

YEAR 1902

Five storms were found to have occurred in 1902. Tracks for these storms are presented in Fig. 2.

.Storm 1, 1902 (Jun. 12-17), T. S.

The following information was found in relation to this storm:

- 1) Belen College Observatory, Jun. 12, 9 A.M. We have been for 10 days near the buffer zone between an anticyclone off the S.E. United States and a low pressure area, without any cyclonic motion, over the western Caribbean and Yucatan. This morning at 8 A.M. there were indications of a cyclonic perturbation towards the center of the Gulf of Mexico and we can expect southerly gusty winds and showers as the tempest moves towards the Atlantic Ocean passing over Florida. L. Gangoiti, S.J. (Diario de la Marina, Havana, Jun. 12, 1902, evening edition, p.2, col.2). Author's note: The low pressure system are was still in the western Caribbean on Jun. 12. 2) Observations taken at the Weather Bureau station (Havana). Jun. 10, 7:30 P.M., N.E., 5 meters per second (12 mph), 759 millimeters or 29.88 inches; Jun. 11, 7:30 A.M., E., 3.6 meters per second (8 mph), 758.2 millimeters or 29.85 inches (Diario de la Marina, Havana, Jun. 12, 1902, evening edition, p.2, col.2). 3) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Jun. 10, center of a large low placed 17 N., 80.5 W., but no W. wind to support it. Jun 11, center of a low placed 19 N., 79.5 W., but no W. wind to support it. Jun. 12, Havana, E. f. 2, 29.78; Cienfuegos, E. f. 2, 29.79; Camaguey, S.E. f. 2, 29.81; ship near 18 N., 84 W., E. f. 3, 29.47 (too low); center placed 20.5 N., 83.5 W., but not supported by W. winds; it any, the center would have been near the ship in the western Caribbean. Jun. 13, Tampa N.N.E. f. 4, 29.93; Jupiter, E.S.E. f. 5, 29.83; Key West, E. to E.S.E. f. 4, rain, 29.72; Havana, S. f. 4, 29.73; Cienfuegos, S. f. 4, 29.77; ship near 22 N., 87 W., N. f. 2, heavy rain; ship near 26 N., 86 W, E. f. 4, 29.80. Jun. 14, Pensacola, N. f. 2, 29.82; Jacksonville, S.E. f. 5, 29.81; Tampa, S.S.E. f. 4, 29.73; Jupiter, S.W. f. 5, 29.83; Key West, S. f. 4, 29.83; ship near 25 N., 84 W., S.W. f. 6, 29.86; ship near 27 N., 84 W., W.S.W. f. 9, heavy rain. Jun. 15, Pensacola, N.N.W. f. 4, 29.77; Jacksonville, S. f. 5, 29.74; Tampa, S. f.5, 29.87; Atlanta, N.E. f.2, 29.76; Charleston, S. f. 5, 29.84. Jun. 16, Wilmington, S. f. 6, 29.62; Charlotte, N.W. f. 6, 29.74; low center estimated to be near 35 N., 79 W., just ahead of a cold front. Jun. 17, extratropical low placed 47.5 N., 66 W. (Historical Weather Maps, Jun. 1902). Author's note: Wind forces (f) are on Beaufort scale, pressures are in inches. 4) Storm warnings are displayed from Eastport to Baltimore (The New York Times, Jun. 17, 1902, p.3, col.3). Author's note: This statement was probably issued in the evening of Jun. 16. 5) Sandy Hook, 9:30 P.M. (Jun. 16), light breeze from N.E., raining, thick offshore (The New York Times, Jun. 17, 1902, p.6, col.3). 5) Some maximum velocities were as follows: Tampa, S. 36 mph on Jun. 14; Jupiter, S.W. 48 mph on Jun. 13; Jacksonville, S.W. 42 mph on Jun. 15; Savannah, S.W. 36 mph on Jun. 15; Wilmington, S. 41 mph on Jun. 16; Hatteras, 47 mph on Jun. 16; Cape May, N.W. 33 mph on Jun. 16;

