Storms of 1865 - 1870

STORMS OF 1865-1870

By: Jose J. Fernandez-Partagas

Introduction.

The present report describes results of continuing activities by its author as a part of the effort of improving historical knowledge of tropical cyclones to be used in studies determining their 1851-1920 frequency over the Atlantic Ocean. The study of storms of tropical nature in the 1850's and early 1860's was addressed in previous reports prepared by the author (Fernandez-Partagas, 1994a; Fernandez-Partagas, 1994b) and the present report covers the period 1865-1870 which is just prior to the storm documentation by Neumann et al (1993) that starts in 1871. Findings resulting from reviewing previously known storm cases and from documenting new ones for the six years from 1865 to 1870 are presented here.

Sources and methods.

As in Fernandez-Partagas (1994a) and Fernandez-Partagas (1994b), the reviewing of previously known storms made use of available lists from various authors, such as Tannehill (1938), Garriott (1900), Alexander (1902), Garcia-Bonnelly (1958), Dunn and Miller (!960), Ludlum (1963) and Salivia (1972). The Tannehill's list served as an initial source and cases mentioned by other authors and that were not listed by Tannehill (1938) were then added in order to obtain all previously known storms for the period 1865-1870. For some storms the authors have just indicated their place and time of occurrence; for other storms, however, they have given full accounts of them. Therefore, the author of this study decided to put together what the various authors have expressed about each storm and to supplement their information by using what appears in other books or articles (Sarasola, 1928; Rodriguez-Ferrer, 1876; Vines, 1895; Frankenfield, 1917; Chapel, 1927; Tucker, 1982) and what was published in newspapers, primarily in The New York Times and in The Times (London). It should be emphasized that the newspaper information, containing general news about storm occurrences and narratives of weather events encountered by vessels, was not only important in revealing additional findings about already known storm cases but in allowing the author of this study to document a large number of new storms whose existence was not known before.

Results.

The detailed study of the 1865-1870 storms is presented in the Appendix. The Appendix presents 50 storms on a one-by-one basis for the above mentioned six-year period. Only 18 of these storms were previously known cases; however, 19 instead of 18 storms had been listed before because one of the storms was entered twice as having occurred as two independent storms in two different places. The author of this study documented 32 new storms which represent a 64 percent of the 50 cases which are now known to have occurred over

the period 1865-1870. This contribution of 32 new cases by the author represents a 177.8 percent increase in the number of known storms for said period. Similar contributions for the period 1851-1857 (Fernandez Partagas, 1994a) and for the period 1858-1864 (Fernandez-Partagas, 1994b) resulted in increases by 61.5 percent and 242.9 percent in the number of known storms, respectively.

As in Fernandez-Partagas (1994a) and Fernandez-Partagas (1994b), no attempt to classify storms as tropical storms and hurricane was made. However, a discussion about the intensity of particular storms was included for a number of 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 was denoted in brackets following the storm identification. For instance, the third storm of 1868 was referred to as Storm 3, 1868 (Oct. 5-7) because it was documented for the period Oct. 5-7, 1868. No specific days of the month were known for one storm case and no date was available for a second storm case.

The 50 cases which are now known to have occurred over the period 1865-1870 are listed in Table 1. Information on whether or not each storm was a newly documented case and on whether or not a track for it was achieved is included in the table. Storms which directly affected land are listed in Table 2. This table shows that 27 out of the 50 storms (or 54 percent of the storms) did affect land. This 54 percent was found to be smaller than the 64.3 percent corresponding to the period 1951-1857 which can be inferred from Fernandez-Partagas (1994a) but larger than the 43.8 percent corresponding to the period 1858-1864 (Fernandez-Partagas, 1994b).

Some of the decisions which were required during the study of the 50 storms above were difficult to be taken. For instance, the author questioned whether or not to accept new storm cases which were found at high latitude. In general, these storms were accepted in August and September when they were apparently coming from lower latitudes and/or they were attained by severe gales or hurricane winds. The reasoning for accepting these storms is that storms of tropical origin in these peak months of the hurricane season tend to bring their own characteristics to high latitudes and to only gradually evolve into extratropical systems. Caution was taken, however, in accepting high latitude storms in other months of the season. A second major problem dealt with accepting storms previously mentioned in hurricane literature which were vaguely documented and about whose existence the author of this study is skeptical. The decision made in those cases, which fortunately were only a few, was to retain the storms due to the lack of evidence against them.

