5, barometer 29.86 inches; Kingston, wind S.E, force 3, barometer 29.76 inches; Port-au-Prince, wind E. force 6, barometer 29.76 inches. Oct.28, Kingston, wind S.E. force 5, barometer 29.75 inches; Santiago de Cuba, wind S.E. force 4, barometer 29.77 inches; Camaguey, wind E. force 5, barometer 29.72 inches; Cienfuegos, wind N.E. force 3, barometer 29.71 inches; Havana, wind N.E. force 3, barometer 29.83 inches; ship near lat. 20.3 N., long. 83 W., wind N.E. force 6, barometer 29.68 inches (probably too low). Oct.29, Jupiter, wind E. force 4, barometer 29.78 inches; Key West, wind N.E. force 5, barometer 29.71 inches (not clearly read off the map); ship near lat. 27.5 N., long. 77.5 W., wind E.N.E. force 6, barometer 29.86 inches; ship near lat. 26 N., long. 76 W., wind E. force 9, barometer 29.50 inches (obviously too low); ship near lat. 25 N., long. 74 W., wind E.S.E. force 8, barometer 29.77 inches; ship near lat. 22.3 N., long. 74 W., wind E.S.E. force 6, barometer 29.68 inches; Santiago de Cuba, wind S.E. force 4, barometer 29.71 inches; Camaguey, wind S.E. force 4 (wind direction and speed not clearly read off the map), barometer 29.59 inches; Cienfuegos, wind W. force 4, barometer 29.38 inches; Havana, wind N. force 5, barometer 29.68 inches; ship near lat. 20 N., long. 84 W., wind N. force 10 (probably too high), barometer 29.83 inches; ship near lat. 18 N., long. 78 W., wind S.W. force 6, barometer 29.59 inches (too low); ship near lat. 17 N., long. 79 W., wind W.S.W. force 5; Kingston, wind S.E. force 5, barometer 29.75 inches (Historical Weather Maps, Oct.1899). 12) The minimum pressure which was recorded at Havana (Belen College Observatory) in association with this cyclone was 751.2 millimeters (29.58 inches) and occurred on Oct.29 (Sarasola, 1928). 13) Oct.28-29, 1899. A cyclone of good intensity which formed between Jamaica and Santiago de Cuba moved to the N.W., reaching the southern coast of Cuba between Tunas de Zaza and Cienfuegos while turning to the N.N.W. towards the Florida Straits. It caused great flooding and damage to the country as well as the blowing down of some houses and loss of life (Sarasola, 1928). Author's note: Actually taken from the catalog of Cuban cyclones by M. Gutierrez-Lanza which is included in Sarasola (1928). 14) Extracts from newspapers published at Santa Clara province: Remedios. From 5 P.M. Oct.28, the rain storm became more intense. A strong wind began blowing at 10:30 P.M., lasting until the early morning of Oct.29. Camajuani. The lower part of the town was flooded during the night of Oct.28, but no casualties occurred. Sancti-Spiritus. A train had left town for Tunas de Zaza in the night of Oct.28 to assist the inhabitants of the latter place. The train returned to Sanct-Spiritus in the morning of Oct.29 bringing a number of families that were fearing a flooding as the Zaza River threatened to overflow. Strong gusts blew several houses at Sancti-Spiritus but no loss of life was reported (Diario de la Marina, Havana, Nov.1, 1899, p.2, col.1). Author's note: The Monthly Weather Review, Oct.1899 also published a brief account of storm damages in Cuba which was sent Mr. W.B.