Philadelphia, N. 36 mph on Jun. 17; Portland, Me., N.E. 36 mph on Jun. 17 (Monthly Weather Review, Jun. 1902). 7) Storm of Jun. 14, 1902. Apalachee Bay. Minor (Dunn and Miller, 1960). 8) The storm first appeared over the Gulf of Mexico, passed N.E. along the Atlantic coast of the United States on Jun. 15-16, was central over the Canadian Maritime Provinces on Jun. 17 and passed N.E. of Newfoundland on Jun. 18. The disturbance was located about mid-ocean on Jun. 19 and on Jun. 20 its approach was indicated by stations on the west coast of Ireland where a barometric pressure of 29.24 inches was reported at Valentia. During Jun. 21-22, the storm moved N. off the west coasts of Ireland and Scotland (Monthly Weather Review, Jun. 1902). 9) Map showing a track for the storm starting in the vicinity of Havana in the morning of Jun. 13, being near Tampa in the morning of Jun. 14 and to the S. of Atlanta in the morning of Jun. 15; it then continued on a N.E. course to the Canadian Maritime Provinces on Jun. 17 where a merge with a low pressure area coming from the lake region occurred (Monthly Weather Review, Jun. 1902). 10) A storm was first observed near 14 N., 82 W. on Jun. 10, 1902 and lasted 12 days; it recurved near 24 N., 85 W. and it was last observed near 60 N., 21 W. (Mitchell, 1924). Author's note: A portion of the track in Mitchell (1924) was found to be similar to the tracks in Tannehill (1938) and Neumann et al. (1993) for this storm.

Primarily on the basis of information in item 3), the author of this study introduced some modifications along the track for Storm 1, 1902 which is shown in Neumann et al. (1993). While the track in the above publication was started in the southwestern Caribbean on Jun. 10, the author decided to delay the initialization of his track to Jun. 12 as no evidence of a closed circulation could be supported by data prior to that day (item 3). On the basis of a ship in the western Caribbean Sea with E. wind and quite low pressure (29.47 inches, which is likely to be too low), the author estimated his 7 A.M. position near 17.7 degrees N., 84.0 degrees W. although he admits that his confidence in that position is low. Other 7 A.M. positions along the author's track were as follows: Jun. 13, near 24.0 degrees N., 83.0 degrees W.; Jun. 14, near 28.0 degrees N., 84.0 degrees W.; Jun. 35, near 32.0 degrees N., 82.5 degrees W.; Jun. 16, near 35.0 degrees N., 79.0 degrees W. All of these positions were somewhat to the S. and E. of the ones given in Neumann et al. (1993), and the track in the above publication was extended to the N.E., resulting in an author's 7 A.M. Jun. 17 position near 47.5 degrees N., 66.0 W. As a merge with another pressure area occurred on Jun. 17 (item 9), the author decided to terminate his track on that day in spite of the continuation of an eastward motion for several days suggested in items 8) and 10). The author's track for Storm 1, 1902 is displayed in Fig. 2.

The tropical storm status which Neumann et al. (1993) gave to this storm was found to be supported by maximum wind velocities along the U.S. east coast in item 6) and by a ship report for Jun. 14 (force 9 on the Beaufort scale) included in item 3). Tropical storm intensity was denoted along the author's track over the period Jun. 12-13; however, it is very likely that winds were below that intensity prior to some time on Jun. 13. The extratropical

stage was introduced along the track as the storm entered Virginia on Jun. 16.

Storm 2, 1902 (Jun. 21-28), H.

The following information was found in relation to this storm:

- 1) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Jun 19, S.E. flow seemed to prevail over the Bay of Honduras and no low center was drawn on the map. Jun. 20, Merida, calm, 29.82; ship near 21 N., 94.7 W., N.E. f. 2, 29.91; ship near 22.7 N., 89.3 W., E.S.E. f. 4, 29.86; Villahermosa (Mexico), calm 29.79; no low center was drawn on the map over or near the Yucatan peninsula. Jun. 21, Villahermosa, calm, 29.73; ship near 20 N., 91 W., E.S.E. ff. 3, 29.77 (pressure not clearly read); Merida, calm, 29.86; ship near 22 N., 95 W., E. f. 5, 29.83; Veracruz, E. f. 2, 29.81; no center placed on map, but lowest pressure at Villahermosa. Jun. 22, Villahermosa, calm, 29.77; Merida, calm, 29.90; Veracruz, N. f. 1; 29.81; ship near 22 N., 95 W., N. f. 5, 29.94. Jun. 23, Tampico, calm, 30.06 (probably too high, but rose from 29.99 on the previous day); Veracruz, N. f. 1; 29.89; Merida, N.N.E. f. 2, 29.90; ship near 22 N., 92 W., N.E. f. 4 (wind direction probably wrong or local effect), rain, 29.86. Jun. 24, ship near 27 N., 94.5 W., E. f. 4; Corpus Christi, S.E. f. 2, 29.95; Tampico, S. f. 2, 29.94; Ciudad Victoria (Mexico), E. f. 1, 30.01. Jun. 25, Tampico, calm, 29.84; ship near 22 N., 95.7 W., S. f. 4, 29.77; Corpus Christi, S.E. f. 3, 29.87. Jun. 26, Corpus Christi, E. f. 4, rain, 29.70; Galveston, E.S.E. f. 3, 29.74; Tampico, calm, 29.73. Jun. 27, Corpus Christi, S.W. f. 4, 29.54; Galveston, S.E. f. 7, rain, 29.57; San Antonio, W.N.W. f. 4, 29.46. Jun. 28, storm became extratropical over E. Oklaska near 34.5 N, 95 W. (Historical Weather Maps, Jun. 1902). Author's note: Wind forces (f) are on Beaufort scale, pressures are in inches. 2) The severest weather of the month resulted from the Gulf storm of Jun. 26-27, in connection with which ample and timely warnings were issued. I.M. Cline, New Orleans forecast district. Storm warnings were ordered on Lakes Michigan and Huron during the afternoon of Jun. 18. The storm that had moved from the western Gulf of Mexico was very severe on the southern part of the lake region. H.J. Cox, Chicago forecast district (Monthly Weather Review, Jun. 1902). 3) A disturbance is developing over the West Gulf (The New York Times, Jun. 27, 1902, p.6, col.4). Author's note: The above statement was probably issued in the evening of Jun. 26. 4) Minimum pressures were 29.39 inches at Corpus Christi and 29.51 inches at Galveston; maximum wind velocities were N.W. 36 mph and S.E. 49 mph, respectively (Weather Bureau, 1903). Author's note: The Monthly Weather Review, Jun. 1902, stated a maximum wind of only 26 mph at Corpus Christi, which is probably in error. 5) Storm of Jun. 26, 1902. N. of Corpus Christi. Minimal (Dunn and Miller, 1960). 6) Map showing a track for this storm. Some positions along the track were as follows: near Corpus Christi in the morning of Jun. 26; near San Antonio in the morning of Jun. 27; over extreme eastern Oklahoma in the morning of Jun. 28; over the southern shore of Lake Erie in the morning of Jun. 29, the track being terminated near Atlantic City in the evening of that day (Monthly Weather Review, Jun. 1902). 7)

A storm was observed near 17 N., 85 W. on Jun. 19, 1902 and lasted 14 days; it recurved near 30 N., 96 W. and it was last observed near 54 N., 21 W. (Mitchell, 1924). Author's note: Portions of the track in this publication were found to be similar to the tracks shown in Tannehill (1938) and Neumann et al. (1993).

On the basis of information in the above items, item 1) in particular, the author of this study introduced a number of modifications to the storm track in Neumann et al. (1993). The above track was started over the western Caribbean Sea on Jun. 19 but, according to information in item 1), no evidence of a closed cyclonic circulation was found over the Caribbean Sea and Yucatan during the period Jun. 19-20. Therefore, the author of this study decided to start his track with a 7 A.M. Jun. 21 estimated position near 18.0 degrees N., 92.7 degrees W; this position is over land in the vicinity of Villahermosa (Mexico) and was found to be about 170 miles to the W.S.W. of the one shown in Neumann et al. (1993) for that day; the author's estimated position was supported of the minimum pressure at Villahermosa on Jun. 21 (item 1). On the basis of information in item 1) and space-time continuity, the author's 7 A.M. positions for the period Jun. 22-24 were estimated as follows: Jun. 22, near 19.0 degrees N., 93.5 degrees W.; Jun. 23, near 20.0 degrees N., 94.3 degrees W.; Jun. 24, near 21.0 degrees N., 95.0 degrees W.; the difference of these positions with respect to the corresponding ones in Neumann et al. (1993) ranged from about 100 miles on Jun. 24 to about 60 miles on Jun. 22 and Jun. 23. On the basis of information in item 1), the author's 7 A.M. estimated positions for the period Jun. 25-27 were as follows: Jun. 25, near 23.3 degrees N., 96.3 degrees W.; Jun. 26, near 26.5 degrees N., 97.0 degrees W.; Jun. 27, near 30.0 degrees N., 97.7 degrees W; these positions were about 120 miles to the S.S.E., about 30 miles to the S. and about 70 miles to the S.S.W. of the ones in Neumann et al. (1993), respectively. The 7 A.M. Jun. 28 position in Neumann et al. (1993) was kept unchanged, but the author of this study extended the track in the above publication to Jun. 29 by estimating a 7 A.M. position near 41.5 degrees N., 82.0 degrees W. for that day in agreement with information in item 6). The author's track was terminated near Atlantic City late on Jun. 29 because of uncertainties in identifying a frontal wave near 39 N., 63 W., which is shown on the weather map for the morning of Jun. 30, as the same weather system on the U.S. east coast in the evening of Jun. 29. The author's track for Storm 2, 1902 is displayed in Fig. 2.

