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Atmospheric Determinants And the History of the Old South

W. M. Pine*

The effects of changes in the atmospheric mantle of gases, moisture-vapors, and minute solid particles, suspended as a solar filter over the earth's surface, on the behavioral patterns of the inhabitants living below have been matters of vital concern since people first recognized such changes. More recently, with the coming of the so-called scientific age and the search for predictability, the question of the causal relationships between atmospheric changes and historic behavioral patterns has stirred more than a little controversy among both scientists and historians.¹

Earlier in this century, the eminent Yale geographer, Ellsworth Huntington, added to the intensity of this controversy with his theories on "Climatic Determinism." He ascribed to climatic determinism not only economic, political, and cultural cycles over the past several millenia, but the parameters of such things as religious concepts as well.² While Huntington has been vigorously criticized as being simplistic and even racist, Professor David Hackett Fischer pointed out in 1980 that "the Huntington thesis has never been fully refuted. It was merely ridiculed, because it failed to fit the metaphysical framework of social science in the mid-twentieth century."³

Whatever the validity of climatic determinant arguments, any relationships of climate to history are of particular interest when reviewing the era of westward transatlantic European expansion and the resulting development of the Americas, especially in the colonial and antebellum periods of the Old South.

The principal means of transoceanic transportation until the decades following the War Between the States were sailing vessels. While the first steam-propelled vessels made transatlantic crossings in 1838, it was not until the 1870s that steam finally replaced the winds as the principal method of transoceanic propulsion.⁴

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¹Lorin Blodget, *Climatology of the United States and the Temperate Latitudes of the North American Continent* (Philadelphia: J.B. Lippincott & Co., 1857), pp. 17-28.

²Ellsworth Huntington, *Civilization and Climate* (New Haven, CT: Yale University Press, 1915).

³David Hackett Fischer, "Climate and History: Priorities for Research," *Journal of Interdisciplinary History* vol. X, no. 4 (Spring 1980), pp. 828.

⁴Robert G. Albion, *Rise of New York Port* (Newton Abbott, N.Y.: David & Charles, 1970), pp. 317ff.

Sailing vessels depended entirely upon terrestrial winds and the resultant wind-driven ocean currents for both propulsion and directional guidance. Moreover, such ships could sail safely over long distances only in above-freezing temperatures and relatively moderate winds. Hypothermia, a result of prolonged exposure to freezing temperatures, severely lowered a crew's physical capabilities; high winds seriously threatened the buoyancy of sailing vessels (often causing them to "sail under"); and both sails and riggings became unmanageable when coated with ice and frozen spray. Thus, in the days of sail, there were certain well-defined atmospheric limits within which transoceanic trade and communications could be effectively and profitably maintained.

In the late-Middle Ages, relatively moderate temperatures over the northern latitudes made it possible for Irish monks and Norse raiders and adventurers to sail and row their small, open boats in a counter-clockwise route. They traveled northwestward from the British Isles and the Scandinavian peninsula along the archipelago of North Atlantic islands to the northeastern coast of North America. Along the way they established colonies, particularly in Iceland and in Greenland (whose name was significant under the circumstances). Homeward bound, they were able to pick up the great northeasterly flow of winds and wind-driven ocean currents in the mid-latitudes, the entire rotational system now being identified by oceanographers as the Subpolar Semipermanent Lowpressure System, or, more simply, the Icelandic Low.⁵

During this period, now known as the Medieval Optimum, or the Age of the Vikings, the northern seas were full of fish and apparently free of ice during much of the year. Grasses and grains could be grown and animal husbandry practiced in some places as far north as the Arctic Circle.⁶

However, beginning in the thirteenth century, temperatures in the higher latitudes slowly began to drop, growing seasons gradually were foreshortened, the northern seas became clogged with ice floes, many of the colonies had to be abandoned, and even the vast schools of food fishes moved southward to warmer waters. In fact most northern peoples were forced to migrate southward as food became scarce and even fuel supplies were depleted.⁷

Thus, with the coming of the Little Ice Age, further westward exploration in the northern latitudes was of necessity diverted southward to the longer distances of the warmer lower latitudes.

⁵W.L. Donn, *Meteorology* (New York: McGraw-Hill, 1965), Figure 19.7, pp. 410ff.

⁶C.E.P. Brooks, *Climate Through the Ages* (New York: R.V. Coleman, 1926; repr. Mineola, NY: Dover Books, 1970), pp. 356-357; also S.H. Schneider and Randi Londer, *Coevolution of Climate and Life* (San Francisco: Sierra Books, 1981), pp. 111-119.