Stockman, Forecast Official of the Weather Bureau office at Havana. 15) Santiago de Cuba, Oct.29. After 5 days of continuous rain storms, a terrific hurricane from S.E. swept, causing considerable destruction. Twelve houses were wrecked and others badly damaged. Telegraph lines are down and it is impossible for vessels to enter or leave the harbor (The New York Times, Oct.30, 1899, p.7, col.2). Author's note: The use of the word hurricane in the above dispatch is misleading. Indeed, the storm was over central Cuba and not near Santiago de Cuba on Oct.29. The word "hurricane" seems to refer in this case to strong winds affecting the above mentioned city. 16) Kingston, Jamaica, Oct.29. Reports on the severe rain storm that have swept the country arrive from various points and confirm the fear that extensive damage has been done. The Rio Cobre inundated Spanish Town, doing considerable harm. Advices from the town of Black River report great damage to shipping and wharves there, as well as serious damage to crops (The New York Times, Oct.30, 1899, p.7, col.2). 17) Norfolk, Va., Nov.11. The schooner "Henry P. Mason", from Galveston to Philadelphia, put into Hampton Roads today. The "Mason" got as far as the Florida coast where a hurricane which lasted 3 days struck her on Oct.29 (The New York Times, Nov.12, 1899, p.3, col.2). 18) During Oct.30 the center of the disturbance moved northwards and in the evening was central off the Carolina coast. On the morning of Oct.30 the display of storm signals was extended to Sandy Hook, N.J. and advisory messages regarding the character and course of the storm were sent northward to Boston. The morning reports showed a marked increase in the intensity of the storm and coast interest along the middle Atlantic and south New England coasts were notified that dangerous N.E. gales might be expected. During the northward passage of the storm severe gales were encountered along the south and middle Atlantic and south New England coasts (Monthly Weather Review, Oct.1899). 19) Observations taken at 8 A.M. (E.S.T.) which were taken from weather maps: Oct.30, ship near lat. 29 N., long. 75 W., wind E.S.E. force 12, barometer 29.26 inches; ship near lat. 27 N., long. 73 W., wind S.E. force 9, barometer 29.59 inches; ship near lat. 26 N., long. 74 W., wind S. force 6; Jupiter, wind N.W. force 4, barometer 29.52 inches; Key West, wind N.W. force 5, barometer 29.70 inches; storm center shown near lat. 27.7 N., long. 76.7 W. on the 8 A.M. (E.S.T.) Oct.30, 1899 map. Oct.31, data difficult to read off the map in the vicinity of the storm center. Center with pressure below 985 millibars (29.09 inches) shown on the 8 A.M. Oct.31. 1899 map to have been located to the S. of Wilmington; however, as read off the map, the wind there seems to have been from the S. (no force could be read), suggesting that the center was then to the N.W. of the station (Historical Weather Maps, Oct.1899). 20) At Charleston, S.C. the wind reached a velocity of 58 mph from the N.W, at 10:05 P.M. Oct.30. The News and Courier (Charleston, S.C., Oct.31, 1899) published an interview with Mr. L.N. Jesunofsky of the Weather Bureau in which he announced the

occurrence of that wind and added that "the wind has increased a little since that time". A dispatch from Florence, dated on Oct.31, indicated that between 11 P.M. Oct.30 and 2 A.M. Oct.31 the wind seems to have reached its height (there) which was very nearly 70 mph, while the rain seemed to have come down in sheets. Many buildings were either unroofed or moved from their foundation, a large amount of fencing blown down and the trees badly twisted and broken (as published in The News and Courier, Charleston, S.C., Nov.1, 1899). The Morning Start, Wilmington, N.C., Nov.1, 1899 published the following account given by Capt. F.C. Miller of the steamer "Catherine Whiting", which was wrecked at Goss Beach, Brunswick County (N.C.) during the hurricane: "About 12 o'clock Tuesday (midnight Oct.30-31) there was a dead calm for 15 minutes and then the wind shifted to the east...The wind then shifted to S.E. and caused the ocean to sweep right in towards shore...The ship began to drift rapidly towards the land which was 2 or 3 miles away. At 4 A.M. Tuesday the ship got in the breakers and struck bottom, with a heavy thump, in 4 fathoms of water..." From the record of the storm written in the Wilmington Weather Bureau station journal: The wind gradually increased in force from the S.E., reaching a gale velocity at 3 P.M. (Oct.30) and became very severe during evening. The gale continued very severe during the night and forenoon (Oct.31) accompanied by heavy rain till 4:50 A.M. and light showers from 8:10 A.M. to 3:30 P.M. Rapid and decided fall of barometer until 5 A.M. (Oct.31) when it reached 28.90 inches (actual). After this time it began to rise rapidly. The wind gradually veered from N.E. to S.E. during the night, blowing with increased force, reaching a maximum velocity of 43 mph from the S.E. at 4:50 A.M. The wind came in great gusts at times, reached extreme velocities of 50 to 55 mph. Towards noon the wind began to shift to S.W., becoming steady from that direction at 4 P.M. and gradually decreasing in force. Gale ended at 8:07 P.M. At the summer resort beaches -Wrightsville Beach 10 miles due E. and Carolina Beach 18 miles S.E.- the wind and tide played havoc. The amount of damage done in Wilmington and vicinity is enormous, not so much by the high winds but my the tremendously high tide accompanying. The tide reached nearly the highest point in the history of the port, and much damage was due to submerged wharves and warehouse floors (Ho, 1989). Author's note: The Monthly Weather Review, Oct.1899 also refers to the maximum velocities at Charleston and Wilmington and to the wreck of the "Catherine Whiting". 21) Some observations taken at Charleston, S.C.: Oct.30, 6 P.M. (E.S.T.), barometer 29.48 inches, wind N. 29 mph; 8 P.M., barometer 29.38 inches, wind N.N.W. 31 mph; 10 P.M., barometer 29.18 inches, wind N.N.W. 44 mph; midnight (Oct.30-31), barometer 29.10 inches, wind N.W. 36 mph; Oct.31, 2 A.M., barometer 29.08 inches, wind N.W. 30 mph; 4 A.M., barometer 29.08 inches, wind N.W. 23 mph; 6 A.M., barometer 29.13 inches, wind W.N.W. 21 mph; 8 A.M., barometer 29.25 inches, wind W. 21 mph; 10 A.M., barometer 29.31

