

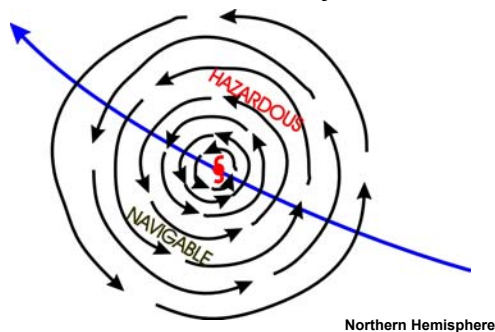
MET 4532, Hurricanes



Assignment:

- Saturday is the 82nd anniversary of the 1935 “Labor Day Hurricane” in the middle Keys
- For Next Time:
- E, 23-28: Sun and Sea

Redfield/Reid/Piddington Model of Circulating Cyclonic Storms

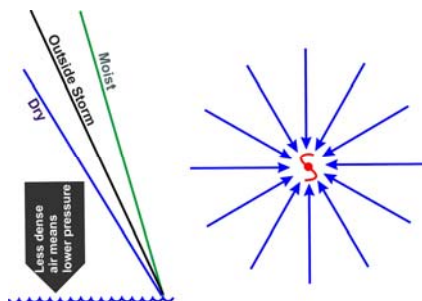


James Pollard Espy (1785-1860)

- Appointed US Govt. first meteorologist in 1842
- Published *The Philosophy of Storms* in 1841
- Recognized the role of condensational heating in clouds
- Sought to explain all low pressure systems through condensational heating
- Thought that air flowed straight into lows
- Discounted Coriolis force proposed by Farrell
- Long conflict with Redfield & Reid.



Espy's Theory of All Cyclones



Founding National Weather Services

- **Heinrich Brandes**, 1816
 - Analyzed observations collected by mail
 - Understood relationship between pressure & weather
- Timely forecasts required land-line telegraph
 - Gauss & Weber 1833
 - Morse 1837
- **Joseph Henry** (Sec. of the Smithsonian) began collecting telegraph reports (1849)
 - More efforts were motivated by weather disasters
 - Sevastopol 1854 (Crimean War)
 - Great Lakes 1865 & 1866
- **Le Verrier** did retrospective analysis of Sevastopol storm
- **Buy Ballot** (Netherlands) began using telegraph reports, 1860
- **Robert Fitzroy** began collecting observations and forecasting in UK (1859-1860)
- **Cleveland Abbe** established an academic weather network (1868)
 - Pres. Grant directed the army to observe weather (1870)
 - Hired Abbe to analyze and forecast
 - Extended nationwide (1872) and to Cuba and Jamaica (1873)
- US had analyzed ship reports since 1855, but not in real time.



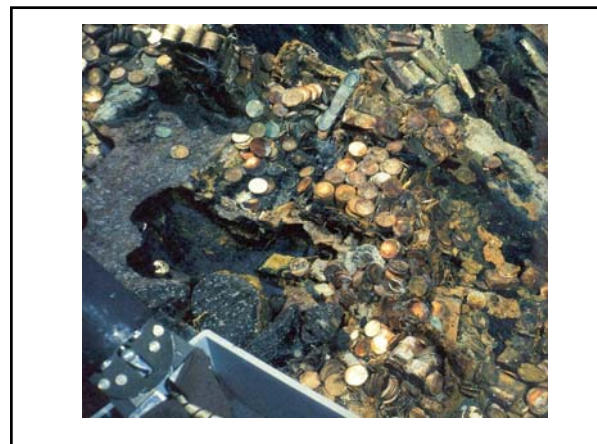
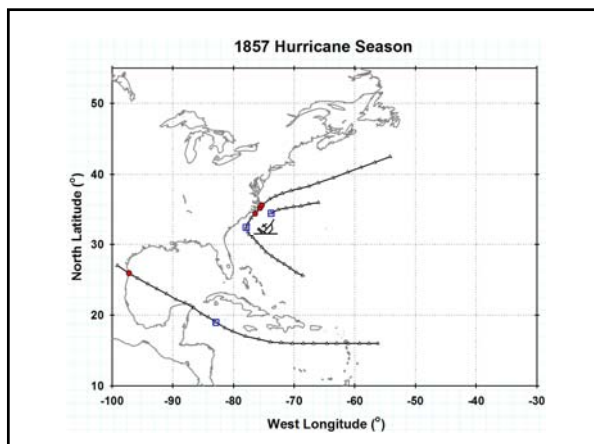
Fr. Benito Viñes

