

A Load of Guano: Baltimore and the Fertilizer Trade in the Nineteenth Century

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Pendant la première partie du 19ème siècle, les fermiers américains des états de la côte atlantique médiale et des régions marécageuses des états méridionaux expérimentaient avec des méthodes pour rajeunir les terres épuisés des plantations. Ceci a créé une demande pour l'importation de l'engrais connu sous le nom de guano, essentiellement la fiente d'oiseau, qui s'était accumulée durant des siècles sur de petites îles de la côte ouest de l'Amérique du Sud. Les négociants de Baltimore ont commencé à importer le guano péruvien dès 1832, et d'ici 1860, les importations se sont élevées à presque 100.000 tonnes annuellement. La politique péruvienne a interrompu l'approvisionnement, faisant entrer en lice le développement de sources alternatives, entre autres les Caraïbes. Les cargaisons malodorantes et quasi-toxiques de guano ont rendu difficiles et parfois mortelles les opérations d'extraction, de chargement et de déchargement de l'engrais pour les ouvriers et les équipages de navire.

Agricultural needs in the American South drove a worldwide search for fertilizer resources in the mid-nineteenth century. Tobacco, cultivated in the Chesapeake region since the seventeenth century, and cotton, which was intensely cultivated in the South during the first half of the nineteenth century, both drained the soil of nutrients. As pressure on the land increased, it became less feasible to allow fields to lie fallow for extended periods to recover from nutrient depletion. Societies organized for agricultural reform in the early nineteenth century began to promote the use of manure and other fertilizers for most crops, although agricultural opinion discouraged its use for tobacco because it imparted an unfavorable flavor to the leaf.

Bird guano from Peru first arrived in Baltimore in 1832 in two casks consigned to John A. Skinner, editor of the *American Farmer* who presumably was experimenting with this substance as part of his effort to promote the use of fertilizers.¹ Guano took hold more quickly in Britain and European markets than it did in America. An 1842 article in a Baltimore paper reported “a new kind of manure called ghano, [sic] brought

¹ Courtenay J. Whedbee, *The Port of Baltimore in the Making* (Baltimore: F. Bowie Smith & Son, 1953); Frank Henry, “The Plant-Food Capital of the Nation,” *Baltimore Sun* (11 July 1954), 11.

from the Chincha Islands, in the Pacific Ocean.”² Shortly afterward, Baltimore began the regular importation of guano in small quantities. These imports were distributed to farming areas around Maryland and the upper South, especially Virginia and North Carolina.

At first the guano was used in its raw form, but several firms, including those in Baltimore, began employing the guano as an ingredient in a mix or as processed fertilizer. A significant industry dedicated to the development, manufacture, and distribution of chemical fertilizers grew up in Baltimore, with bird guano and animal bone dust as principal ingredients.

Table 1: Guano Imports to the United States (in tons)

Origin	1850	1861
Peru	5,750	97,485
Other South America	5,850	
New Granada (Columbia, Ecuador)		2,738
Venezuela		1,980
Mexico		460
British West Indies	140	6,209
Danish West Indies		180
French West Indies		100
British Possessions in Africa		320
Sandwich Islands (Hawaii)		120
Other Pacific islands		2,610
Totals	11,740	112,202

Sources: *Commerce and Navigation*. Report of the Secretary of the Treasury for the year ending 30th June 1850 (Gideon & Co., 1851), 148; *Commerce and Navigation*. Report of the Secretary of the Treasury for the year ending 30th June 1861 (Washington: GPO, 1862), I:230,392.

Imports of guano to the United States rose from under 12,000 tons in 1850 to over 100,000 tons in 1861.³ As seen in table 1, most of that guano came from Peru (87 percent in 1861), and Baltimore was its largest port of entry. In 1853, Maryland passed a guano inspection law to ensure the quality of the product, a move that tended to divert some of the trade to other ports, particularly New York. Peru’s government monopoly on the guano trade, however, shifted that trade back to Baltimore firms by 1858 when a new firm acquired the charter to export guano to the United States.⁴ Baltimore would continue to lead New York in the import of guano for much of the nineteenth century, as shown in table 2.