inches, wind W. 21 mph (Ho, 1989). 22) Some observations taken at Wilmington, N.C.: Oct.30, 6 P.M. (E.S.T.), barometer 29.45 inches, wind N.N.E. 26 mph; 8 P.M., barometer 29.36 inches, wind N.N.E. 22 mph; 10 P.M., barometer 29.24 inches, wind N.E. 26 mph; midnight (Oct.30-31), barometer 29.13 inches, wind N.E. 30 mph; Oct.31, 2 A.M., barometer 29.03 inches, wind E. 26 mph; 3 A.M.,barometer 28.99 inches, wind E. 28 mph; 4 A.M., barometer 28.98 inches, wind E. 26 mph; 4:50 A.M., maximum wind S.E. 43 mph; 5 A.M., barometer 28.96 inches, wind S.E. 35 mph; 6 A.M, barometer 29.00 inches, wind S.E. 25 mph; 7 A.M., barometer 29.08 inches, wind S.S.E. 35 mph; 8 A.M., barometer 29.13 inches, wind S. 28 mph; 10 A.M., barometer 29.18 inches, wind S. 19 mph (Ho, 1989). 23) A large crowd boarded the Seacoast train for Wrightsville to witness for themselves the severity of the storm. One reporter from the Wilmington Messenger wrote: "The massive railroad trestle was warped and twisted, and for a few hundred feet extending from the station towards Hammocks the rails and ties were torn from the piles, and presented a tangled piled down in the waters of the sound... To the right and left, stretching around the sound, as far as the eye could reach, where but yesterday, as it were, the famous shell road wound in beautiful curves, was a mess of deep tangled debris of every conceivable kind, the wreckage of cottages from the beach and of boats and bath houses along the shore of the sound" (Barnes, 1995). 24) During the last 24 hours the Caribbean Sea storm has moved N. off the Florida and South Atlantic coasts and was central last evening S.E. of Wilmington, its progress having been about 29 mph. The storm has increased in intensity and has been attended by N.E. to N. gales of 30 to 60 mph, the latter velocity being reached at Cape Henry and Kitty Hawk (The New York Times, Oct.31, 1899, p.2, col.7). Author's note: The storm position to the S.E. of Wilmington was found to be too far to the E.; actually the storm was to the S. of Wilmington in the evening of Oct.30. The Monthly Weather Review, Oct. 1899 also mentions the maximum velocity of 60 mph which was reached at Cape Henry on Oct.30. 25) The Caribbean Sea storm has moved slowly N. and was central yesterday near Raleigh, where a barometric pressure of 29.34 inches was reported. The highest wind velocity reported during yesterday was 60 mph from the N.E. at Sandy Hook (The New York Times, Nov.1, 1899, p.2, col.6). 26) The first genuine storm of the autumn set in yesterday and hurricane signals were displayed along the coast. The storm brought a good deal of rain and winds that blew over 40 mph (The New York Times, Nov.1, 1899, p.7, col.6). 27) Philadelphia, Oct.31. The heavy N.E. storm outside the Delaware Capes reached its height today, when accompanied by rain, the wind blew over 60 mph. By noon the wind had moderated and was blowing about 55 mph. Along the coast the tides today were the highest in some years (The New York Times, Nov.1, 1899, p.7, col.6). 28) The storm has continued its progress along the Atlantic coast States with little change in energy and was central last night off the Maine coast (The New York Times.

