 30.07; Kingston, N. f. 2, 29.89; ship near 18 N., 80 W., E.N.E. f. 6, 29.77; ship near 10 N., 80 W., W. f. 4, 29.50; ship near 12 N., 77 W., S.S.E. to S. f. 6, 29.74; low placed 14 N., 78.5 W., probably a bit N. and E., better near 13 N., 79 W. Nov. 11, Kingston, W. f. 3, 29.72; ship near 15 N., 77 W., E.N.E. f. 5, 29.68; ship near 14 N., 80 W., N.N.W. f. 6, 29.65; Turks Is., E.S.E. f. 5, 29.96; low placed 13.5 N., 78 W., probably a bit S. and W. Nov. 12, Kingston, N.N.W. f. 4, 29.70; ship near 18.8 N., 75 W., N. f. 5, 29.77; ship near 16 N., 74 W., N.W. f. 6, 29.74; Turks Is., N.E. f. 6, 29.76; ship near 16 N., 70 W., S. f. 7; San Juan, S.E. f. 3, 29.79; low placed 17.5 N., 70.5 W., too far E., the low was probably near the southern coast of Haiti, S.W. of Port-au-Prince. Nov. 13, Kingston, N.W. f. 2, 29.79; Turks Is., N.E. to N.N.E f. 5, 29.78; ship near 19 N., 68 W., S.W. f. 5, pressure could not be read; San Juan, S. f. 3, 29.69; ship near 25 N., 67 W., E. f. 9, rain; ship near 21 N., 66 W., N. f. 6, 29.71 (wind direction somewhat suspicious, it could have be N.E. or E.N.E. to fit better other observations); ship near 20 N., 64 W., S. f. 6; ship near 21 N., 63 W., S. f. 5, 29.83; low placed 20 N., 66.5 W., it could have been too far to the E. and located near 20 N., 67 W. in reality. Nov. 14, Kingston, N.N.E. f. 2, 29.89; ship near 19 N., 61 W., W. f. 5, 29.77, showers; ship near 22 N.,