² *Niles National Register* (4 June 1842) quoted in Maryland Historical Society MS 481, folder “Fertilizer.”

³ *Commerce and Navigation*. Report of the Secretary of the Treasury for the year ending 30th June 1850 (Gideon & Co., 1851), 148; *Commerce and Navigation*. Report of the Secretary of the Treasury for the year ending 30th June 1861 (Washington: GPO, 1862), I:230,392.

⁴ Whedbee, 55.

Table 2: Guano Imports in Baltimore and New York – (tons)

Port	1861	1897	1908
Baltimore	53,959	2,233	1,997
New York	47,979	25	683
Total U.S.	112,202	7,103	27,665

Sources: *Commerce and Navigation*. Report of the Secretary of the Treasury for the year ending 30th June 1861, II:134, 280; *Commerce and Navigation* 1894, 49; *Commerce and Navigation* 1897, 114; *Commerce and Navigation*, 1908, 368.

In the mid-nineteenth century, the greatest volume of imported guano came from the Chincha Islands, a small group of cliff-fringed rocky islands off the coast of Peru, where coastal pelicans had left deposits for centuries. It was both the most expensive and the most efficacious guano for fertilizer because of its high nitrogen content. The Chincha Islands, being more arid than other guano sources, kept the guano's nitrogen content from being leached out by rainwater. Deposits in wetter locations such as the Caribbean and off the coast of Africa had a lower nitrogen to phosphorus ratio.

The Peruvian firm F. Barreda y Hermano (and Brother) was formed in 1851 to obtain a charter from Peru's government to be the exclusive supplier of guano to the United States, and it remained in business during the 1850s when American consumption expanded significantly. The firm's principal was Felipe Barreda, who remained in Lima, Peru, while his younger brother Federico (1827-1883) represented the firm in the United States. Guano was consigned to Barreda, but remained the property of Peru until sold. Like other chartered Peruvian guano exporters who had exclusive charters to other foreign markets, Barreda made money not only on commissions, but on high-interest loans advanced to the Peruvian government that were paid off by the sale of guano.⁵

Barreda expanded the market for guano by printing up advertising brochures and by giving away fifty tons of guano, a few sacks at a time, to American farmers. His efforts succeeded in boosting U.S. imports of guano to about 61,000 tons annually by 1855.⁶

Based in Baltimore Barreda built a distribution network in the United States stretching from Boston to New Orleans. Some ships arriving from Peru went straight to a U.S. port such as New York, Charleston, or New Orleans for sales in regional markets, but most stopped first at Hampton Roads, just inside the mouth of the Chesapeake Bay. Curiously, although Barreda maintained offices in Baltimore, he did not need to bring most of the guano to that city for distribution. At Hampton Roads, his chartered captains received orders to proceed to another port according to market conditions.

⁵ Frederick Barreda Sherman, *From the Gaudalquivir to the Golden Gate by Way of Lima, Baltimore, New York, Newport, Washington, London, Paris, and Cuajiniqualapa. Being the Story of the Lives of Federico Luciano Barreda y Aguilar and Matilde Laverrierie y Barreda his Wife with Certain Information Concerning their Ancestors and their Descendants* (Mill Valley, Cal.: Hall and Smith Co., 1979), 20, 24-5.

⁶ Sherman, 27-28.

The Barreda enterprise was remarkably efficient at communicating between hemispheres. Every fifteen days the Peruvian partner sent Federico a shipping report, listing the name, tonnage, and destination of every guano-laden ship on its way, as well as the same data for ships loaded and awaiting clearance at Callao, or currently loading, or waiting to go to the islands.⁷ When it appeared that he would be inundated with coming cargoes, Barreda made additional trips to find buyers for his guano.⁸

Barreda had considerable troubles in Baltimore. His buyers saw him as a monopolist who charged inflated prices. Indeed, Maryland's 1853 guano inspection law may have been created as a response to Barreda's presence. Just a few months after his arrival in Baltimore, Barreda complained in a letter, "eight boats unloading and two boats loading while I struggle with these people who are the most tricky scoundrels in Christendom."⁹ In 1856, possibly because of regulatory pressures in Maryland, Barreda relocated his offices from Baltimore to New York.¹⁰