Nov.2, 1899, p.2, col.7). 29) Some temperatures taken in the New York area on Nov.1, 1899 (in degrees Fahrenheit). Weather Bureau office, 3 A.M., 59; 6 A.M., 60; 9 A.M., 61; midday, 60; 4 P.M,, 60; 6 P.M., 59; 9 P.M.. 52. New York Times building, 3 A.M., 56; 6 A.M., 59; 9 A.M., 66; midday, 68; 4 P.M., 54; 9 P.M., 53 (The New York Times, Nov.2, 1899, p.2, col.7). Author's note: Differences in simultaneous temperature readings during daytime were attributed to the fact that The New York Times had its thermometer at 6 feet above the ground in the middle of the busy city whereas the thermometer at the Weather Bureau was located on top of the building 265 feet above ground level. The official Weather Bureau readings suggest that Nov.1. 1899 was a cool day in the New York area. 30) The Caribbean Sea disturbance has passed eastward over Newfoundland (The New York Times, Nov.3, 1899, p.2, col.4). 31) Some additional maximum velocities were as follows: Key West, N.W. 40 mph on Oct. 29; Raleigh, N. 41 mph on Oct.31; Hatteras, N.E. 46 mph on Oct.30; Norfolk, N.E. 50 mph on Oct. 31; Cape Henry, N.E. 72 mph on Oct.31; Cape May, N.E. 46 mph on Oct. 31; Atlantic City, N.E. 44 mph on Oct.31,; Philadelphia, N.E. 36 mph on Oct. 31; New York, N.E. 52 mph on Oct.31; Block Island, N.E. 57 mph on Oct.31; Boston, N.E. 31 mph on Oct. 31; Portland, Me., N.E. 21 mph on Oct.31 (Monthly Weather Review, Oct.1899). 32) Storm of Oct.26-Nov.5, 1899. Western Caribbean Sea, Cuba, inland over North Carolina (Tannehill, 1938). 33) Storm of Oct.29-31, 1899. Minor on the S.E. Florida coast, the center remaining offshore. Major in the Carolinas, high tides. Minor along the coast of the Middle Atlantic States, high winds and tides (Dunn and Miller (1960). Author's note: Ho (1989) has estimated a central pressure around 28.20 inches as the storm made landfall on the coast near the South Carolina- North Carolina border early on Oct.31; his estimate was found to support the major hurricane status which Dunn and Miller (1960) gave to this storm in the Carolinas. 34) Map showing a track for this storm. Positions along the track were as follows: Oct. 26 (morning), lat. 19.3 N., long. 78 W.; Oct.27 (morning), lat. 20 N., long. 81 W.; Oct.28 (morning), lat. 21 N., long. 82.5 W.; Oct.28 (evening), lat. 22.7 N., long. 83.7 W.; Oct.29 (morning), lat. 22.7 N., long. 80 W.; Oct. 29 (evening), lat. 24.5 N, long. 80.5 W.; Oct.30 (morning), lat. 26.7 N., long.78.7 W.; Oct.30 (evening), lat. 33 N., long. 76 W.; Oct.31 (morning), lat. 35.7 N., long. 76.3 W.; Oct.31 (evening), lat. 35.5 N., long 78.7 W.; Nov.1 (morning), lat. 41 N., long. 73.7 W.; Nov.1 (evening), lat. 43.5 N., long. 68.5 W.; Nov.2 (morning), lat. 48 N., long. 57.5 W. (Monthly Weather Review, Oct.1899). Author's note: Some of the storm positions above were found to be seriously erroneous. 35) An Oct.1899 storm appeared near lat. 19 N., long. 78 W., recurved near lat. 22 N., long. 81 W. and disappeared near Newfoundland. An accompanying track took the storm first to the S.W. of Cienfuegos; then recurved the storm over Cuba, bringing the center to the Florida Straits near Cardenas; next the storm motion was turned

northward off the Florida east coast until reaching the Carolina coast (Garriott, 1900). 36) A storm was first observed near lat. 13 N., long. 81 W. on Oct.26 and lasted 13 days; it was last observed near lat. 62 N., long. 15 W. (Mitchell, 1924). Author's note: The corresponding storm track shown in Mitchell (1924) was found to be quite similar to the one in Neumann et al. (1993) as for Storm 6, 1899. However, the latter authors started their track near lat. 12 N., long. 80.5 W. on Oct. 23 or three days earlier than Mitchell (1924) and brought the storm to near lat. 15 N., long. 81.3 W. by Oct.26.