⁷Schneider and Londer, pp. 114-117.

Columbus was the first to discover not only how to reach the Americas across the warmer southern waters, but also how to get back to Europe itself, an even more momentous though less recognized discovery.⁸ In so doing, he inadvertently followed the high pressure clockwise rotating system of winds and wind-driven ocean currents now known as the Subtropical Semipermanent Highpressure System, or simply as the Azores High.

Thus, as the *Pilot Charts of the North Atlantic Ocean* show, there were (and are) two major counter-rotating systems of winds and wind-driven currents in the North Atlantic between the Equator and the Polar Ice Cap. Together they form a Figure 8 with a common northeast-flowing "River in the Sea" between them.⁹

The larger elliptical route in the mid- and lower-latitudes soon became the principal marine highway between the opposite coasts of the North Atlantic during the colonial period. It continued as such until temperatures again moderated in the north and the more northern latitudes again became navigable by sailing ships.

About 100 years after Columbus's voyages, the British were able to break the control of the Spanish fleet over the southwestern seaways. From then on, they sailed their slow, tublike square-rigged ships clockwise around this approximately 9,000-mile elliptical track, averaging about 100 miles per day in favorable weather.¹⁰ In general, they sailed from the British Isles southward along the northwest coasts of Africa, then due west to the Antilles before heading northwestward to make landfall along the mid-Atlantic coast of North America, where they founded their first colonies in the early 1600s.¹¹ This same general course was followed as late as 1957 when Captain Alan Villiers sailed *Mayflower II* from Plymouth, England, to Plymouth, Massachusetts.¹²

Largely because of its strategic location on the coast close to the main peripheral flow of this warmer rotational system, colonial Charleston, the gateway to the Old South, ultimately became the leading American port for

⁸Daniel J. Boorstin, *The Discoverers* (New York: Random House, 1983), p. 223.

⁹U.S. Defense Mapping Agency, Hydrographic/Topographic Office, *Pilot Charts of the North Atlantic Ocean* (Washington, D.C.: Department of Defense.

¹⁰Captain Alan Villiers, *Men, Ships, and the Sea* (Washington: National Geographic Society, 1962), pp. 143-153. Villiers describes his piloting *Mayflower II*, in 1957, from Plymouth, England, to Plymouth, Mass., over a 5,400 mile course in 53 days elapsed time.

¹¹Matthew Fontaine Maury, USN, *Influence Arising from the Discovery of the Gulf Stream on the Commerce of Charleston*, Proceedings of the Third Annual Meeting of the American Association for the Advancement of Science, March 1850.

¹²Villiers, *Give Me a Ship to Sail* (New York: Scribner, 1959), pp. 218-219.

transatlantic voyages.¹³ The more northern ports handled greater overall tonnages, but this was largely in intracoastal trade. In 1770, for instance, Philadelphia cleared 47,000 tons, Boston 38,000, Charleston 27,000, and New York 25,000; yet in that same year, London was the destination of 109 ships which left Charleston and of only 26 that departed from Philadelphia.¹⁴

Within the next sixty years, however, Charleston was completely eclipsed as the major transatlantic port by New York which, by the beginning of the War Between the States, handled greater tonnages of transatlantic shipments than all the other American ports combined. This diversion from the southern to the northern ports was described by Matthew Fontaine Maury, USN, in Charleston in 1850 when he read a paper titled, "On the Influence Arising from the Discovery of the Gulf Stream Upon the Commerce of Charleston."¹⁵ Lieutenant Maury, a Southerner who later became a Confederate commodore, was concerned about the alarming impact which this shift was having on the Old South in making it completely dependent on the northeastern shipping and financial interests for its very existence. He hoped somehow the trend could be reversed.

As Professor John Van Dusen has pointed out: "Dependence was the one word which characterized the South during the entire antebellum period. She was dependent on Wall Street for the capital necessary to furnish the advances on her cotton.... She was dependent on New York for her importations from Europe.... She was dependent on northern shipping lines to bring these supplies to her harbors and take the cotton away.... She was dependent on northern shipyards for such ships as were owned in the state."¹⁶

The data in Table I highlights a number of the resulting disparities in direct foreign trade:¹⁷

TABLE I:
COMPARATIVE DOLLAR BALANCES, 1831-1860
(IN MILLIONS OF DOLLARS)

	Northern Ports	Southern Ports	Differences	N/S
Exports	\$2,514	\$2,295	\$ 219	52%/48%
Imports	\$4,732	\$ 408	\$4,324	92%/8%

¹³Maury, pp. 18.

