

**A Reconstruction of Historical Tropical
Cyclone Frequency in the Atlantic from
Documentary and Other Historical Sources
1851 to 1880**

Part I: 1851-1870

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Storms of 1851 - 1857

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Introduction

The present report describes the results of the activities performed by its author in support to the effort of improving historical knowledge of hurricanes to be used in determining their 1851-1920 frequency over the Atlantic Ocean. The focus during this first quarter of the project was in studying storms of tropical nature in the 1850's and the effort was concentrated in reviewing previously known cases and documenting new ones for the seven years from 1851 to 1857, both inclusive. These years represent approximately one third of the period 1851-1870, which is just prior to the storm documentation by Neumann et al (1993) that starts in 1871.

Sources and Methods

The reviewing of previously known cases made use of available lists from various authors such as Tannehill (1938), Garriott (1900), Alexander (1902), Garcia-Bonnely (1958), Dunn and Miller (1960), Ludlum (1963) and Salivia (1972). The Tannehill's list served as an initial storm source, and cases cited by other authors and that were not in the Tannehill's list were then added to it in order to obtain all previously known storms for the 1851-1857 period. In some cases the above mentioned authors were found to give full accounts of the storms; in other cases, the information given was limited to the place and date of occurrence. Therefore, the author of this study felt that there was a need for putting together what the various authors had expressed about each storm as well as to supplement their information by using what appeared in other books (Sullivan, 1986, Rodriguez-Demorizi, 1958) and what was published in newspapers, primarily The Times (London) and The New-York Daily Times which became The New York Times on September 13, 1857. The newspaper information was basically of two kinds: 1) general news about storm occurrences and 2) marine information containing weather events encountered by vessels. An example of the information provided by newspapers is shown in Fig. 1. This figure shows part of the Marine Intelligence information published in The New-York Daily Times, Oct. 28, 1853, p. 8, col. 6, which contains some weather and weather-related happenings reported by various vessels. The author of this study went through the above mentioned newspapers and also through the Gaceta de la Habana and extracted from them whatever information he felt was useful for this study. It should be emphasized that newspaper information was not only important in revealing additional documentation about already known storm cases but in allowing the author of this study to document a good number of new storms whose existence was unknown before.

MARINE INTELLIGENCE.

PORT OF NEW-YORK. THURSDAY, OCT. 27.

Cleared.

Steamships—United States, Lucas, New-Orleans, M. Q. Roberts; George's Creek, Terry, Baltimore, P. V. Coal Co.

Ships—Houghton, Cutter, New-Orleans, Stanton & Thompson; Franklin King, Liverpool, J. O. Baker & Co.; Ocean Queen, Smith, London, J. Griswold, Morgan & Wells; Kathay, Stoddard, London, Goodhue & Co.

Barks—Lowell, Sherman, Apalachicola, Ralph Fox; A. B. Sturges, Rice, Barbadoes, H. & W.; Delafeld; Tequin, Hill, Bristol G. C. Duncan & Co.

Brgs—Mary Hamilton, Walker, Charleston, T. Waddell; Uranus, Church, Aspinwall.

Schooners—Rebecca, Wazlom, Petersburg, Jas. Hunter & Co.; John Thomas, Elzey, Reppahannock, C. M. Fry; Maria, Blissett, Baltimore, Johnson & Lowden; J. B. Bleeker, Swezey, Wilmington, Boundry, Watson & Co.; Capt. John, Tinker, Jacksonville, Chas. & E. J. Peters.

Sloops—Fredk. Brown, Gardner, Providence, master; Mary L. Compton, Robinson, Alexandria, &c., Van Brunt & Slaght.

Propeller—Authracite, Jones, Philadelphia, W. H. Thompson.

Arrived.

Steamship Northern Light, Miner, San Juan del Norte, via Norfolk, 718 passengers and \$1,588,000 in specie to Chas. Morgan.

Steamships Jamestown, Parrish, Parrish, from Norfolk and Richmond, mdse. to Ludlam & Piesants.