59 W., E.N.E. f. 8, pressure could not be read but probably around 1005 millibars (29.68) according to isobar drawn; San Juan, N. f. 4, 29.87; Turks Is., N.E. f. 3, 30.02; Dominica, S.W. no speed, 29.88; ship near 15 N., 60 W., S.W. f. 4; Martinique, S. f.2, 29.89; low incorporated to a front and placed 25 N., 53 W., it seems to be very far to the N.E. and a position near 21 N., 59 W. appears to be more reasonable (Historical Weather Maps, Nov. 1909). Author's note: Wind forces (f) are on Beaufort scale; pressures are in inches. 2) During the latter half of the first decade of the month a storm that apparently acquired intensity in that neighborhood and remained nearly stationary for a period of 4 or 5 days caused exceptionally heavy rains in Jamaica. From Nov. 5 to 11, inclusive, the rainfall at Kingston was 30.45 inches. Six lives were lost, about 20 percent of the banana crop was destroyed. The lowest barometer reading at Kingston during the storm was 29.70 inches on Nov. 12. By the morning of Nov. 13 the storm center had advanced to a point near the west coast of Haiti, where great damage by flood was reported. Santo Domingo was also severely visited. Vessels in the path of the storm, both in the Windward Passage and on the Atlantic, experienced gales of exceptional violence (Monthly Weather Review, Nov. 1909). Author's note: The above information was extracted from an article by E.B. Garde. 3) Belen College Observatory, Nov. 11, 6 P.M. At the edge of the anticyclone we have enjoyed for many days a perturbation has formed and at 2 P.M. this afternoon was located to the S.E. of Santiago de Cuba, E. of Jamaica and W. of extreme western Haiti. We have sent this note to Washington. It would be best if it recurved soon to the N.E. as we expect. L. Gangoiti, S.J. (Diario de la Marina, Havana, Nov. 12, 1909, morning edition, p.4, col.3). 4) National Observatory, Nov. 11. According to observations from Camaguey this morning and from Santiago de Cuba at 3 P.M., it appears that there is a cyclonic perturbation to the S.E. of the latter province. This is confirmed by a cablegram from the direction of the Weather Bureau of Washington at 4 P.M. The cablegram says: "Indications of a perturbation over the central Caribbean Sea. Reports from Jamaica are missing" (Diario de la Marina, Havana, Nov. 12, 1909, morning edition, p.4, col.4). 5) Belen College Observatory, Nov. 12, 9 A.M. At 8 A.M. today we sent the following message to the Weather Bureau of Washington: "Center of the cyclone was W. of Gonave Island (Haiti) at 7 A.M. Its course appears to be N. one quarter to N.N.E." We have received from Mr. Moore at 9:20 A.M.: "Perturbation of marked intensity is apparently moving northward toward the Windward Passage." L. Gangoiti, S.J. (Diario de la Marina, Havana, Nov. 12, 1909, evening edition, p.4, col.1). Author's note: The National Observatory also published in the same issue the advisory sent by the Weather Bureau of Washington. 6) Belen College Observatory. The center of the cyclone was to the E.S.E. of Guantanamo at 3 P.M. (Nov. 12). At 8 P.M. (Nov. 12) we received the following cablegram from Mr. Ernesto Brook of Guantanamo: "Gangoiti-Havana. Following wireless message was from ship "Krompic", Kingston. Cyclone N.E. of Jamaica at 9 P.M. Thursday (Nov. 11). Unprecedented rainfalls on Wednesday and Thursday (Nov. 10-11). Great damage to railroads. Telegraph wires at down. 500,000 banana plants lost. American cruiser "Eagle" struck a pier; it was removed by the British cruiser "Seylla", sustaining great damage. Fruit steamers "Dorado", "Tratfort" and "Amanda" were wrecked. The "Amanda" was refloated. Brook." L. Gangoiti, S.J. (Diario de la Marina, Havana, Nov. 13, 1909, morning edition p.4, col.4). 7) Extracted from an article by L. Gangoiti, S.J. of the Belen College Observatory, dated on Nov. 30, 1909: A telegram from Port-au-Prince on Nov. 13 said that a violent hurricane has caused immense damage in the island of Haiti. Another cablegram from Cap Haitien on Nov. 13 said that the flooding due to the hurricane has cut communications with places where provisions are gotten, that the sea was very rough, that damage was considerable and that some fatalities occurred. A message from Holland Bay, Jamaica, stated that numerous plantations were totally destroyed. The Provincial Observatory of Santiago de Cuba said that the cyclone moderated about 6;30 P.M. (presumably of Nov. 12), at which time the barometer started to rise rapidly; at 6 P.M. the wind had blown very hard; coastal erosion and cyclonic winds were reported at Baracoa. From The New York Herald: Puerto Plata, Saturday (Nov. 13). Beginning with a light N. wind, a violent wind storm developed in a few hours, sweeping the sea into the port. Another wireless message said that at 8 P.M. Friday (Nov. 12, when passing Punta Maysi (extreme eastern Cuba) coming from Jamaica, the ship "August Wilheim" experienced strong winds and that the "Prince Joaquin" had to stop moving due to the heavy rain and hard winds. Telegram from Turks Is. on