The hurricane status which Neumann et al. (1993) gave to this storm was supported by the minimum pressure of 29.39 inches which was recorded at Corpus Christi (item 1). As the maximum wind blew from the N.W. at that station (item 4), the center of the storm passed to the E. of that place and, therefore, the central pressure was definitively lower than 29.39 inches. It is likely, however, that hurricane intensity was not reached until late Jun. 25 or early Jun. 26 and, consequently, the hurricane status was denoted along the author's track only for a portion of Jun. 26. Prior to this day and on Jun. 27, tropical storm intensity was denoted along the track; this status was changed to the extratropical storm stage on Jun. 28 and continued until late Jun. 29. Although tropical

storm intensity was denoted all throughout the period Jun. 21-25, the author believes that the weather system remained as a weak low pressure area over most of that period and, in reality, did not reach tropical storm status until Jun. 25.

Storm 3, 1902 (Sept. 16-25), H.

The following information was found about this storm: 1) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Sept. 16, ship near 7 N., 31 W., S. f. 5, 29.86. Sept. 17, ship near 10 N., 33 W., S.S.W. f. 4, 29.80; ship near 8 N., 39 W., N.N.W. f. 2, 29.71. Sept. 18, ship near 10 N., 38.8 W., S.S.W. f. 6, 29.74. Sept. 19, ship near 13 N., 46 W., S. f. 2, 30.00 (probably too high); ship near 17 N., 55 W., N.E. f. 5, showers. Sept. 20, ship near 17 N., 50 W., S. f. 5, 30.21 (obviously too high); ship near 23 N., 57 W., N.E. f. 4, 29.94; ship near 20 N., 58 W., N.E. f. 4, 29.94. Sept. 21, ship near 27.7 N., 50 W., N.W. f. 12, 29.26 (not clearly read off the map, it could be as low as 28.97). Sept. 22, ship near 35 N., 46.7 W., N. f. 7, showers, 29.71; ship near 36.7 N., 45 W., S.E. f. 8, 29.77; ship near 34 N., 46.5 W. N.N.W. f. 6, 29.62; extratropical low placed 35 N., 45 W (it might have been still tropical with front embedded in the circulation to the N. of the center). Sept. 23, extratropical low placed 38.5 N., 38.5 W. Sept. 24, extratropical low placed 42 N., 34 W. Sept. 25, extratropical low placed 49 N., 29 W. (Historical Weather Naps, Sept. 1902). Author's note: Wind forces (f) are on Beaufort scale, pressures are in inches.

It was curiously noticed that only Neumann et al. (1993) gave a track for this storm; neither Mitchell (1924) nor Tannehill (1938) gave tracks for Storm 3, 1902. Only relatively minor adjustments were made along the track in Neumann et al. (1993) which directionwise was found to be reasonable at practically all times. 7 A.M. positions for Sept. 16, Sept. 18 and Sept. 19 were adjusted to the E.S.E. by roughly 90-120 miles to 8.0 degrees N, 32.0 degrees W, to 12.3 degrees N., 43.0 degrees W and to 14.3 degrees N., 49.3 degrees W., respectively. 7 A.M. positions for Sept. 21, Sept. 23 and Sept. 24 were adjusted to the S.W. by distances ranging from about 120 miles (Sept. 23) to about 60 miles (Sept. 21 and Sept. 24). New positions were as follows: Sept. 21, near 28.3 degrees N., 49.5 degrees W.; Sept. 23, near 38.5 degrees N., 38.5 degrees W.; Sept. 24, near 42.3 degrees N., 33.5 degrees W. The above adjustments were aimed at better satisfying information in item 1) and at improving space-time continuity along the storm track. 7 A.M. positions for Sept. 17, Sept. 20, Sept. 22 and Sept. 25 in Neumann et al. (1993) were kept unchanged. The author's track for Storm 3, 1902 is shown in Fig. 2.