Information in the 36 items above allowed the author of this study to introduce some modifications along the track shown in Neumann et al. (1993) as for Storm 6, 1899. After having examined information contained in the Historical Weather Maps for the period Oct.22-25 (not reproduced here), the author of this study seriously questioned the early track in Neumann et al. (1993) because suitable ship data, which were available for Oct.24 only, did not support a cyclonic circulation where, according to the above authors, the storm supposedly evolved during its incipient stages. On the basis of information in items 1) and 11) and after applying backwards some space-time continuity from his estimated storm position for the next day, the author of this study started his track with a 7 A.M. Oct.26 position estimated near 17.3 degrees N., 74.3 degrees W., which was about 450 miles to the E.N.E. of the corresponding position in Neumann et al. (1993) and suggested serious errors along their alleged track. The author's 7 A.M. Oct. 27 position was based on information in items 2), 3) and 11) and was estimated near 18.5 degrees N., 76.3 degrees W.; this position was about 360 miles to the E.N.E. of the one in Neumann et al. (1993). The author's 7 A.M. Oct.28 position was primarily based on information in item 5) and 11) and was estimated near 20.0 degrees N., 79.0 degrees W.; this position was about 120 miles to the E. of the corresponding one in Neumann et al. (1993). On the basis of information in items 7) and 11), in general, and in items 8) and 10), in particular, the author of this study decided to introduce a slight adjustment to the S.W. in the 7 A.M. Oct.29 position which is shown in Neumann et al. (1993), resulting in a new morning position near 22.7 degrees N., 80.0 degrees W. for that day. The 7 A.M. Oct.30 position in Neumann et al. (1993) was kept unchanged because it was found to be supported by morning observations for that day (item 19). On the basis of information in items 20) and 22), the 7 A.M. Oct.31 position in Neumann et al. (1883) was adjusted to the N. by about 70 miles to near 34.5 degrees N., 79.0 degrees W. 7 A.M. positions in Neumann et al. (1993) for the period Nov.1-4 were kept unchanged. The author's track is displayed in Fig.2.

The hurricane status which Neumann et al. (1993) gave to this

storm as for Storm 6, 1899 was found to be supported by information contained in a number of the items above. In fact, Storm 7, 1899 was a major hurricane in the Carolinas as indicated in item 33). On the basis of the content of item 6) and observations taken at Tunas de Zaza (items 5, 7 and 8), the author of this study believed that the storm reached hurricane intensity during Oct.28 and, therefore, introduced such intensity along his track on that day. Because the storm was a major hurricane at landfall on the Carolina coast early on Oct.31, the author decided to keep the hurricane status during most of that day, changing it into the one corresponding to the extratropical stage as the storm crossed the 37 degrees N. parallel. Temperatures in item 29) showed that the system exhibited extratropopical characteristics as it reached the vicinity of New York in the morning of Nov.1.

Storm 8, 1899 (Nov.7-10), T. S.

This is a case which has been recently unearthed by the author of this study. Strictly speaking, this is not a new case because it was listed in the catalog of Cuban cyclones by M. Gutierrez-Lanza, and its existence was published in The New York Times, Diario de la Marina (Havana, Cuba) and the Monthly Weather Review, Nov.1899. However, this storm might be considered as a new one from the standpoint that it is not included in Neumann et al. (1993).