Nov. 13: A strong storm was felt here on Friday (Nov. 12), accompanied by heavy rain and hurricane winds. From The New York Herald, Nov. 21: Narrative by the captain of the "Maracaibo". We left San Juan on Nov, 12 with rough seas but little wind. We were fully in the hurricane on Nov. 14 and for 8 hours we were in the eye of the storm. According to our estimate the wind blew 150 mph. Observations taken on board the "Boston", from Halifax to Turks Is., lat. 21 44 N., long. 71 1 W. Nov. 12, 5:30 P.M., wind E.N.E., rough sea, barometer 29.90 inches. Nov. 13, 4 A.M., E.N.E. hurricane wind, heavy seas and rain, barometer 29.86 inches. Nov. 13, midday, wind E.N.E. still strong, 29.79 inches; 4 P.M., barometer 29.70 inches, no change in weather conditions; 8 P.M., barometer 29.65 inches. Midnight Nov. 13-14, barometer 29.65 inches,--wind moderated; 4 A.M., barometer 29.65 inches, rain stopped, less N.N.E. wind, barometer 29.70 inches; 8 A.M., back on course towards Turks Is. On Nov. 11 the barometer was extremely high: 30.60 inches (Diario de la Marina, Havana, Dec. 2, 1909, morning edition, p.4, cols. 4-6 and p.5, cols.1-3). Author's note: The weather information furnished by the "Maracaibo" and the "Boston" appears to be unreliable. 8) Nov. 10-12, 1909. A somewhat intense cyclone passed through the Channel between Cuba and Haiti, and it was felt with moderate strength over eastern Cuba. Loss of the steamer "Maria Herrera" (Sarasola, 1928). Author's note: Actually taken from the catalog of Cuban cyclones by M. Gutierrez-Lanza which is included in Sarasola (1928). The storm center crossed over Hispaniola and did not pass through the Windward Passage. The "Maria Herrera" was a Cuban steamer which left Santiago de Cuba for Puerto Rico and was never heard from; the steamer is believed to have sunk in the storm. 9) Very bad weather at Oriente province and to a lesser extent at Camaguey and Las Villas due to the cyclone of Jamaica, Haiti and Turks Is., which caused the loss of the coastal steamer "Maria Herrera" (Martinez-Fortun, 1942). 10) Port-au-Prince, Nov. 13. The hurricane that crossed Haiti has caused immense damage, the extent of which it is as yet impossible to determine. There was considerable loss of life, according to reports from various places. At Gonaive, the river overflowed its banks and invaded the districts to the N. and S. of the town. The steamer "Alleghany", which arrived here, passed before Cap Haitien and Port de Paix but could not communicate with l;and on account of the heavy sea which was running (The New York Times, Nov. 14, 1909, p.2, col.5). 11) New York, Nov. 13. A telegram from Port-au-Prince, Haiti, stated that Haiti and Santo Domingo have been devastated by cyclones and heavy floods. Port de Paix, Gonaives, Cap Haitien and other towns are in ruin, and 19 dead have been already found in Port de Paix (The Times, London, Nov. 15, 1909, p.5, col.5). 12) Grand Turk, Bahamas, Nov. 13. A severe storm passed on this island yesterday. The wind was of hurricane force and was accompanied by heavy rain. No news have been received of the outlying islands for a week (The Times, London, Nov. 15, 1909, p.5, col.5). 13) The storm of Nov. 8-14, 1909 was felt on the island of Hispaniola, where it is known as that of San Severo (Garcia-Bonnelly, 1958). 14) A storm was first observed near 10 N., 81 W. on Nov. 8, 1909 and lasted 6 days; it was last observed near 20 N., 60 W. (Mitchell, 1924). Author's note: Tracks for this storm in Tannehill (1938) and Neumann et al. (1993) were found to be similar to the corresponding track in Mitchell (1924).

On the basis of information contained in the above items, particularly in item 1), the author of this study introduced some modifications along the track for Storm 10, 1909 shown in Neumann et al. (1993). Author's 7 A.M. positions for the period Nov. 8-14 were estimated as follows: Nov. 8, near 10.3 degrees N.,81.7 degrees W.; Nov. 9, near 11.3 degrees N., 80.3 degrees W.; Nov. 10, near 12.7 degrees N., 78.7 degrees W.; Nov. 11, near 14.3 degrees N.m 77.0 degrees W; Nov. 12, near 18.0 degrees N., 72.7 degrees W.; Nov. 13, near 20.0 degrees N., 67.7 degrees W.; Nov. 14, near 21.0 degrees N., 59.0 degrees W. The difference between the author's positions and the corresponding ones in the above publication was found to range from about 110 miles on Nov. 13 to about 60 miles on Nov. 8, Nov. 11-12 and Nov. 14. The author's track for Storm 10, 1909 is displayed in Fig. 1.

It was a difficult case for the author to decide whether or not to upgrade to a hurricane Storm 10, 1909 from the tropical storm intensity shown in Nuemann et al. (1993). On one hand, information in a number of the 14 items above suggested hurricane intensity both at Hispaniola and Turks Is. and the word "cyclone" used by the Belen College Observatory also implied hurricane status in accordance with Cuban nomenclature regarding tropical weather systems. On the other

hand, no winds of hurricane force and no pressures that were low enough to support them were reported in item 1), the word "Hurricane" is sometimes applied to strong rain storms (not to true hurricanes) in Santo Domingo and an analysis of the available information appeared to indicate that winds of near-hurricane or hurricane force were not concentrated near the storm center, but were blowing at considerable distances to the north. Under the above circumstances, the author decided to be conservative and to keep the tropical storm status given to the storm in Neumann et al. (1993). Tropical storm intensity was, therefore, denoted along the author's track over the period Nov. 8-13 and the extratropical stage was introduced on Nov. 14 in accordance with information in item 1).

Special statement.

In addition to the 10 storms which were discussed above, three possible cases were found in 1909. These three cases are presented next.

A) Case of Jun. 2-4, 1909.