The guano supply was interrupted in late 1856 when an insurrection involving much of the Peruvian navy seized the Chincha Islands. The uprising was squashed, but in the confusion, the Peruvian government claimed that it had not received all it was due on guano contracts. It sent investigators to contracted guano traders in France, England, and the United States. When Barreda refused to open his books to the government investigator, his firm lost its contract in early 1858. Another Peruvian firm, Zaracondegui, succeeded Barreda for distribution to the United States, and this firm made Baltimore again the headquarters for the Peruvian guano trade.¹¹

As demand increased, additional sources of guano were sought and discovered, particularly in other parts of South America, the Caribbean, the Hawaiian Islands and other Pacific Islands, and off the coast of Africa. Captain Edward K. Cooper of the Baltimore barque *Abbotsford* discovered what he thought was guano on an uninhabited Caribbean island in 1856. One of Cooper's crew had died on the voyage, and he chose this island twenty-five miles south of Haiti to bury the man. In digging the grave, the crew found white powdery earth in their shovels, which they took to be guano. In a move ultimately backed by Congress, Cooper staked a claim to the group of four islands, naming the group the Guano Islands and the largest one Navassa Island.

The deposits on Navassa turned out to be not so much guano, but sulphate of lime, also useful as fertilizer. Although these deposits were discovered in 1856, extensive exploitation of this source did not take place until after the American Civil War. In response to this discovery, Congress passed the Guano Islands Act, allowing U.S. citizens

⁷ Shipping report, F. Barreda and Brother Papers (MS 2281), Maryland Historical Society; also Sherman, 37.

⁸ Letter of Federico Barreda to Matilde Laverrerie dated Baltimore 30 Aug. 1852, as translated in Sherman, 30.

⁹ Letter of Federico Barreda to Matilde Laverrerie dated Baltimore 30 Aug. 1852, as translated in Sherman, 29.

¹⁰ Sherman, 46.

¹¹ Sherman, 51, 55-6.

who discovered and peacefully occupied islands with guano deposits to claim them as U.S. possessions. The claim for Navassa Island was made in 1857 and was formally recognized by the United States in 1859.¹² Although Haiti disputed the claim and occupied the island in 1859, Cooper's possession was backed up by the U.S. Navy and a detachment of marines.¹³

Cooper was a partner in the Baltimore firm of R. W. L. Rasin, the first Baltimore firm to import guano from Caribbean sources. Rasin imported guano or guano-like deposits from Roncader Island, Cay Arenas, Morant Keys and Pedro Keys, in addition to Navassa Island, which does not seem to have been a significant source for this firm. Rasin experimented with a number of sources for fertilizer ingredients. In addition to guano, he introduced the use of ground bone and other slaughterhouse refuse for fertilizers.¹⁴ In 1864 R. W. L. Rasin sold his interests in Navassa Island to the Navassa Phosphate Company of New York, which was organized to pursue this business. Navassa Phosphate continued some of its operations in Baltimore with Rasin as its Baltimore agent.¹⁵

Caribbean and Mexican guano were imported in greater quantities in the 1870s as the Peruvian sources approached exhaustion. Although Peruvian guano was still considered superior because of its higher nitrogen content, as the last of it was scraped and blasted off the volcanic islands, the shipments came mixed with as much as 20 to 50 percent gravel.¹⁶

Guano was a cargo of last resort for captains and shipowners. The yellowish dust would cover every part of the ship during loading. The noxious odor of ammonia that was released by the guano during handling dried out noses and irritated eyes; crew who were working to place the cargo in the hold were often unable to remain in the hold for more than five minutes at a time. The cargo also presented a fire hazard. The only upside was that it killed rats and other vermin on the ship, but it was equally hard on the ship's cat.¹⁷

Conditions were worse still for the miners removing the guano deposits from the islands, particularly because of the abusive treatment they suffered. On the Peruvian guano islands, Chinese laborers were imported and coerced to mine. On Navassa Island in the Caribbean, black laborers were brought in, and conditions were no better for the blacks on Navassa than for the Chinese "coolie" laborers on the Chincha Islands.