¹⁴Albion, pp. 4ff.; P.C. Coker III, *Charleston's Maritime Heritage, 1670-1865* (Charleston, S.C.: CokerCraft, 1987), p. 45; Converse D. Clowse, *Measuring Charleston's Overseas Commerce: Statistics from the Port's Naval Lists* (Washington, D.C.: University Press of America, Inc., 1981), Table C-11.

¹⁵Maury, 19.

¹⁶John G. Van Dusen, *Economic Bases of Disunion in South Carolina* (New York: Columbia University Press, 1928), pp. 328-329.

¹⁷Northern Ports: New York, Boston, Philadelphia, Baltimore. Southern Ports: Charleston, Savannah, Mobile, New Orleans. Albion, Apps. 2 & 3.

		Period 1860 only		
Exports	\$ 176	\$ 184	8	49%/51%
Imports	\$ 312	\$ 24	\$ 288	93%/7%

From the above data it will be noted that, in the period 1831-1860, direct shipments from the southern ports in terms of dollars almost equalled those of the northern ports while these same southern ports received only 8 percent of the total imports. In the year before the start of the Civil War, exports from the southern ports comprised 51 percent of the total exports, while these ports received only 7 percent of the imports.

Tonnages handled by the indicated ports add a further dimension:¹⁸

TABLE II:
COMPARATIVE TONNAGE BALANCES, 1831-1860
(IN THOUSANDS OF TONS)

	Northern Ports	Southern Ports	Differences	N/S
Exports	41,324	20,778	20,506	67%/33%
Imports	49,173	16,379	32,794	75%/25%
			Period 1860 only	
Exports	2,862	1,477	1,385	66%/34%
Imports	3,062	1,010	2,052	75%/25%

Upon comparing the above tabulations on a price-per-ton basis it will be noted that in the period 1831-1860 shipments clearing the northern ports averaged about \$61 per ton while those entering these ports averaged about \$96 per ton. The shipments clearing the southern ports averaged about \$110 per ton while those entering averaged about \$2.50 per ton. In other words, most of the transatlantic carriers entering the southern ports were apparently coming in under ballast based on the above tabulations and conclusions reached by Professor Van Dusen.¹⁹ This was particularly true for Savannah and Mobile. In the case of Charleston during the period 1831-1860, 3,387,000 tons cleared its harbor in transatlantic trade apparently valued at \$100 per ton while, in the same period, 2,372,000 tons entered the port valued at approximately \$16 per ton.²⁰

Lieutenant Maury must have overlooked the fact that temperatures in the northern latitudes apparently moderated to a point where sailing ships could again transit the long-abandoned shorter routes in the higher latitudes. In fact, this condition becomes evident by referring to the regular

¹⁸Northern Ports: New York, Boston, Philadelphia, Baltimore. Southern Ports: Charleston, Savannah, Mobile, New Orleans. Albion, Apps. 4 & 5.

¹⁹Van Dusen, pp. 199ff.

²⁰Albion, Apps. 1-5.

updating of the series of *Pilot Charts* which Maury himself initiated in the 1840s.²¹ Such rising temperatures must have pushed the ice cap farther north, opening up formerly clogged seas; reduced was the exposure to icing in the riggings as well as the threat of decimating chill factors, which had reduced the physical limits of the sailors who had to handle the rigging.

It will be remembered that the colonial ships followed the longer southern westbound routes not only because the weather was warmer, but because the ships found following winds and favorable ocean currents which propelled them around the entire elliptical track. On the eastbound legs, all vessels, both sail and, later, steam, continued to follow the old traditional northeastern routes of the Gulf Stream and the North Atlantic Drift. However in taking the new northern westbound routes, the square-riggers had to sail a substantial part against the prevailing westerly winds during much of the sailing year, as noted above. This demanded sailing at angles toward the winds, or tacking, westbound, which carried them well into the subpolar zones where freezing temperatures were often encountered, particularly when west of the influences of the North Atlantic Drift.²²

Thus it seems reasonable to conclude that in spite of the advances in navigational techniques westbound passages in the northern latitudes would have continued to be extremely hazardous if not impossible had it not been for the appearance of warming trends.²³ As a result of these moderating temperatures, the entire North Atlantic Basin became not only more navigable but more "habitable," a condition which continued for several decades thereafter.²⁴

The navigators of the transatlantic sailing ships were extremely sensitive to atmospheric changes since they depended entirely on the winds and temperatures for the progress of their ships. Regularly scheduled square-rigged packets were able to carry the constantly increasing volumes of westbound trade in minimum times and with maximum safety until replaced after the War Between the States when the operation of steamships became profitable. The speed of these packets can be seen in the logs of 4,160 sailing ships reported to have sailed westbound during the period 1821-1860. Not only can their general courses be plotted, but it may be assumed that they generally encountered open seas and navigable temperatures enroute. Robert G. Albion has summarized more than 4,000 voyages between the ports of Liverpool, Portsmouth, and Havre and the port of New

²¹See footnote 9 above.