Documentation of this storm was based on the following information: 1) Observations taken at 8 A.M. (E.S.T.) which were extracted from weather maps: Nov.7, ship near lat. 12 N., long. 80 W., wind W.N.W. force 2, barometer 29.71 inches; ship near lat. 13 N., long. 76.7 W., wind E.S.E. force 4, barometer 29.94 inches (probably too high). Nov.8, Kingston, wind N. force 2, rain, barometer 29.89 inches; Santiago de Cuba, wind N.E. force 3, barometer 29.92 inches; Port-au-Prince, wind E. force 3, barometer 29.87 inches; Camaguey, wind N.E. force 3, barometer 29.96 inches; ship near lat. 19 N.,long. 75 W., wind S.E. force 3; ship near lat. 15.7 N., long. 75 W., wind N.E. force 5, barometer 29.91 inches; ship near lat. 12 N., long. 77.3 W., wind N.E. force 3, barometer 30.03 inches (too high). Nov.9, Santiago de Cuba, wind S.E. force 4, barometer 29.83 inches; Camaguey, wind N.E. force 3, barometer 29.84 inches; Cienfuegos, wind N.E. force 2, barometer 29.90 inches; ship near lat. 22.7 N., long. 73 W., wind E. force 4, barometer 29.86 inches; ship near lat. 21 N., long. 73 W., wind E.S.E. force 6; ship near lat. 19.8 N., long. 74 W., wind E. force 4, barometer 29.83 inches; ship near lat. 19.8 N., long. 79.7 W., wind N.E. force 5, barometer 29.88 inches. Nov. 10, Camaguey, wind N.E. force 2, barometer 29.85 inches; Santiago de Cuba, wind S.W.

force 1 (barometer could not be read off the map); ship near lat. 27.5 N., long. 74 W., wind N. force 4, barometer 29.94 inches; ship near lat. 26.7 N., long. 70 W., wind S.W. force 5, barometer 29.94 inches; two ships near Crooked Is. with wind N.E. forces 3 and 4, one of them reporting a barometer reading of 29.86 inches (Historical Weather Maps, Nov.1899). 2) Belen College Observatory, Nov.8, 6 P.M. Our observer at Santiago de Cuba, Mr. Mason, reported to us by a cablegram this afternoon: "Holland Bay, Jamaica, strong tempest since daybreak, continuous rain, wind now blowing from S.W. Here (at Santiago de Cuba), barometer 29.89 inches, intermittent light rain, wind light from S.E." Although this is not the ordinary time for cyclones we will try to inform the public about any emergency. L. Gangoiti, S.J. (Diario de la Marina, Havana, Nov,9, 1899, morning edition, p.2, col.6). 3) Belen College Observatory, Nov.9, 7 P.M. The observer at Santiago de Cuba has sent several telegrams to us. At 2:30 P.M. we received the following one: Manzanillo, during the early morning wind N.E. 40 mph; this morning wind N.; now wind W. with a tendency to become S.W., barometer went down three tenths (it should probably read 3 millimeters which are about 12 hundredths of an inch), cyclonic weather, barometer still low, requesting from captain of the "Josefita" to telegraph you last night observations. At 5:30 P.M. a telegram was received from the captain of the "Josefita", at Manzanillo: "Very rainy weather was observed last night. wind from N.E., seas from S.W., barometer 29.75 inches; barometer rose in the early morning, the sight of Cape Cruz (from Manzanillo) has cleared". It is clear that this morning there was a tempest of slight intensity to the S.E. of Havana, near Cape Cruz. There has been gusts from the S.E. at Santiago de Cuba and the cable communication with Jamaica was interrupted. L. Gangoiti, S.J. (Diario de la Marina, Havana, Nov.10, 1899, morning edition, p.2, col.8). 4) The meteorological observatory of the Weather Bureau has told us by phone that there was a tempest to the S. of the province of Santiago de Cuba, which is moving to the N.W. and will cause winds from S.W. to E. over the eastern part (of Cuba) and from the N.W. over its western portion (Diario de la Marina, Havana, Nov.10, 1899, evening edition, p.2, col.1). Author's note: The above information was probably given to the newspaper in the morning of Nov.9. 5) Belen College Observatory, Nov.10, 10 A.M. The tempest that appeared near Holland Bay (Jamaica) on Nov.8 and that yesterday morning caused a moderate tempest at Manzanillo, in all likehood has moved away from the island (of Cuba), after having caused rains and winds that were not very strong. It was mainly felt in the eastern region of the island. L. Gangoiti, S.J. (Diario de la Marina, Havana, Nov.10, 1899, evening edition, p.2, col.1). 6) A disturbance off the S. coast of eastern Cuba has caused strong winds and heavy rain over Cuba and Jamaica with a maximum reported rainfall of 5.70 inches in 48 hours at Santiago de Cuba. The minimum barometric pressure noted yesterday was 29.76 inches at Santiago (de Cuba) and Puerto