Ship Vicksburg, Higgins, Havana, Oct. 15, sugar and molasses to Wm. Nelson & Sons. Oct. 19, off Cape Florida, had a heavy gale from N. W. Oct. 24, lat. 36-38, lon. 75-54, had fresh gales from S., barometer 29.4. At 4 P. M. wind suddenly shifted to N. W., and blew a perfect hurricane for 12 hours.

Ship Silas Holmes, Kempton, New-Orleans, 13 ds. mdse. to Wm. Nelson & Sons. Left on the Barkship Oswego, Williams, for New-York; bark Sarah King, fur do. left the day previous. The S. H. has experienced very gales from the W., North of Hatteras.

Ship Wm. B. Travis, Smith, Galveston, Oct. 7, cotton and rice to J. H. Brower & Co.

Bark Mary & Jane, (of Newburyport,) Milliken, Penang, June 5, Achen Head June 21, pepper, tin and tea to D. G. & W. B. Bacon.

Bark W. H. Brodie, Attridge, Mobile, 10 ds., cotton to Sturges, Clearman & Co. Oct. 20, lat. 29, lon. 79 8, fell in with schr. Petite Lizzie, of Blue Hill, from Boston for Jacksonville. Took off the captain and crew. The P. L. was in ballast, and was capized in the hurricane of the 19th when they cut away her masts and she righted. They succeeded after much difficulty in getting on board the W. H. B., as it was blowing a gale at the time.

Bark Brazileira, Campbell, Vera Cruz, Sept. 27, specie, hides and cochineal to Hargous & Bros. The B. has experienced severe weather on the passage.

Bark David Nichols, (of Searsport,) Sweet, Matanzas, 21 ds., sugar to R. P. Buck & Co. Has experienced heavy weather on the passage, split sails, &c.

Bark O. J. Chaffee, Nickels, Cardiff, 45 ds., railroad iron to order.

Bark Rauer, of Portland, Fogg, Sagua la Grande, 9 ds., with sugar, to master. Oct. 20, lat. 26 45, lon. 79 47, spoke bark Diligence, Hutchinson, 5 ds. from Havana. Same time, spoke brig George F. Williams, 8 ds. from Matanzas, for Portland. Oct. 23, lat. 32 03, lon. 77, fell in with and boarded schooner Madeira, of Prospect, Capt. Harriman, from Doboy Island, loaded with a cargo of lumber, bound to New-York. Took from her Capt. H., his mate, and five seamen. Capt. H. reports that three days previous, in a gale, became totally dismasted and leaky, and having no spare or rigging on board, deemed it prudent to abandon the vessel. On the 23d, the bark Ringer, from Sagua la Grand, bore up.

Results

The detailed study of the 1851-1857 storms is presented in the Appendix. The Appendix presents 42 storms on a one-by-one basis for the seven-year period. Twenty-six of these storms were previously known cases and the author of this study was able to newly document the 16 remaining cases. These 16 new storms represent 38.1 percent of the 42 cases which are now known to have occurred over the period 1851-1857. Tannehill (1938) listed 47.6 percent of these cases and the other authors mentioned the remaining 14.3 percent which were not included in Tannehill's book.

No attempt to classify the storms as tropical storms and hurricanes was made. The grouping of tropical storms and hurricanes in a single batch was in agreement with a similar policy for early storms followed by Neumann et al (1993). However, a discussion about the intensity of particular storms was included for some of the cases. Each storm in the Appendix was identified by the number it had in chronological order of detection throughout its corresponding year. The known life-span for each storm was denoted in brackets following the storm identification. For instance, the fourth storm of 1853 was referred to as Storm 4, 1853 (Sept. 8-10). No specific days of the month were known for two cases, and neither the month nor the day was known for a third one.

The 42 storm cases which are now known to have occurred over the 1851-1857 period are listed in Table 1. Information about newly documented cases and tracks achieved is included in this table. The most intense storm in Table 1 was found to be no. 14: its lowest pressure of 27.30 inches appeared to have set a record for an Atlantic hurricane which lasted for many years (Fernandez-Partagas, 1993). Storms which directly affected land are listed in Table 2. This table shows that 27 out of the 42 storms did affect land.

