

IMPACT ON HURRICANE HISTORY OF A REVISED LOWEST PRESSURE AT  
HAVANA (CUBA) DURING THE OCTOBER 11, 1846 HURRICANE

By: José Fernández-Partagás  
Meteorologist

In a separate note, Fernández-Partagás (1993) documented that the lowest pressure at Havana during the October 11, 1846 hurricane was 27.70 instead of 27.06 inches of mercury as mentioned by Garriott (1900), Algué (1904), Krebs (1911), Tannehill (1938), Dunn and Miller (1960) and Ludlum (1963), among other authors. The revised pressure value (27.70 inches of mercury) was recorded on board the steamship "Thames" that happened to be in the Havana harbor during the hurricane. The 27.06 inches of mercury pressure was regarded as a sea-level pressure record for an Atlantic hurricane until November 5, 1932 when the steamer "Phemius" recorded 27.01 inches of mercury in the western Caribbean Sea in a late season storm. One could ask whether or not the new value (27.70 inches of mercury) did set a record for an Atlantic hurricane. No definite statement should be made in that respect without a thorough investigation but a preliminary search in various information sources (Reid, 1841; Garriott, 1900; Tannehill, 1938; Mitchell, 1924a; Dunn and Miller, 1960; Ludlum, 1963; Salivia, 1972) has not revealed any hurricane-related, undisputable pressure value lower than 27.70 inches of mercury prior to 1846. Lowest reliable pressure encountered in the search was 28.00 inches of mercury at San Juan (Puerto Rico) on August 2, 1937 (Salivia, 1972; Ludlum, 1963) and also at Matanzas (Cuba) on October 5, 1844 (Tannehill, 1938; Dunn and Miller, 1960). Quoting from Pedro Tomás de Córdova's *Memorias geográficas, históricas, económicas y estadísticas de esta Isla de Puerto Rico*, Salivia (1972) mentioned a value of 27.10 inches of mercury at Guadeloupe on July 26, 1825 which was discarded because it does not agree with the pressure drop of 1.86 inches of mercury indicated by Tannehill (1938). Such a drop would give a value in the vicinity of 28.10 inches of mercury if a drop from a normal pressure near 30.00 inches of mercury were assumed. Therefore, it appears to be that the new lowest pressure value (27.70 inches of mercury) at Havana on October 11, 1846 set a pressure record for a hurricane. Consequently, a revision of the history of a record of this kind seems to be in order for Atlantic hurricanes in general and for those affecting Cuba in particular.

A revision of the history of the lowest pressure  
for a hurricane (1846-present)

Except for Reid (1841), information given by all of the above-mentioned authors -and also by several other authors- was used in an attempt to reconstruct the history of the pressure record for an Atlantic hurricane between 1846 and 1932 (after removing the 27.06 inches of mercury spurious value) and to extend it to the present. In addition to this literature of meteorological nature, some newspaper information about hurricanes was used to produce a second version of that history, which the author of this note believes it is closer to reality than the one based upon conventional hurricane literature alone.

According to data shown by some of the above-mentioned authors, the 27.70 inches of mercury sea-level pressure record for a hurricane presumably established during the 1846 Havana hurricane was tied when the brig "Reindeer" reported a 27.70 inches of mercury pressure in a hurricane about 60 miles northwest of Great Abaco Island (Bahamas) on September 7, 1854 (Ludlum, 1963) and was tied for a second time when a 27.70 inches of mercury pressure was reported at Nassau (Bahamas) on October 1, 1866 (Tannehill, 1938). However, the

record remained unbroken until September 29, 1915 when a 27.61 inches of mercury pressure was recorded on board the steamship "Hermione" in the Gulf of Mexico near latitude 27.8 degrees North, longitude 90 degrees West (Mitchell, 1924a). According to The New York Times, October 4, 1915 (volume LXV, no. 21072, page 6, column 4), a similar pressure value (27.60 inches of mercury) was recorded on board the steamer "Almirante" in the western Caribbean Sea some 100 miles to the south of Kingston, Jamaica near midnight September 24-25, i.e., about four days before the steamship "Hermione" encountered the hurricane in the Gulf of Mexico. This newspaper information is not going to be used at this time because only hurricane specialized sources are used in producing this first version of the history of the lowest pressure recorded for a hurricane.