²²Albion, *Square-Riggers on Schedule* (Princeton, N.J.: Princeton University Press, 1956), pp. 196ff.

²³H.H. Lamb, *Climate, History and the Modern World* (London: Methuen & Co., Ltd., 1982), Fig. 30, p. 76.

²⁴*Ibid.*, pp. 243ff.

York; the average trip was 36.1 days (Portsmouth), 36.3 days (Liverpool), and 37.7 days (Havre).²⁵ By contrast, in 1795 ships sailed from British ports to Charleston in about 60 days.²⁶

In addition to the disparities between exports and imports so apparent at the beginning of the War Between the States is the fact that of the twenty-five U.S. shipping lines operating regularly scheduled packets between American and European ports, twenty-two were located in northern ports, with seventeen of that number being located in New York.²⁷ Together with the thousands of intracoastal vessels either built or owned in the northern ports, by 1860 the northern interests had available a merchant marine of such potential force as to have forestalled any serious consideration of intervention on the parts of the best customers of the southern cotton producers.²⁸

For the northeastern shipping and financial interests, control of the northern transatlantic shipping lanes was a continuous source of additional investment capital. This capital not only allowed them to add to their marine transportation system, but became available to develop industrial resources by which to take over the European share of the domestic market for finished goods. In addition to the formal Federal tariffs, northeastern interests were able to erect a second "barrier" between southern producers of cotton and the European textile industry simply by their increased control of the toll gates. This informal "tariff," or add-on, obviously reduced the returns of southern investments in land and slaves, the margins being skimmed-off in the normal exchange routines. Some Southerners claimed that nearly half the returns on the cotton production of the Old South passed into northern hands; Van Dusen quotes a figure of 15-20 percent difference between possible direct trade with European markets and the then-current routing of trade through New York.²⁹

Whatever the real figures, there can be little question that the control of the northern transatlantic westbound pipeline secured for the northeastern interests a self-perpetuating source of capital funds, based on northern shares of the profits on southern cotton production. This, in turn, critically reduced the returns on the capital investments of the southern plantation system, as noted above.

In desperation, forceful separation from the North seemed to many Southerners to be the only available escape. However, there was little in secession itself which provided a cure for such inequities since the north-

²⁵Albion, p. 52.

²⁶Maury, pp. 18-19.

²⁷Carl C. Cutler, *Queens of the Western Ocean* (Annapolis, Md.: U.S. Naval Institute Press, 1961), app.

²⁸Ibid., pp. 359ff.

²⁹Van Dusen, pp. 191ff.

eastern interests had by that time already begun to improve the pipeline by introducing profitable transatlantic steamships, presumably with capital accrued back in the days of the sailing packets.

While Huntington in the early-twentieth century may have attempted to apply his arguments too broadly, thereby arousing extensive criticism and even ridicule, the series of changes now apparent in the behavior of the atmospheric masses over the North Atlantic Basin during the past millennium seem to lend substantive support to many of his arguments.³⁰ Though even today, while there are gaps in available records which make it impossible to present conclusive evidence in documenting such changes, the records show that events have occurred within a framework of atmospheric limits outside whose parameters such events would not have been possible. More specifically, it may be validly assumed, first, that certain specific changes in this atmospheric mantle brought to an end the Medieval Optimum and replaced it with the Little Ice Age. Second, it may be argued that later changes increasing the temperatures in the northern latitudes brought to an end the Little Ice Age which contributed in a major way to the northward diversion of the transatlantic traffic. With all due apologies for referencing the obvious, if a series of events took place which could not have happened in below-freezing weather, then it is reasonable to conclude that the weather at the time was not freezing.