The abusive treatment of laborers on Navassa Island and the Caribbean is illustrated by the log of the American barque *Albemarle*. *Albemarle* was a medium

¹² David P. Billington, Jr., "Note on the Legal History of Navassa Island," <http://members.aol.com/davidpb4/legal.html>.

¹³ George W. Howard, "R. W. L. Rasin & Co's Chemical Works," *The Monumental City, Its Past History and Present Resources* (Baltimore: J. D. Ehlers, 1873), 734.

¹⁴ Howard, 734.

¹⁵ Howard, 735.

¹⁶ *Baltimore Sun* (27 Aug. 1875).

¹⁷ Basil Lubbock, *The Nitrate Clippers* (Glasgow: Brown, Son & Ferguson, 1932), 5-6.

clipper, launched in 1878 from the Skinner and Sons shipyard in Baltimore for use in the coffee trade from Rio de Janeiro. She was an advanced ship for her day, with wire standing rigging, and she maintained a reputation for speed.¹⁸ Her first owners, merchants Whedbee and Dickinson of Baltimore, kept her employed in the coffee trade for twelve years.¹⁹ In 1890 she was sold to the Navassa Phosphate Company,²⁰ which sent her on successive voyages between Baltimore and Navassa, sometimes returning to Carteret, New Jersey instead of Baltimore, and also touching at other Caribbean ports.

In 1891, about a year after *Albemarle* came into the Navassa Phosphate Company's hands, her long-time master and part-owner Captain William H. Forbes took command. Forbes's log survives to show *Albemarle*'s activity in this period. For the next eight months *Albemarle* made three voyages to the Caribbean, each of them originating in Baltimore and each touching at Navassa. On each southbound trip, *Albemarle* carried ship's stores, provisions, and equipment for mining phosphate, as well as African American laborers; she returned with guano and phosphate. On one voyage, she carried coal southbound to Laguyra, the port for Caracas, Venezuela, but then sailed back to Navassa for her return cargo.

On the first voyage recorded in Forbes's log, *Albemarle* returned with a tragic cargo: the corpses of three men, white supervisors who were slain in a violent strike that had taken place on Navassa Island in 1889. The bodies were first interred on the island, and in 1891 returned to their families for burial. Also on this trip, 153 African-American laborers returned home to Maryland; 108 of them had been involved in the strike. Two of these men were kept in irons, and once during the voyage, on 26 June 1891, the captain felt sufficiently suspicious of his passengers that he set a double watch.²¹

The trouble on Navassa with a poorly-treated and restless labor force had festered until the workers rioted, killing several of their supervisors. Most of the laborers were from Maryland, where they had signed 15-month contracts to work for the Navassa Phosphate Company. They were paid \$8 per month plus food and housing. Following maritime practice, the pay was due at the end of the contract, but there were deductions for sickness at \$1 per day and punitive fines for various infractions. Food was rationed, but tobacco and canned food were offered at a company store at inflated prices, again charged against wages due to the laborer. By the end of the contract, the company might owe a worker no wages at all.²²

Housing was similarly poor, with unventilated rooms with no mattresses,

¹⁸ Howard I. Chappelle, *The National Watercraft Collection* (Washington: United States National Museum, 1960), 62-3.

¹⁹ *Boyd's Business Directory of Baltimore City, Arranged and Classified According to Business, 1876* (Washington: Wm. H. Boyd, 1876), 46; also directory for 1888.

²⁰ Certificate of Register for Bark *Albemarle* (2 Aug. 1890), National Archives, RG 41, official number file 105787.

²¹ Capt. William H. Forbes, log of bark *Albemarle*, ms, collection of Chesapeake Bay Maritime Museum, 1997.46.