It should be mentioned that a pressure value of 27.50 inches of mercury that Ludlum (1963) quoted from the Daily Register as having been recorded at Mobile during the July 30, 1870 hurricane was discarded because it does not fit the minimal hurricane classification given to this storm by Dunn and Miller (1960). A pressure value of 26.85 inches of mercury Krebs (1911) mentioned at Martinique during the August 18, 1891 hurricane was also discarded because, according to Tannehill (1938), it does not agree with other available information, and a possible pressure value of 27.00 inches of mercury at Cape San Antonio (western tip of Cuba) during the August 14, 1915 hurricane was discarded as well because Mitchell (1924a) stated: "Means of determining the correctness of that reading are not at hand."

The pressure record of 27.61 inches of mercury (steamship "Hermione", September 29, 1915) was not going to last long: It was broken less than four years later when the steamer "Fred W. Weller" recorded a 27.36 inches of mercury pressure near Dry Tortugas on September 9, 1919 (Tannehill, 1938).

The pressure value of 27.22 inches of mercury reported in the eye of a hurricane by the steamship "Toledo" in the extreme southeastern Gulf of Mexico near Cayo Jutías (Cuba) on October 19, 1924 (Mitchell 1924b) established a new record, replacing the one of 27.36 inches of mercury set in 1919. It should be mentioned that there is a discrepancy about the lowest pressure recorded on board the steamship "Toledo": Father Mariano Gutiérrez-Lanza of the Belén College Observatory of Havana stated that the minimum pressure was 27.08 inches of mercury (Sarasola, 1928) instead of the 27.22 inches of mercury value Dr. José Carlos Millás, director of the Cuban National Observatory, forwarded to Mr. Charles L. Mitchell, together with many other observations taken on board the "Toledo" during the storm. The author of this note chose to use the 27.22 inches of mercury value because of its wider acceptance in hurricane literature (Mitchell, 1924a; Tannehill, 1938; Dunn and Miller, 1960).

The pressure record of 27.22 inches of mercury remained valid until November 5, 1932 when the steamer "Phemius" reported a 27.01 inches of mercury reading in a western Caribbean hurricane. New records were set on September 2, 1935 when a 26.35 inches of mercury reading was obtained near the northern end of Long Key (Florida Keys) during the Labor Day storm (Mc Donald, 1935) and on September 13, 1988 when a sea-level pressure of 26.22 inches of mercury was determined by reconnaissance aircraft in Hurricane Gilbert, then located over the western Caribbean Sea about 150 miles to the south of the southwestern Cuban coast (Lawrence and Gross, 1989).

So far, the author of this note has based the above history on information contained in conventional hurricane literature. However, he has recently found information published in newspapers, particularly in The New York Times and in The Times (London), which allows one to modify such a history, probably bringing it significantly closer to reality because the newspapers mentioned show pressures that are lower than those in conventional literature for earlier years and there is no reason to believe that early hurricanes of greatest intensity were weaker than today's ones.

Based upon data published in The Times (London), the 27.70 inches of mercury record appears to have been broken much earlier than in

1915 and just about seven years after it was presumably set at Havana on October 11, 1846. The following information is published in The Times on October 3, 1853 (no. 21549, page 9, column 2): "The Danish bark Hermann, bound to St. Thomas with coals, met a severe gale on the 3d of September, in lat. 20, long. 56W., the barometer falling as low as 27.30, but, being prepared, she escaped injury. The gale lasted 12 hours..." There is no way to assess how accurate the value of 27.30 inches of mercury is but, if it were accepted, it would have set a pressure record for an Atlantic tropical cyclone. The 27.30 inches of mercury pressure reading was taken along the track of a mature hurricane William Redfield traced back to the Cape Verde Islands (Tannehill, 1938) and, in addition, such a hurricane is said to have been an "extensive" one. As undoubtedly this hurricane attained an unusually great intensity, the author of this note is in favor of accepting the pressure value recorded on board the bark "Hermann" and that, therefore, it broke the previous record by four tenths of an inch.