The hurricane status that Neumann et al. (1993) gave to this storm was fully supported by information for Sept. 21 in item 1), showing a ship report of hurricane winds (force 12) from the N.W. and pressure of 29.26 inches or lower. As in the track in Neumann et al. (1993), the author denoted hurricane status along the portion of his track for Sept. 20-21 and changed the hurricane into an extratropical stage on Sept. 22. Prior to Sept. 20, tropical storm status was denoted along the author's track.

Storm 4, 1902 (Oct. 5-13), H.

The following information was found in relation to this storm:

- 1) The most important storm of the month (Oct.) appeared on Oct. 6 in the Gulf of Campeche, moved thence to the middle Gulf coast of the U.S. by Oct. 10, reached a position off the south New England coast by the morning of Oct. 12 and advanced over the Atlantic Ocean to a point near the N. coast of Scotland by Oct. 16. The history of this storm previous to Oct. 6 can not be positively determined. It is believed, however, that it originated within an area of low barometric pressures that covered the Gulf of Tehuantepec on Oct. 3, when the barometer read 29.76 inches at Salina Cruz, a fall of 9 hundredths of an inch in 24 hours. By the morning of Oct. 4 the low pressure area had apparently shifted its position over the isthmus to the Gulf of Campeche where, at Frontera, the barometer had fallen 5 hundredths of an inch in 24 hours and to 29.85 inches. During Oct. 5-6 the barometric depression deepened over the Gulf of Campeche and on the latter day acquired hurricane intensity and began a N.N.E. course over the Gulf of Mexico (Monthly Weather Review, Oct. 1902). Author's note: The above statement was prepared by Prof. E.B. Garriott, in charge of Forecast Division.
- 2) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Oct. 3, Salina Cruz, E. f. 4, 29.92; Villahermosa, calm, 29.84. Oct. 4, Salina Cruz, calm, 29.99; Villahermosa, E. f. 1, 29.80; Veracruz, calm, 29.88. Oct. 5, Veracruz, N. f. 4, 29.3; Villahermosa, W.N.W. f. 2, 29.81; Merida, N.E. f. 2, 29.86; Salina Cruz, N.E. f. 4, 29.96. Oct. 6, Veracruz, N. f. 5, 29.96; ship near 21.7 N., 96 W., N.N.E. f. 3, 30.06. Oct. 7, Veracruz, N. f. 2, 29.99; Villahermosa, N.W. f. 2, 29.76. Oct. 8, no data in the storm area. Oct. 9, no data in the storm area. Oct. 10, Port Eads, N.E. f. 6, 29.82; ship near 27.5 N, 91.5 W., N.E. f. 6, 29.94; ship near 22 N., 92 W., N.W. f. 5, 29.94; ship near 26 N., 88 W., E. f. 6 (direction seems to be wrong), 29.77; center placed 27.5 N., 88.5 W. Oct. 11, Montgomery, W. f. 3; Atlanta, S.S.E. f. 4, 29.59; low centered just W. of Atlanta with extratropical characteristics (Montgomery, 60 degrees Fahrenheit; Atlanta, 61 degrees Fahrenheit). Oct. 12, ship near 39 N., 70.8 W., S.S.E. f. 4, 29.32; other ships to the S. and S.E. showing winds from W. and S.W. force 8-9; center of low placed 39 N., 71.5 W. Oct. 13, extratropical low placed near 43 N., 55 W. (Historical Weather Maps, Oct. 1902). Author's note: Wind forces (f) are on Beaufort scale, pressures are in inches. Information for Salina Cruz on Oct. 3 in this item was found to differ from the corresponding one shown in item 1).
- 3) Extracted information furnished by Prof. A. E. Kennelly of Harvard University: On Oct. 6 we were lying cable from Campeche toward Frontera of Tabasco in the steamer "Ydun". On Oct. 5 we had fair weather but with a marked westerly swell. On Oct 6 the weather became threatening and the glass fell slowly. The wind steadily increased from the S. By 4 P.M., ship's time, the wind and sea had increased in violence to such a degree that it was necessary to cut and buoy our cable in a position approximately 19 30 N., 92 10 W. The wind remained at approximately S. The gale increased in violence each hour until 3