Determination of a track was feasible for 32 out of the 50 storms in the period 1865-1870. Of course, a track was achieved only for the known life-span of the storms, which might be in many cases just a portion of their real lives. As done in Fernandez-Partagas (1994a) and Fernandez-Partagas (1994b), it should be emphasized that the tracks prepared for these storms are far less accurate than the ones achieved for today's tropical cyclones. The tracks shown in this report should be interpreted as describing the general motion of the storm from one area to another rather than

Table 1
List of Storms
(1865-1870)

List No.	Ident. # & Date	Newly Documented	Track Achieved
1	Storm 1, 1865 (May 29-30)	Yes	No
2	Storm 2, 1865 (Jun. 30)	Yes	No
3	Storm 3, 1865 (Aug.20-24)	Yes	Yes
4	Storm 4, 1865 (Aug. 22-23)	No	No
5	Storm 5, 1865 (Sept. 6-13)	No	Yes
6	Storm 6, 1865 (Sept. 28)	Yes	No
7	Storm 7, 1865 (Sept. ?)	No	No
8	Storm 8, 1865 (Oct. 18-25)	No	Yes
9	Storm 1, 1866 (Jul. 15)	Yes	No
10	Storm 2, 1866 (Aug. 13-17)	Yes	Yes
11	Storm 3, 1866 (Sept. 4-6)	Yes	Yes
12	Storm 4, 1866 (Sept. 18-20)	Yes	No
13	Storm 5, 1866 (Sept. 22-24)	Yes	Yes
14	Storm 6, 1866 (Sept. 24-Oct. 5)	No	Yes
15	Storm 7, 1866 (Oct. 29-30)	No	Yes
16	Storm 8, 1866 (Oct. 29-30)	No	No
17	Storm 9, 1866 (No Date)	No	No
18	Storm 1, 1867 (Jul. 28-Aug.3)	No	Yes
19	Storm 2, 1867 (Aug. 12)	Yes	No
20	Storm 3, 1867 (Aug. 31-Sept. 3)	Yes	Yes
21	Storm 4, 1867 (Sept. 8)	Yes	No
22	Storm 5, 1867 (Sept. 29-30)	Yes	Yes
23	Storm 6, 1867 (Oct. 2-5)	No	Yes

24	Storm 7, 1867 (Oct. 9)	Yes	No
25	Storm 8, 1867 (Oct.27-30)	No	Yes
26	Storm 1, 1868 (Sept. 3-6)	Yes	Yes
27	Storm 2, 1868 (Oct. 1-7)	Yes	Yes
28	Storm 3, 1868 (Oct. 3-5)	Yes	Yes
29	Storm 4, 1868 (Oct. 15-17)	Yes	Yes
30	Storm 1, 1869 (Aug. 12)	Yes	Yes
31	Storm 2, 1869 (Aug. 16-17)	No	Yes
32	Storm 3, 1869 (Aug. 27)	Yes	Yes
33	Storm 4, 1869 (Sept. 1-2)	Yes	No
34	Storm 5, 1869 (Sept. 4-5)	Yes	Yes
35	Storm 6, 1869 (Sept. 7-8)	No	Yes
36	Storm 7, 1869 (Sept. 11-18)	Yes	Yes
37	Storm 8, 1869 (Sept. 14)	Yes	No
38	Storm 9, 1869 (Oct. 1)	Yes	No
39	Storm 10, 1869 (Oct. 4)	No	Yes
40	Storm 1, 1870 (Jul. 30)	No	No
41	Storm 2, 1870 (Aug. 30-Sept. 4)	Yes	Yes
42	Storm 3, 1870 (Sept. 1-4)	Yes	Yes
43	Storm 4, 1870 (Sept. 9-13)	No	Yes
44	Storm 5, 1870 (Sept. 17-20)	Yes	Yes
45	Storm 6, 1870 (Oct. 5-14)	No	Yes
46	Storm 7, 1870 (Oct. 7)	Yes	No
47	Storm 8, 1870 (Oct. 10)	Yes	Yes
48	Storm 9, 1870 (Oct. 19-22)	No	Yes
49	Storm 10, 1870 (Oct. 23-24)	Yes	No
50	Storm 11, 1870 (Oct. 30-Nov. 3)	Yes	Yes