The newly postulated pressure record (27.30 inches of mercury) was going to remain valid for fifty-seven years until it was apparently broken by a reading of 27.10 inches of mercury which is referred to in The New York Times, October 22, 1910 (volume LX, no. 19264, page 5, columns 3 and 4). The reading was taken on board the steamship "Brazos" in an unspecified location in the southeastern Gulf of Mexico (to the north of Pinar del Río province, Cuba) and at an unspecified time during the period October 15-17, 1910. The ship was sailing from Galveston to New York, where it arrived three days late after having fought a hurricane against almost overpowering odds. The ship lost its wireless and power and, because of the extremely adverse weather conditions, its position could not be determined for three days. The ship came significantly off its normal route and, when its position was thought to be just south of Key West, the "Brazos" found itself a very short distance from Havana. The 27.10 inches of mercury reading was taken by Captain William F. Evans, who said: "It was the worst blow I have ever experienced. The barometer registered 27.10, the lowest I ever saw. At the time of the Galveston flood the reading was 28.14. The storm struck us with indescribable fury. It looked as though the elements were trying to tear the sea up by the roots..." The October 1910 hurricane was a very severe one and its track made a counter-clockwise loop over the southeastern Gulf of Mexico. The storm was then over the warm waters feeding the Gulf Stream. The steamship "Jean" was in the eye of the storm about 27 miles south of Dry Tortugas near noon October 17, 1910 and recorded a 27.80 inches of mercury minimum pressure but the central pressure had risen to 28.20 inches of mercury by the time (about 12:20 a.m. October 18th) the hurricane moved over Ft. Myers (The Tampa Morning Tribune, October 22, 1910, 17th year, page 3, column 5). It is, therefore, entirely possible -and very likely- that pressure values significantly lower than 27.80 inches of mercury had occurred in the October 1910 hurricane on the 15th and/or the 16th and even earlier on the 17th. Although how accurate the 27.10 inches of mercury reading is cannot be determined, the author of this note believes that such a value is within limits for acceptance. Consequently, he is in favor of accepting it as a new pressure record for an Atlantic hurricane.

After accepting that the 27.10 inches of mercury reading on board the steamship "Brazos" set a pressure record in October 1910, the sequence of the 27.01, 26.35 and 26.22 inches of mercury pressure records for an Atlantic hurricane remains as previously discussed.

#### A Revision of the history of the lowest pressure recorded in Cuba (1846-present)

The records examined above are for an Atlantic tropical cyclone regardless of the location the storms occurred. Hereafter, attention is going to be focussed only on those hurricanes which directly affected the island of Cuba.

As far as pressure records in Cuba is concerned, the true value of 27.70 inches of mercury at Havana during the October 11, 1846

hurricane obviously set a new record: the previous one was 28.00 inches of mercury and was recorded at Matanzas during the October 5, 1844 hurricane (Tannehill, 1938; Dunn and Miller (1960). For all practical purposes, the 27.70 inches of mercury record was tied on September 25, 1917. During the hurricane of that date, the barometer fell to 27.74 inches of mercury at Consolación del Sur, Pinar del Río province, and to at least 27.71 inches of mercury at La Palma (near the northern coast of that province). The above values are based on information Fr. Mariano Gutiérrez-Lanza of the Belén College Observatory of Havana published in *Diario de la Marina* on October 7, 1917 (year LXXXV, no. 280, page 1, column 1). It should be mentioned that a possible reading of 27.00 inches of mercury at Cape San Antonio during the August 14, 1915 hurricane (Mitchell, 1924a) was discarded due to insufficient information.

A sea-level pressure which was definitely lower than 27.70 inches of mercury was recorded during the October 19, 1924 hurricane. A reading of 27.52 inches of mercury was taken at Los Arroyos, Pinar del Río province, establishing a new record for the lowest sea-level pressure recorded in Cuba. This value was published by Mitchell (1924b), who acknowledged that it had been kindly sent to him by Dr. José Carlos Millás, director of the Cuban National Observatory. Tannehill (1938) cited a minimum pressure reading of 27.22 inches of mercury at "Jutias City" which is misplaced, and the value of 27.20 inches of mercury that Dunn and Miller (1960) mentioned at "Jutias Bay" in the October 1924 hurricane is in error and misplaced. Neither "Jutias City" nor "Jutias Bay" exist, but these authors are obviously referring to Jutías Cay, a key off the northwestern coast of Pinar del Río province from where no pressure observations were available. However, their mistake can be understood because the similar value of 27.22 inches of mercury was the minimum pressure reported by the steamship "Toledo" when the ship was in the eastern portion of the eye of the hurricane off Jutías Cay -in Spanish: Cayo Jutías- at 3:30 p.m. October 19, 1924 (Mitchell, 1924b). Because of the prevailing hurricane conditions, the ship must have been in open waters of the Gulf of Mexico, a good distance from that key, at the time the minimum pressure was observed. According to Fr. Mariano Gutiérrez-Lanza (*Diario de la Marina*, November 18, 1924, year XCII, no. 321, page 18, columns 1-7), the crew of the "Toledo" estimated its position to be 23.1 degrees North, 83.9 degrees West, or about 25 miles to the north of Jutías Cay, at 11 a.m. The ship was sailing from Veracruz (Mexico) to Havana but, due to the extremely heavy weather, the hurricane force winds and the tremendous seas the "Toledo" was encountering, the ship's position at 3:30 p.m. should not have been significantly different from the one just mentioned.