A.M. the next morning when the ship was evidently in the center of the hurricane with practically calm weather, but heavy sea. The barometer (aneroid) indicated 28.66 inches. Our position is not accurately known since we had drifted northward but it was in the center and probably about 19 45 N., 92 10 W. In the center of the hurricane where we had remained for 2 hours hundreds of birds of all kinds settled on the ship. When the gale furiously recommenced at 5 A.M., it blew from the N. As the day wore on it turned slowly to the W.. We subsequently learned that the gale had passed over Frontera and had done some damage farther south on the isthmus. The gale was over in the morning of Oct. 8, when the ship anchored near the Champoton Shoals (Monthly Weather Review, Oct. 1902). Author's note: Under heavy gales and hurricane conditions, accompanied by extremely rough seas, for 12 hours, it seems likely that the 15-mile northward drift given by Prof. Kennelly was an underestimate and that the "Ydun" probably entered the storm center near 20 N. and not near 19 45 N. 4) By the night of Oct. 10 the center of the disturbance had crossed the Gulf coast line near Mobile. At this time the storm had lost the hurricane intensity it possessed over the southern Gulf. The lowest barometer reported at 8 P.M. Oct. 10 was 29.72 inches at Mobile, and the maximum wind velocity noted that day was 42 mph at New Orleans (Monthly Weather Review, Oct. 1902). 5) Washington, Oct. 10. Since Thursday night (Oct. 9) a storm of marked intensity has moved over the Gulf of Mexico and is apparently central tonight over the middle Gulf coast. It has caused some high winds on the coast and rain in the East Gulf and South Atlantic States, except North Carolina. Storm warnings are displayed from Louisiana to Punta Rassa, Fl. and from Jacksonville to Fort Monroe (The New York Times, Oct. 11, 1902, p.6, col.3). 6) Washington, Oct. 11. The Gulf storm has continued its N.E. movement with steadily increasing intensity and is central tonight over extreme N. Carolina. The high winds have reached the southern portion of the Middle Atlantic States while the rain extends into the Ohio Valley and southern New England (The New York Times, Oct. 12, 1902, p.19, col.4). 7) Washington, Oct. 12. The Gulf storm has passed off the southern New England coast (The New York Times, Oct. 13, 1902, p.7, col.4). 8) Minimum pressures associated with the storm were 29.73 inches at New Orleans, 29.67 inches at Mobile and 29.64 inches at Pensacola; maximum wind velocities were N.E. 42 mph, N.W. 24 mph and N.W. 29 mph, respectively (Weather Bureau, 1903). Author's note: The lowest pressure (29.64 inches) with a maximum velocity of 29 mph from the N.W. reported at Pensacola suggested that the storm center made landfall on the Gulf coast (evening of Oct. 10) to the E. of Pensacola and not near Mobile as inferred from items 4), 10) and 11). 9) Some other maximum velocities were as follows: Jacksonville, S.W. 36 mph on Oct. 11; Savannah, W. 32 mph on Oct. 11; Augusta, S.W. 28 mph on Oct. 11; Columbia, S.W. 41 mph on Oct. 11; Wilmington, W, 30 mph on Oct. 11 (Monthly Weather Review, Oct. 1902). 10) Storm of Oct. 10-11, 1902. Mobile. Minor (Dunn and Miller, 1960). 11) Map showing a track for this storm. Positions along the track were near Port Eads in the morning of Oct. 10, near Mobile in the evening of Oct. 10, near Atlanta in the morning of Oct. 11, near Lynchburg in the evening of Oct. 11, near Atlantic City in the morning of Oct. 12, off

Nantucket in the evening of Oct. 12, and off Newfoundland in the morning of Oct. 13 (Monthly Weather Review, Oct. 1902). 12) A storm was first observed near 20 N., 93 W. on Oct. 7, 1902 and lasted 11 days; it was last observed near 60 N., 15 E. (Mitchell, 1924). Author's note: A portion of the track in Mitchell (1924) was found to be similar to the storm tracks in Tannehill (1938) and Neumann et al. (1993). All of these tracks show the storm crossing from the Pacific to the Atlantic (Gulf of Campeche).