Principe (Camaguey) and the maximum wind velocity was 30 mph at Havana (The New York Times, Nov.10, 1899, p.2, col.5). 7) The Caribbean Sea disturbance has apparently dissipated (The New York Times, Nov.11, 1899, p.2, col.6). 8) A severe storm visited the island of Jamaica on Nov.8-9, causing considerable damage to property and crops from the east end of the island to Morant Bay in the S. and to Lucea on the north coast (Monthly Weather Review, Nov.1899). 9) From a report of the Havana forecast district sent to the Weather Bureau by W.B. Stockman, Forecast Official: On the morning of Nov.9 Cuban stations and Kingston, Jamaica, were notified that a storm was apparently central S. of eastern Cuba. In the afternoon the Jamaica cable was interrupted. At 4 P.M. Santiago de Cuba and Puerto Principe (Camaguey) were informed that the storm was moving N.N.W. and that rains and high southeasterly winds, backing to easterly were indicated for eastern Cuba, and all Cuban stations warned of rain and high winds. Reports from Kingston, dated on Nov.8, received the afternoon of Nov.9, indicated very stormy conditions over that place, and cablegrams to newspapers in the United States confirmed these reports. No authentic reports of reported damage on the Island of Jamaica on Nov.8 have been received. (Monthly Weather Review, Nov.1899). 10) Maximum wind velocity at Kingston, Jamaica, was N.W. 24 mph on Nov.8 (Monthly Weather Review, Nov.1899). 11) Nov.8-9, 1899. A cyclone of weak intensity crossed over Santiago de Cuba province. There were no casualties, but it caused damage to buildings and crops. The vortex passed to the E. and near Kingston and emerged into the Atlantic near Gibara (Sarasola, 1928). Author's note: Actually taken from the catalog of Cuban cyclones by M. Gutierrez-Lanza which is included in Sarasola (1928). Gibara is located on the northern coast of eastern Cuba at lat. 21 09 N., long. 76 11 W. The Atlas Nacional de Cuba (Academia de Ciencias, 1970) also mentions this storm as a cyclone of weak intensity which affected Oriente (Santiago de Cuba) province. Finally, it should be mentioned that, according to the nomenclature used in reference to storms in Cuba, the word "cyclone" normally refer to those storms attaining hurricane intensity. 12) Kingston, Jamaica, Nov.9. Owing to the extent and gravity of the reported destruction and consequent distress throughout the island from the late storm which only now is been fully realize, the Gleaner today urged the Government to institute a systematic inquiry for the purpose of ascertaining the details and furnishing relief (The New York Times, Nov.10, 1899, p.7, col.2). 13) Kingston, Jamaica, Nov.10. Communication with the eastern part of this island has been partially reestablished and advices from various points show that on Wednesday (Nov.8) the heavy weather culminated in a tremendous hurricane which during the night completely razed the banana and other perishes (The New York Times, Nov.11, 1899, p.7, col.2). 14) Kingston, Jamaica, Nov.11. The storm struck the east end at 1 o'clock (apparently in the afternoon) and raged along the northern slopes for 4 hours. Port

Antonio experienced serious damage to property, including the United Fruit Company's wharf and premises, etc. But the main force of the cyclone apparently struck Morant Bay to Priestman's River which district is still totally cut off. The town of Morant Bay is shattered (The New York Times, Nov.12, 1899, p.7, col.5). 15) At Campechuela, near Manzanillo, during the late storm a ceiba tree crashed into a farmhouse instantly killing the owner's wife and 3 children, wounding him seriously (Diario de la Marina, Havana, Nov.15, 1899, morning edition, p.1, col.2). 16) During a recent storm in Camaguey, the new hospital, in course of construction by the American military authorities, was blown down, wounding 8 workmen and slightly injuring several others (Diario de la Marina, Havana, Nov.17, 1899, evening edition, p.2, col.5). Author's note: The above accident might not be associated with this storm; however, it looks that it most likely was.

On the basis of information contained in the above items, the author of this study prepared an approximate track for Storm 8, 1899. His track was started with his 7 A.M. Nov. 7 position near 12.7 degrees N., 77.5 degrees W. which was estimated by using ship information for that day contained in item 1). The author's 7 A.M. Nov.8 position was near 17.0 degrees N., 76.5 degrees W. and was estimated after a careful analysis of information in items 1) and 2).The author's 7 A.M. Nov.9 position was estimated near 20.7 degrees N., 76.7 degrees W., chiefly on the basis of information in item 3). The author's 7 A.M. Nov.10 position was based on ship information for that day (item 1), particularly that pertaining to ships to the north of the 25 degrees N. parallel; such a position was estimated near 27.5 degrees N., 71.4 degrees W.. It should be mentioned that the author had higher confidence in his position estimates for Nov.8-9 than in his estimates for Nov.7 and Nov.10. The author's track is displayed in Fig.2.