The determination of a track was feasible for 24 out of the 42 storms in the 1851-1857 period. However, it should be emphasized that the tracks prepared are far less accurate than the ones achieved for today's storms. Rather than showing the exact displacement of the storm's center from one time to another, the tracks should be interpreted as describing the general motion of the storm from one area to another. Estimated positions for 7 A.M. EST on consecutive days, which might frequently have errors of at least 100 miles (in some cases as much as 200-300 miles) over the open sea but that were more reliable near and over land, were joined by smooth curves to produce the tracks displayed in Figs. 2 to 8. The estimated 7 A.M. positions were denoted by black dots along the tracks, with adjacent numbers indicating the day of the month. The month was indicated only for the starting day of each track and, in addition, for the first day of the month when a track continued from one month to the next. The storm number was indicated by a larger size digit placed near the beginning of the track.

There was a large number of storms (18 out of the 42 cases in the 1851-1857 period) for which no track could be determined. These storms were also shown in Figs. 2 to 8. These latter cases were denoted by a cross located at the place where the storm

Table 1
List of Storms
(1851-1857)

List No.	Indent. # & Date	Newly Documented	Track Achieved
1	Strom 1, 1851 (before Jul. 7)	YES	NO
2	Storm 2, 1851 (Jul. 10)	NO	NO
3	Storm 3, 1851 (Aug. 16-27)	NO	YES
4	Storm 4, 1851 (Sept. 13-16)	YES	NO
5	Storm 5, 1851 (Sept. 18)	NO	NO
6	Storm 6, 1851 (Oct. 16-19)	YES	YES
7	Storm 1, 1852 (Aug. 19-27)	NO	YES
8	Storm 2, 1852 (Sept. 5-6)	NO	YES
9	Storm 3, 1852 (Sept. 9-13)	NO	YES
10	Storm 4, 1852 (Sept. 22-30)	NO	YES
11	Storm 5, 1852 (Oct. 6-10)	NO	YES
12	Storm 1, 1853 (Aug. 5)	YES	NO
13	Storm 2, 1853 (Aug. 10)	NO	NO
14	Storm 3, 1853 (Aug 30-Sept. 10)	NO	YES
15	Strom 4, 1853 (Sept. 8-10)	YES	YES
16	Storm 5, 1853 (Sept. 21)	YES	NO
17	Storm 6, 1853 (Sept. 26-30)	NO	YES
18	Storm 7, 1853 (Sept. 28)	NO	NO
19	Storm 8, 1853 (Oct. 19-20)	YES	NO
20	Storm 9, 1853 (Nov. 26)	NO	NO
21	Storm 1, 1854 (Aug. 23)	YES	NO
22	Storm 2, 1854 (Sept.7-12)	NO	YES
23	Storm 3, 1854 (Sept. 18-19)	NO	YES
24	Storm 4, 1854 (Sept. ?)	NO	NO
25	Storm 5, 1854 (Oct. 20-22)	NO	YES
26	Storm 1, 1855 (Aug. 6)	YES	NO
27	Storm 2, 1855 (Aug. 10)	YES	YES
28	Storm 3, 1855 (Aug. 11 or 14)	YES	NO
29	Storm 4, 1855 (Aug. 24-27)	NO	YES
30	Storm 5, 1855 (Aug. 31-Sept.2)	NO	YES
31	Storm 6, 1855 (Sept. 15-16)	NO	YES
32	Storm 1, 1856 (Aug. 10-11)	NO	YES
33	Storm 2, 1856 (Aug. 13-14)	YES	YES
34	Storm 3, 1856 (Aug. 21-22)	NO	NO
35	Storm 4, 1856 (Aug. 25-Sept.3)	NO	YES
36	Storm 5, 1856 (Sept. ?)	NO	NO
37	Storm 6, 1856 (Sept. 18-22)	YES	YES