Obviously the centers of the atmospheric mantle shift from time to time, in turn causing its internal zones to shift. These shifts may range from seasonal to semi-permanent as they reposition themselves. Just a few temperature degrees of change could make the difference between navigable and non-navigable sailing conditions.³¹

To many historians and even scientists in the past, the atmospheric behavior over an extensive area may have seemed to have been comparatively constant.³² As has been noted, this misconception is probably due to the fact that relatively small, long-term deviations have profound effects on the semipermanent shifts in the positioning of this overlaying mass and may be discerned only over extended periods of time. In large part, temperatures are functions of latitudes, based principally on the relative intensity of solar radiation.³³ However, the transparencies of the atmospheric filter, for example, and the albedo (or reflective power) of the surfaces below ultimately determine in large part the actual surface temperatures

³⁰Herman Flohn and Roberto Fantechi, *The Climate of Europe: Past Present, and Future* (Dordrecht: D. Reidel Publishing Co., 1984), Table 5.2, p. 204.

³¹See footnote 9 above; of special interest are the "Sea and Air Temperatures" inserts.

³²Blodget, pp. 481ff.

³³Donn, Fig. 19-7, p. 410.

and conditions at any time.³⁴ Changing positions of the earth in relation to the sun, volcanic eruptions, changes in the carbon dioxide content of the atmospheric mantle, or reorientations of heat-bearing ocean currents are examples of factors triggering temperature changes.³⁵

The atmospheric mantle converted the radiant energy of the sun to the masses of air and seas in motion, which were intercepted by the sails of ships, which, in turn, "hooked a ride" back and forth between Europe and North America across the North Atlantic Ocean. The centers of the overlying atmospheric masses in a more-or-less integrated system moved slowly with the varying intensities of solar radiation. The first change not only made the development of the direct trade between Europe and the North American colonies possible, but ultimately made Charleston the major gateway of transatlantic trade during the colonial period. The second change, a partial reversal of the first, made it possible for the northern ports, and particularly New York, to divert incoming European shipments through their tollgates.

Basically, then, this entire historical development was dependent on the propulsive energy imbedded in this atmospheric mass which provided the power required both to drive and guide the sailing vessels of the colonial and antebellum periods of history. The popularly recognized roots of the War Between the States, which destroyed the productive system of the Old South, were apparently of secondary importance as long as international trade was dependent on the winds and navigable seas in the higher latitudes.

³⁴Schneider and Londer, pp. 189-204.

³⁵*Ibid.*, pp. 222ff.

BOOK REVIEWS AND NOTES

Within the Plantation Household: Black and White Women of the Old South

By Elizabeth Fox-Genovese. Chapel Hill and London: University of North Carolina Press, 1988. Pp. xvii, 544. \$34.95 (cloth); \$12.95 (paper).

Within the Plantation Household combines analytical and narrative history, emphasizing the primacy of class alliance and race conflict over gender camaraderie. For Elizabeth Fox-Genovese, white women's positions in the North and the South encase different gender conventions, even "sibling rivalry." Northeastern womanhood was expressed through bourgeois domesticity, gender unity, and egalitarian struggle. Slaveholding women, in patriarchal male-centered households, maintained "militant defense of their class privileges" and "antagonistic" yet "dutiful" attitudes toward slaves. They revelled in passionate, selfless love for husbands, obsessive engrossment with children — giving birth at great physical risk — and boundless attachment to their peculiar "civilization." Rejecting the theme of black female autonomy and sisterhood previously claimed by historian Deborah Gray White, the author views slave women as accepting a paternalism which limited their culture, agency, and solidarity. White women and slave women willingly embraced male dominance as central to their own sense of self and security.

Fox-Genovese uses several vignettes to support her arguments. Sarah Gayle of Alabama, the subject of the Prologue, epitomizes southern female gentility. From journal entries the author surmises Gayle possessed "warmth, humor, intelligence, and love of her family, black and white." Her untimely death itself, from tetanus through poor dentistry, epitomized the self-sacrificing nature of these women.

Louisa Susanna McCord of South Carolina, the supreme embodiment of slaveholding womanhood, exemplified wealth, connections, anti-feminism, proslavery sentiments, and duty toward her "black and white family." McCord atypically received an excellent education, eschewed "belle" ambitions, wrote poetry and novels, penned opinions on free trade and hierarchical social systems (her own in particular), denounced women's rights, and attacked reformers from Harriet Beecher Stowe to Harriet Martineau. Her sometimes reactionary words, like declaring blacks sub-human, drew protests from the "jewel of the southern church," Rev. Dr. James Thornwell. Fox-Genovese views McCord's life and writings as demonstrative of how slaveholding women accepted "men" as the embodiment of female culture and experience.

The author's discussion of South Carolinian Mary Boykin Chesnut maintains that previous writers misinterpreted this important historical figure, largely because nuances in her diary were missed, while "pub-