Information in the above items allowed the author of this study to introduce some modifications along the track in Neumann et al. (1993). Because of uncertainties regarding the storm's early history (item 1) but primarily on the basis that any storm passage over the Isthmus of Tehuantepec would have implied a reformation rather than a pure motion of a weather system, the author decided to start his track with a 7 A.M. Oct. 5 position near 18.7 degrees N., 95.0 degrees W. on the basis of information for Veracruz on that day (item 2) and the swell from the west reported by the "Ydun" (item 3); this position was found to be about 150 miles to the W.N.W. of the corresponding one in Neumann et al. (1993). By using information for Oct. 6 and Oct 7 in item 3) and a slight acceleration of the storm center to the E.N.E. and N.E., the author of this study estimated 7 A.M. positions near 19.3 degrees N., 93.7 degrees W. for Oct. 6 and near 20.3 degrees N., 92.0 degrees W. for Oct. 7; these positions were found to be about 80 miles to the W.N.W. and a few miles to the N.E. of the respective positions in Neumann et. al. (1993). As no information was available near the storm center for Oct. 8-9 (item 2), the author's 7 A.M. positions for these days were based on the general N.N.E. course indicated to have occurred over the Gulf of Mexico (item 1) and on the continuation of a slight acceleration in forward motion; the author's positions were near 22.0 degrees N., 90.5 degrees W. for 7 A.M. Oct. 8 and near 24.5 degrees N., 89.7 degrees W. for 7 A.M. Oct. 9; such positions were found to be about 100 miles to the S.E. and to the S.S.E. of the respective ones in Neumann et al. (1993). The author's 7 A.M. Oct. 10 position was based on information for that day in item 2) and also on space-time continuity as applied backwards using information in item 8) and its corresponding author's note; such a position was estimated near 28.0 degrees N., 88.5 degrees W. and was found to be about 100 miles to the S.S.E. of the one shown in Neumann et al. (1993). Positions for the period Oct. 11-12 in this latter publication were kept unchanged. The author's track for Storm 4, 1902 is displayed in Fig. 2.

The hurricane status which Neumann et al. (1993) gave to this storm was found to be fully supported by information in item 3), and the central pressure as low as 28.66 inches reported by the "Ydun" (item 3) indicated that the storm was nearing the strength of a major hurricane on Oct. 7. Tropical storm status was indicated along the author's track during Oct. 5 and was upgraded to a hurricane by 7 A.M. Oct. 6 and retained on Oct. 7-9; the very significant intensification which occurred as the storm was not far from the Mexican coast on Oct. 6 was found to justify the gales on the Tabasco coast and some damage inland which were reported in item 3). Tropical storm status was reinstated by 7 A.M. Oct. 10 as weakening was indicated by data for that day in item 2) and by

information in item 4). On the basis of information in item 2), the extratropical stage was introduced along the author's track early on Oct. 11.

Storm 5, 1902 (Nov. 1-6), T. S.

The following information was found about this storm: 1) This storm passed northeastward over Santo Domingo on Nov. 1 and advanced then N.E. over the Atlantic with a gradual increase in intensity (Monthly Weather Review, Nov. 1902). Author's note: The above publication included several messages which were cabled to Puerto Rico, Cuba and the Azores and to weather stations from New Orleans to Boston, in relation to this storm. 2) Data extracted from 9 A.M. (E.S.T.) Historical Weather Maps: Nov. 1, Turk Is, N.E. f. 2, 29.82; Santo Domingo, N. f. 2, 29.81; San Juan, S. f. 2, 29.80; St. Kitts, S.S.W. f.2, 29.82; Bermuda, N. f. 2, 29.92; ship near 26 N., 65 W., E.N.E. f. 8, 29.71 (probably too low); ship near 24 N., 66 W. E.N.E. to N.E. f. 3, 29.97 (too high). Nov. 2, Bermuda, N.E. f. 3, 29.72; ship near 31 N., 65 W., N. f. 8, 29.74; ship near 28 N., 58 W., S.S.W. f. 8; ship near 29 N., 55 W., S.E. f. 8, 29.77; center placed 29 N., 60.5 W. (probably too far E. and S.). Nov. 3, ship near 35 N., 57 W., E.S.E. f. 11, 29.12; ship near 33 N., 63 W., N. f. 10 (probably too high); Bermuda, N.N.E. to N. f. 2, 29.79; ship near 31.7 N, 56 W., S.W. f. 9; ship near 32 N., 52 W., S.W. f. 9; center placed 35.5 N., 53.5 W. (much too far to the E.N.E., near 34.3 N., 58 W. looks to be a much better location). Nov. 4, Bermuda, N. f. 2; ship near 38 N., 59.7 W., N.E. f. 10, 29.71; ship near 35 N., 56.5 W., S.W. f.3, showers; ship near 33.8 N., 58.7 W., N.N.W. f. 8, 29.65; ship near 39 N., 54 W., E.N.E. to N.E. f. 8, 29.77; ship near 33.8 N., 50.5 W., S. f. 6; ship near 33 N., 59.7 W., N.W. f. 10, 29.65; ship near 30.7, 57.5, W.N.W. f. 7; center placed 36 N., 55 W. Nov. 5, ship near 39 N., 47 W., E. f. 7, 28.85 (too low); ship near 36 N., 46 W., S.W. f. 7, 29.97 (too high); ship near 33 N., 51.8 W., S.W. f. 6; ship near 35 N, 54.7 W., N.W. f. 3, 29.56; center placed 36.5 N, 53.5 W. (near 37 N., 51 W. seems to be a better location). Nov. 6, ship near 39 N., 39 W., S. f. 5, 29.74; ship near 38 N., 50 W., N.E. f. 8, 29.65; ship near 32.5 N, 54 W., N.N.W. f. 6, showers; ship near 32 N., 48 W., W. f. 6, 29.88; center placed 38 N., 43 W. (near 37 N, 46.5 W. appears to be a better position). Nov. 7, center was probably embedded in a dissipating front but could not be easily identified (Historical Weather Maps, Nov. 1902). Author's note: Wind forces (f) are on Beaufort scale and pressures are in inches. 3) A storm was first observed near 23 N., 63 W. on Nov. 1, 1902 and lasted 8 day; it recurved near 28 N., 64 W. and it was last observed near 41 N., 30 W. (Mitchell, 1924). Author's note: The track for this storm in Tannehill (1928) was very similar to the one in Mitchell (1924). The track in Neumann et al. (1993) was similar to the above tracks but was not extended E. of the 45 degrees W. meridian.