Although information contained in several items, item 11) in particular, suggested that this storm reached hurricane strength, the author of this study decided to keep it as tropical storm because no evidence of measured hurricane winds or pressures supporting hurricane intensity was found in the above items.

Special statement.

In addition to the storms which were discussed above, three possible cases were found for 1899. Available information about

these cases was found to be insufficient to assess the true nature of these weather systems and/or their evolution.

A) Case of Sept. 24-26.

The following information was found about this possible case: 1) Taken from 8 A.M. (E.S.T.) weather maps: Sept.24, center of a low placed near lat. 10 N., long. 49.5 W. Sept.25, ship near lat. 18 N., long. 54 W., wind S.E. force 4, barometer 29.62 inches; ship near lat. 15 N., long. 58 W., wind N.W. force 7, barometer 29.38 inches; center of a low placed near lat. 16.5 N., long. 55 W. Sept.26, no data around the center of a low which was placed near lat. 12 N., long 55 W. (Historical Weather Maps, Sept.1899). Author's note: The barometer reading of 29.38 inches reported by a ship near lat. 15 N., long. 58 W. appears to be too low. The above information was judged to be insufficient to determine if this weather system, which apparently had a well-defined closed circulation, attained tropical storm intensity while E. of the Lesser Antilles. This is why this system is kept as a possible case.

B) Case of Oct.7-9.

The following information was found in relation to this possible case: 1) Taken from 8 A.M. (E.S.T.) weather maps: Oct.7, ship near lat. 21 N., long. 62 W., wind N.E. force 5, barometer 29.80 inches; ship near lat. 21.5 degrees N., long. 65 W., wind N.E. force 4, barometer 29.80 inches (probably too low); San Juan, wind S. force 1, barometer 29.88 inches; St. Kitts, N.E. force 2, barometer 29.87 inches; center of a low placed near lat. 20 N., long. 60 W. Oct.8, San Juan, wind W. force 3, barometer 29.85 inches; St. Kitts, wind W. force 3, barometer 29.81 inches; Dominica, wind S.W. force 2, barometer 29.84 inches; ship near lat. 23.7 N., long. 59 W., wind S.E. force 5, barometer 30.03 inches (probably too high); ship near lat. 22.7 N., long. 67 W., wind N.E. force 4; ship near lat. 24 N., long. 68 W., wind N.N.E. force 5, barometer 29.74 inches; center of a low placed near lat. 19.5 N., long. 62.5 W. (too far S. and E.). Oct.9, ship near lat. 26 N., long. 70 W., wind N.N.E. force 5, barometer 29.77 inches; ship near lat. 28 N., long. 68 W., wind S.E. force 4, barometer 29.91 inches; ship near 27 N., long. 68 W., wind S.E. force 2, barometer 29.88

inches; ship near lat. 22.7 N., long. 68 W., calm, barometer 29.91 inches; center of a low placed near lat. 24.5 N., long. 70 W., but ship data suggested that the center was actually to the E. of that location (Historical Weather Maps, Oct.1899). The information above supported the existence of a low pressure area near the Lesser Antilles on Oct.7 which moved to the N.W. and N. during the next two days; however, tropical storm intensity could not be inferred from the available information and this is why this weather system was kept as a possible case.

C) Case of Oct.10-14.

The following information was found about this possible case: 1) Taken from 8 A.M. (E.S.T.) weather maps: Oct.10, ship near lat. 9 N., long. 34 W., wind S.S.W. force 9, barometer 29.77 inches. Oct. 14, ship near lat. 21.7 N., long. 42 W., wind S.S.E. force 8 (Historical Weather Maps, Oct.1899). The ship observations above suggested the existence of a well-developed low pressure area well to the east of the Lesser Antilles which seemed very likely to have attained tropical storm intensity. As a matter of fact, gales (wind force 8-9) were reported by ship observations on Oct.10 and on Oct.14, but there was no way to verify them in the light of additional information because there were no other observations near the low pressure area on the above nentioned days and over the period Oct.11-13. The low pressure area appeared to have moved to the N.W. but not even an approximate track for it could be inferred. Under the above circumstances, the author of this study decided to keep this one as a possible case.