38	Storm 1, 1857 (Jun. 30 - Jul 1)	YES	YES
39	Storm 2, 1857 (Sept. 9-16)	NO	YES
40	Storm 3, 1857 (Sept.22-26)	YES	NO
41	Storm 4, 1857 (Sept.24-28)	YES	YES
42	Storm 5, 1857 (No Date)	NO	NO

Table 2
List of the storms which directly affected
land over the period 1851-1857

List No. (Table 1)	Ident. # and Dates	Areas Affected
1	Storm 1, 1851 (before Jul.7)	Tampico
2	Storm 2, 1851 (Jul. 10)	Barbados
3	Storm 3, 1851 (Aug. 16-27)	Leeward Is., Hispaniola, Cuba, NW FL, GA, S.C., N.C., VA, Newfoundland
6	Storm 6, 1851 (Oct. 16-19)	New England
7	Storm 1, 1852 (Aug. 19-27)	Bahamas, FL Keys, MS, AL
8	Storm 2, 1852 (Sept. 5-6)	Puerto Rico, Hispaniola
9	Storm 3, 1852 (Sept. 9-13)	Central FL
10	Storm 4, 1852 (Sept. 22-30)	Leeward Is., Virgin Is., S.E. Bahamas
11	Storm 5, 1852 (Oct. 6-10)	Jamaica, N.W. FL, GA, S.C., N.C.
13	Storm 2, 1853 (Aug. 10)	Barbados
20	Storm 9, 1853 (Nov. 26)	Santo Domingo
22	Storm 2, 1854 (Sept. 7-12)	GA, S.C., N.C.
23	Storm 3, 1854 (Sept. 18-19)	TX
24	Storm 4, 1854 (Sept. ?)	Galveston
25	Storm 5, 1854 (Oct 20-22)	Bermuda
26	Storm 1, 1855 (Aug. 6)	Tampico
28	Storm 3, 1855 (Aug. 11 or 14)	Nicaraguan Coast
29	Storm 4, 1855 (Aug. 24-27)	Barbados, St. Vincent, Puerto Rico, Hispaniola
31	Storm 6, 1855 (Sept. 15-16)	LA, MS
32	Storm 1, 1856 (Aug. 10-11)	LA
33	Storm 2, 1856 (Aug. 13-14)	Barbados, Grenada, Grenadines
34	Storm 3, 1856 (Aug. 13-14)	Cuba
35	Storm 4, 1856 (Aug. 25- Sept. 3)	S.E. Bahamas, Cuba, N.W. FL, GA, S.C., N.C.
36	Storm 5, 1856 (Sept. ?)	Wilmington, N.C.
39	Storm 2, 1857 (Sept. 9-16)	Hatteras
41	Storm 4, 1857 (Sept. 24-28)	Guadeloupe
42	Storm 5, 1857 (No Date)	Port Isabel, TX

occurred. The life-span and the storm number was written down in the vicinity of the cross. The ratio of these storms to the ones for which a track was obtained was found to be 3 to 4. This result was very encouraging because it meant that a general motion description from one place to another was achieved for most storm cases, and that the contribution of this study was not only significant in documenting new storms and in putting together knowledge about previously known cases but also in providing tracks for 57.1 percent of the 42 cases which are presently known to have occurred over the 1851-1857 period as a result of this study.

Some of the decisions which were required during the course of this research work were difficult to make. For instance, in spite of the author being skeptical about the existence of a few storms previously mentioned in hurricane literature, he made the decision of keeping them on record because no evidence disproving their existence was found. The author also questioned whether to accept or not the storms which were found at high latitudes in August and September. Rigorously speaking, these storms might not have been strictly tropical in nature but, because 1) they were storms apparently coming from lower latitudes and attained by severe gales or hurricane winds and 2) storms of tropical origin during the peak months of the hurricane season tend to bring their own characteristics to high latitudes and to only gradually evolve into extratropical systems, such storms were decided to still be acceptable for this study. Caution was taken, however, in accepting storms at high latitudes late in the hurricane season and, as a matter of fact, a candidate case near Cape Hatteras in mid October 1856 was rejected as it appeared to have been extratropical in nature.