The Monthly Weather Review, Jun. 1909, indicated that a shallow barometric depression formed in the western part of the Gulf of Mexico early in the month and showed a map indicating it had a central pressure of 29.66 inches when near the Delta of the Mississippi. Data plotted on the Historical Weather Maps allowed one to draw a weak low pressure center to the S.S.W of Galveston and to the E.N.E. of Corpus Christi in the morning of Jun. 2. By the morning of Jun. 3, the center had moved to the Mississippi coast, with New Orleans reporting a northerly wind which intensity could not be read off the map and a pressure that could not be clearly read but probably was about 29.65 inches. Pensacola reported a S.E. f. 6 wind and a pressure of 29.69 inches, and a ship just S. of the Mississippi Delta showed a S.W. f. 6 wind and a pressure of 29.65 inches. The low was drawn as an extratropical one but this could be questionable. By the morning of Jun. 4, the low was placed over eastern Tennessee and a temperature contrast around the low supported extratropical characteristics. Although no winds of tropical storm intensity (f. 8) were shown around the system on Jun. 3, the reported pressures were low enough to consider this case as a possible one.

B) Case of Jun. 15- 18, 1909.

This possible case was shown in Historical Weather Maps, Jun. 1909. The morning map for Jun. 15 showed a ship with a S. f. 8 wind near 11 N., 82 W. Another ship with S.E. f. 6 wind and pressure of 29.91 inches and rain appeared plotted on the Jun. 16 morning map. W. and S.W. winds f.2 were shown by two ships in the southwestern Caribbean Sea on the Jun. 17 morning map. The Jun. 18 map showed a ship reporting an E. f. 8 wind near 14 N., 82 W. Although winds of tropical storm intensity were drawn on the maps for Jun. 15 and Jun. 18, this case was kept as a possible one because those two observations could have been reported by the same vessel and be in error. In addition, pressures of only around 29.80 inches which were reported by ships in the area on Jun. 16-17 did not suggest tropical storm intensity.

C) Case of Oct. 16-24, 1909.

The Belen College Observatory first announced to the Weather Bureau of Washington some indications of a perturbation to the N.W. of Martinique in the morning of Oct. 16 and at 3 P.M. that day this was confirmed by the Weather Bureau which said that there was a depression over the Lesser Antilles, probably moving towards the west (Diario de la Marina, Havana, Oct. 17, 1909, morning edition, p.4, col.4). Advisories from the Belen College Observatory and the National Observatory placed the perturbation to the S. of Haiti and Jamaica in the morning of Oct. 19 (Diario de la Marina, Havana, Oct. 19, 1909, evening edition, p.4, col.1). By the morning of Oct. 20 the Belen College Observatory placed the perturbation to the N.E. of Cape Gracias a Dios

(Nicaragua) and over 300 miles to the S. of Havana (Diario de la Marina, Havana, Oct. 20, 1909, evening edition, p.4, col.1). According to advisories published in Diario de la Marina, Havana, Oct. 22, 1909, evening edition, p.4, col.2, the Belen College Observatory located the tempest to the S.S.W. of Havana at 7 P.M. Oct. 21, and about the same time the National Observatory announced that it was located some 250-300 miles to the S.W. of Havana. This observatory added that in the morning of Oct. 22 the barometer had remained high and making its diurnal oscillations, which indicated that the storm had not recurved. Examination of maps in Historical Weather Maps, Oct. 1909, showed a wave-like disturbance to have moved from the vicinity of the Lesser Antilles on Oct. 16 to the Yucatan peninsula by Oct. 22. Although a weak cyclonic circulation was drawn off Yucatan on the Oct. 21 map, data throughout the entire Oct. 16-22 period did not seem to support a closed circulation. The Monthly Weather Review, Oct. 1909, stated that from Oct. 22 to Oct. 24 a storm passed from the western Caribbean Sea to the lower portion of the Gulf of Mexico attended by excessive and persistent rains that caused destructive floods in the State of Tabasco. Curiously, the weather maps for Oct. 22-24 showed high pressure over Tabasco, protruding in the form of a ridge from the west. Based on the above information, the author believes that this case had only a small chance to have become a tropical storm; nevertheless, the decided to include it as a possible one.

A weak low was drawn over the western Gulf of Mexico on the morning weather maps for Jun. 20-21 (Historical Weather Maps, Jun. 1909), and tracks for two storms starting on Nov,. 22 and Nov. 25, 1909, respectively, were included in Mitchell (1924) and reproduced in Tannehill (1938) as his Storms 11 and 12, 1909. The author has examined the data available for the three cases in Historical Weather Maps, Jun. and Nov. 1909, and concluded that these cases practically did not have any chance to have reached tropical storm intensity. Therefore, they were not included as possible cases.