The lowest sea-level pressure record for Cuba set in 1924 (27.52 inches of mercury) still holds today. This is the true lowest pressure ever recorded in Cuban territory after removing the previously accepted record of 27.06 inches of mercury which never occurred in reality. The second lowest pressure ever recorded in Cuba is 27.57 inches of mercury at the Cayo Guano del Este meteorological station (located about 35 miles to the south of Bay of Pigs -Bahía de Cochinos- on the south-central Cuban coast) during the October 24, 1952 hurricane (Norton, 1953). However, it should be mentioned that a pressure of 27.55 inches of mercury was observed to have corresponded to the largest of several oscillations ("pumping barometer") the barograph at the Cuban National Observatory registered near the time of minimum pressure (28.07 inches of mercury) at Havana during the October 20, 1926 hurricane. Dr. Millás discussed such oscillations in *Diario de la Marina*, October 22, 1926 (year XCIV, no. 294, page 14, column 1).

It should be emphasized that the lowest sea-level pressure record of 27.52 inches of mercury, like any other record, does not mean that a pressure lower than the one recorded could have occurred at nearby places where observations were not taken. The author of this note believes that, if pressure observations had been available from the central and eastern portions of the

Guanahacabibes peninsula (western Pinar del Rio province) and from the several keys off the northwestern coast of that province, it is very likely that a pressure lower than 27.52 inches of mercury would have been recorded in Cuba on October 19, 1924.

#### References

- Algué, J., 1904: The cyclones of the Far East. Bureau of Public Printing, Manila, 283 pp.
- Dunn, G.E. and B.I. Miller, 1960: Atlantic hurricanes. Louisiana State University Press, Baton Rouge, La., 326 pp.
- Fernández-Partagás, J., 1993: A revision of the lowest pressure recorded at Havana (Cuba) during the October 11, 1846 hurricane (Unpublished manuscript).
- Garriott, E.B., 1900: West Indian hurricanes. Bulletin H, U.S. Weather Bureau, Dept. of Agriculture, Washington, D.C., 69 pp.
- Krebs, W., 1911: The lowest barometric pressure minima at sea level. Monthly Weather Review, 39, 471.
- Lawrence, M.B. and J.M. Gross, 1989: Atlantic hurricane season of 1988. Monthly Weather Review, 117, 2248-2259.
- Ludlum, D.M., 1963: Early American hurricanes, 1492-1870. American Meteorological Society, Boston, Ma., 198 pp.
- Mc Donald, W.F., 1935: Lowest barometer reading in the Florida Keys storm of September 2, 1935. Monthly Weather Review, 63, 295.
- Mitchell, C.L., 1924a: West Indian hurricanes and other tropical cyclones of the North Atlantic Ocean. Monthly Weather Review, Supplement 24, 47 pp.
- Mitchell, C.L., 1924b: Notes on the West Indian hurricane of October 14-23, 1924. Monthly Weather Review, 52, 497-498.
- Norton, G., 1953: Hurricanes of 1952. Monthly Weather Review, 81, 12-15.
- Reid, W., 1841: An attempt to develop the Law of the Storms. John Weale, London, 572 pp.
- Salivia, L.A., 1972: Historia de los temporales de Puerto Rico y las Antillas, 1492-1970. Editorial Edil, Inc., San Juan, P.R., 385 pp.
- Sarasola, S., 1928: Los huracanes en las Antillas. Bruno del Amo, Madrid, 254 pp.
- Tannehill, I.R., 1938: Hurricanes, their nature and history. Princeton University Press, Princeton, N.J., 257 pp.

Coral Gables, Fl., December 9, 1993.