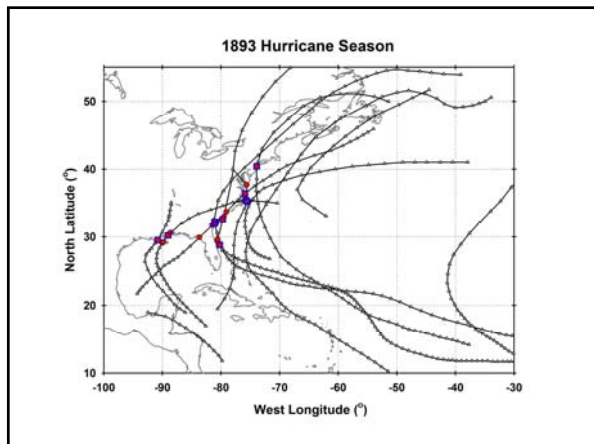
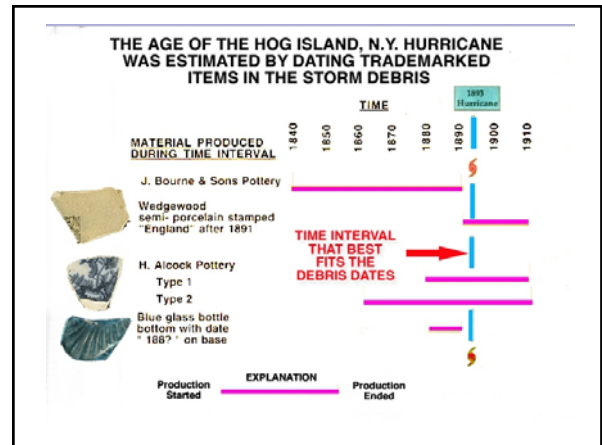
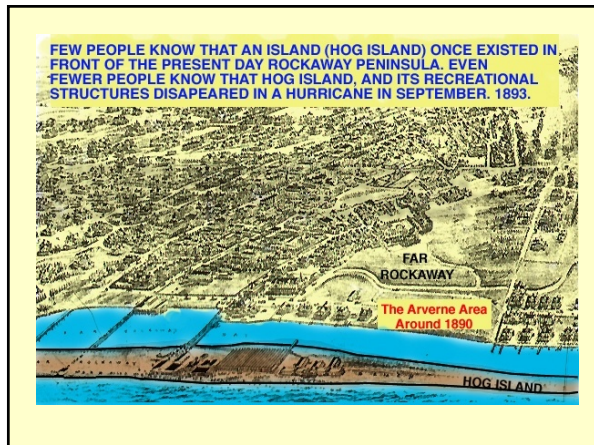
- Became director of Belen College in Havana (1870)
- Two deadly hurricanes struck western Cuba that year
- Began serious study of records and actual hurricanes
- Issued first hurricane warning (1875)
- Became a successful fore-caster and recognized scholar
- Published *Investigation of the Cyclonic Circulation of the Translatory Movement of West Indian Hurricanes* and died (1893).



Herndon and the *Central America*

- Post Gold Rush, 1857
- Mail ship
- Navy Captain William L. Herndon
- Voyage from Panama to Havana to New York
- Lost in a hurricane of Cape Hatteras on 12Sep57
- Three days in storm
- Progressive flooding
- 423 souls lost
- 152 rescued by three ships (*Marine, Ellen, Mary*)
- Last 3 after 72h in the water, 450 mi from sinking
- Loss of 13-15 (not 3 or 21) tons of gold contributed to the Financial Panic of 1857
- Gold salvaged, starting in 1987





Samoa 1889

- Three-way contest between UK, Germany & US to see who would "civilize" the Samoans
- March 15 in Apia harbor
 - USS Trenton, Vandalia, Nipic
 - SMS Olga, Adler, Eber
 - HMS Calliope
- Gringo standoff
- Hurricane (Tropical Cyclone) struck with little warning
- Adler, Eber, Vandalia, Nipic driven ashore
- 140 European sailors drowned
- Larger ships damaged, only Calliope relatively lightly
- War placed on hold, sort of

Summary

- Espy-Redfield conflict, radial inflow or circulation. Role of latent heat release
- Telegraph and the founding of organized observing and forecasting 1860-1870
- Fr Viñes as a hurricane scientist and forecaster
- Loss of the *Central America* (1857)
- European powers humbled in Samoa 1889
- Hog Island (1893), 6 US landfalls...
- **For next time Sun & Sea, Emanuel 23-28**