²² Capt. Edgar K. Thompson, USN (ret.), "Navassa: A Forgotten Acquisition," *The American Neptune* XXVI:3 (July 1966), 174.

although again mattresses could be purchased at exorbitant prices. Added to these deplorable conditions was the cruelty of the supervisors, who punished recalcitrant workers by tricing them up by their wrists for up to six hours in the tropical sun. Complaints to the island superintendent were to no avail.²³

Finally on 14 September 1889, the workers rioted, killing four white supervisors and fatally injuring a fifth. Six days later a British warship HMS *Forward* arrived on the scene and removed the remaining whites, six of whom had survived, all residents of Baltimore.²⁴ Eighteen black laborers were charged with murder or accessory to murder, and they, along with witnesses, were brought back to Baltimore for a series of five highly publicized trials. George S. Key was charged with murder of James Mahon with a pistol; Caesar Fisher and Henry Jones (alias “Texas Shorty”) with the murder of Thomas Foster with an axe and a stone; Henry Jones with the murder of Joseph Fales with an axe; Edward Smith (alias “Devil”) with murdering Samuel Marsh with a stone; and Stephen Peters, Charles H. Smith, and Charles H. Davis with the murder of William T. Shea.²⁵ The juries sentenced three to death, but African-American churches successfully petitioned President Benjamin Harrison to commute the sentences to imprisonment.²⁶

Albemarle met her end in 1894 while still working for the Navassa Phosphate Company. She had just delivered another group of workers to Navassa, and was en route to Puerto Rico to deliver coal when its cargo caught fire and the vessel burned at sea. Navassa Phosphate Company continued operations in Baltimore and New York until the Spanish-American War. With its shipping operations interrupted by war, the company went bankrupt. The new owner of the company abandoned its claim to Navassa Island in about 1901, and since then, the island’s mineral resources have not been exploited.²⁷

The guano trade tapered off early in the century as other sources were developed for chemical fertilizers. Unlike some of the other island sources, Navassa’s supply was never exploited to exhaustion. A lighthouse built on the island in 1929 was abandoned by the U.S. Coast Guard in 1996. Today, the island is still claimed by the United States and administered by the Department of the Interior, which maintains it as a preserve and restricts visitation.

The fertilizer industry continued to thrive on the Chesapeake even after the guano trade dropped off, and by the turn of the twentieth century, Maryland’s leading position in the industry over rival New York was assured, as seen in table 3, which compares the number of establishments, work force, capital investment, and value of products from the fertilizer industry in these two states as represented in the federal manufacturing censuses of 1870, 1890, and 1900.

²³ Thompson, 172-4.

²⁴ *Baltimore American* (1 Oct. and 12 Oct. 1891).

²⁵ *The Navassa Island Riot* (Baltimore: The American Job Office, 1889), 6-7.

²⁶ Al Kamen, “Guardians of the Guano,” *Washington Post Magazine* (2 Aug. 1998), 3.

²⁷ Billington.

Table 3: Fertilizer Industry in Maryland and New York

Maryland	# establishments	# hands employed	capital \$	products \$
1870	15	126	438,800	632,352
1890	53	1,051	6,935,914	6,208,025
1900	40	1,016	7,003,376	5,481,905

New York	# establishments	# hands employed	capital \$	products \$
1870	11	168	213,900	289,011
1890	n/a			
1900	32	1,033	4,600,559	3,147,894

Sources: *The Statistics of the Wealth and Industry of the United States*, Ninth Census, vol. III (Washington: GPO, 1872), 434; *Manufactures, Part II: States and Territories*, Twelfth Census, vol. VIII (Washington: United States Census Office), 330, 550-1, 600-1, 764-5.

Today little fertilizer is shipped domestically by water in the Chesapeake region, though it is ever more critical to the region's agriculture. Trucks and highways have become the principal mode of transportation for this product, as with most other commodities. The fertilizer industry still thrives in the area, most of it marketed to the region's farms. Today Maryland has eleven fertilizer manufacturing plants, just two of which are in Baltimore, and sixteen additional fertilizer blending plants.²⁸ Most of these plants no longer front on navigable waterways, and little, if any, of their product moves by tug and barge, the modern successor to the schooner. Guano is no longer an ingredient in domestic chemical fertilizers, although chicken manure from Delmarva's plentiful chicken houses is used as a phosphate-rich source of fertilizer nutrients. Nevertheless, the fertilizer business, this root of modern agribusiness, started out as bird guano shipped from nearly halfway around the world to Atlantic ports, particularly on the Chesapeake.

²⁸ 2003 *Maryland/DC Manufacturing Directory* (Evanton, IL: Manufacturer's News, Inc., 2002), 404.