Primarily on the basis of information in item 2), the author of this study introduced a number of relatively minor modifications along the track in Neumann et al. (1993). New 7 A.M. positions as estimated by the author were as follows: Nov. 1, near 22.5 degrees N., 67.0 degrees W.; Nov. 2, near 30.5 degrees N, 62.7 degrees W;

Nov. 3, near 34.3 degrees N., 58.0 degrees W.; Nov. 4, near 36.0 degrees N. 55.0 degrees W.; Nov. 5, near 37.0 degrees N., 51.0 degrees W.; Nov. 6, near 37.0 degrees N., 46.5 degrees W. Differences of the above positions with respect to the corresponding ones in Neumann et al. (1993) were found to range from roughly 200 miles on Nov. 1 to about 60 miles on Nov. 3. The author's track for Storm 5, 1902 is displayed in Fig. 2.

The tropical storm status which Neumann et al. (1993) gave to this storm was kept unchanged by the author of this study in spite of the fact that a ship reported a pressure as low as 29.12 inches and an E.S.E. wind force 11 on Nov. 3 (item 2), suggesting the possibility of hurricane intensity on that day.

Special statement.

In addition to the storms which were discussed above, one possible case was found for 1902.

A) Case of Aug. 25-28, 1902.

The following information was found in relation to this possible case: 1) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Aug. 25, ship near 27 N., 46 W., N.N.W. f. 4; ship near 26 N., 44 W., S.W. f. 3, drizzle, 30.03; ship near 26 N., 38 W., S.W. f. 4, thunderstorm; center placed 27.5 N., 42.5 W. Aug. 26, ship near 27 N., 46 W., S.W. f. 3, 30.06; ship near 30 N., 43 W., E. f. 2; ship near 22 N., 41 W., S. f. 4, 30.15; center placed 29.5 N., 44.5 W. Aug. 27, ship near 36 N., 50 W., N. f. 6, showers; ship near 34 N. 47 W., S. f. 4, 19.97; ship near 33 N, 43 W., S. f. 6, 30.00; center placed near 35 N., 48.5 W. Aug. 28, a weak frontal low was drawn near 44 N, 46 W. (Historical Weather Maps, Aug. 1902). Information in item 1) allowed one to infer the existence of a well-defined low pressure center which moved first to the N.W. and then turned to the N., but no winds of tropical storm intensity were found to be associated with this weather system. However, ship data for Aug. 27 showed a wind increase to force 6 on the Beaufort scale both to the E. and to the W. of the center, making it possible for tropical storm winds to have existed just east of the center on that day. This is why the author of this study decided to include this one as a possible case.