Table 2
List of the storms which directly affected land over the period 1865-1870

List No. (Table 1)	Ident. # & Date	Areas Affected
2	Storm 2, 1865 (Jun. 30)	Brownsville
4	Storm 4, 1865 (Aug. 22-23)	Cuba
5	Storm 5, 1865 (Sept. 6-13)	Leeward Is., LA, TX
7	Storm 7, 1865 (Sept. ?)	TX
8	Storm 8, 1865 (Oct. 18-25)	Panama, Cuba, FL
9	Storm 1, 1866 (Jul. 15)	Mantagorda Bay
10	Storm 2, 1866 (Aug. 13-17)	Mexico
13	Storm 5, 1866 (Sept. 22-24)	Newfoundland
14	Storm 6, 1866 (Sept. 24-Oct. 5)	Bahamas
15	Storm 7, 1866 (Oct. 29-30)	NJ, NY, New England
16	Storm 8, 1866 (Oct. 29-30)	Leeward Is.
17	Storm 9, 1866 (No Date)	Galveston
18	Storm 1, 1867 (Jul. 28-Aug. 3)	S.E. New England
23	Storm 6, 1867 (Oct. 2-5)	TX, LA
24	Storm 7, 1867 (Oct. 9)	St. Martin
25	Storm 8, 1867 (Oct. 27-30)	Sombrero, Virgin Is., Puerto Rico, Hispaniola
27	Storm 2, 1868 (Oct. 1-7)	N.W. FL, GA, SC, NC
31	Storm 2, 1869 (Aug. 16-17)	TX
34	Storm 5, 1869 (Sept. 4-5)	LA
35	Storm 6, 1869 (Sept. 7-8)	NY, New England

39	Storm 10 1869 (Oct. 4)	New England, New Brunswick, Nova Scotia
40	Storm 1, 1870 (Jul. 30)	Mobile
43	Storm 4, 1870 (Sept. 9-13)	Bermuda
45	Storm 6, 1870 (Oct. 5-14)	Cuba, FL Keys, N.W. Bahamas
48	Storm 9, 1870 (Oct. 19-22)	Cuba, S. FL
49	Storm 10, 1870 (Oct. 23-24)	N. Hispaniola, S.E. Bahamas
50	Storm 11, 1870 (Oct. 30-Nov. 3)	N.E. Belize, Yucatan

showing the exact displacement of the storm center over specified periods of time. Estimated positions for 7 A.M. EST on consecutive days, which might very frequenty have errors of one or several hundred miles over the open sea but that were more reliable near and over land, were joined by smooth curves to produce the tracks in Figs. 1 to 6. 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 the track continued from one month to the next. The storm number was indicated by larger size numbers placed near the beginning of the track.

There was a relatively small number of storms (18 out of the 50 cases in the period 1865-1870) for which no track could be determined. These storms were also shown in Figs. 1 to 6. These latter cases were denoted by a cross located at the place where the storm occurred, and the life-span and the storm number were written down in the vicinity of the cross.

For the period 1865-1870, tracks for 64 percent of the known storms were achieved. This value is larger than the 57.1 percent obtained for the period 1851-1857 (Fernandez-Partagas, 1994a) but it is smaller than the 72.9 percent which corresponded to the period 1858-1864 (Fernandez-Partagas, 1994b).

Finally, if results shown in Fernandez-Partagas (1994a), in Fernandez-Partagas (1994b) and in the present report were combined, they would confirm preliminary findings in Fernandez-Partagas (1992) in regard that what appears published in newspapers is crucial in obtaining additional information on already known storms and in documenting new storm cases in the nineteenth century: Information which appeared primarily in The New York Times and its predecesor The New-York Daily Times and in The Times (London) has allowed the author to increase from 58 to 140 the number of known storms for the twenty-year period from 1851 to 1870 and it has also helped him in determining a track for 91 out of these 140 storms.

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