

# The Smithsonian, the US Navy, and Aquatic Avian Excrement

by Paul F. Johnston, Curator, National Museum of American History, Smithsonian Institution

A few years ago, an enormous package arrived at my office via the regular US Mail. Loosely wrapped in brown paper, it had no return address. Opening one end revealed a huge, musty leather-covered book, reminding me of a conversation a year or two before with the staff at the US Coast Guard Academy library. That repository had an enormous double elephant folio<sup>1</sup> atlas of forty early nineteenth-century sea charts, bound into a single volume dating to 1826. The charts were out of date and of little interest to the Academy library. Would we be interested in a transfer?

The Coast Guard had an old appraisal from the original 1979 gift, detailing the individual charts. The volume appeared to be complete, so I checked downstairs with the Dibner Library, the Smithsonian's rare book library specializing in pre-1840 scientific publications. They were interested, so I asked the Coast Guard to send it to us at their convenience. Nothing happened for some time, and I forgot about the transaction.

Its arrival reminded me of the earlier correspondence, so I took the book down to the Dibner, where we opened it more fully. A strong musty odor emerged, and the Dibner librarian was concerned that adding the volume to its stacks might transfer the mold to its other holdings. Next it went to our paper conservator, who determined that the mold was not active and could be removed. The volume spent the

next year in her lab, with two volunteers carefully rubbing ground-up pink eraser crumble over front and back surfaces of each blueback chart to clean it of the encrusted salt, stains, grime and inactive mold. It's comforting to know that the things we used and skills we learned in kindergarten are still relevant in today's world!

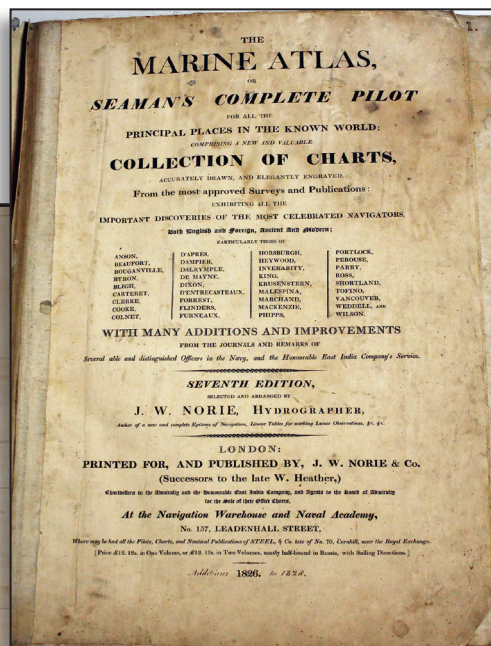
The last two charts in the book had the heaviest usage and wear, with fragments missing in the folds and gutters of the enormous pages. With some cleaning, handwriting was revealed on those same two

charts, which detailed the coasts of Peru and Brazil. The handwritten notes specified a few ship names, some longitudes and latitudes, and ownership of some islands by specific guano companies.

Figuring that tracking down the ships and the guano companies might lead to information about the original owner(s) of the *Atlas*, we started trying to decipher the handwriting. Immediately some ambiguities appeared, frustratingly in the ship names. Our conservator, meanwhile, had tracked down the bookbinder's ticket in

*The Marine Atlas's last two charts contain handwritten notes relating to the Peruvian and Pacific Island guano trade. Ship names and locations, along with other notes about activities and guano island ownership, suggest that the atlas belonged to a guano shipper.*

*(inset) Title page of the 1826 (seventh) edition of the Norie Marine Atlas. This is the world's only known copy in a public institution.*



MARINE ATLAS IMAGES COURTESY SMITHSONIAN'S DIBNER LIBRARY OF THE HISTORY OF SCIENCE AND TECHNOLOGY

<sup>1</sup> Double elephant folio refers to book size: elephant folio books are up to 23 inches tall; double elephant folio books are 50 inches or greater.

New York and dated it to ca. 1856 from the way the company name was specified. She also had tracked down the chart paper watermark, and ascertained that it was the same high-quality British paper used in the printing of Audobon's famous bird series.

At the same time, the Dibner librarian had conducted some research and discovered that this turned out to be the world's only known copy of hydrographer John Norie's *Marine Atlas* in a public institution! Single copies of Norie's charts in several editions were extant in various private repositories, but this seventh edition, dating to 1828, was the only known bound copy in public hands. Not only was the volume unique, its charts were absolutely gorgeous, representing the pinnacle of the chartmakers' craft in the early nineteenth century.

As the *Atlas* work under the paper lab's fume hood progressed, staff who'd seen it and the cleaning work in progress occasionally came by my office and commented on the beauty of the charts. Were we going to exhibit it? Many of the charts were stained and torn, and I didn't pay much attention to the sporadic interest. Then one day our senior designer stopped by after a visit to the paper lab and added his favorable review to the growing chorus. When an overworked designer appears and volunteers to design an exhibit around an object, it was clearly time for the next step. Who was John Norie? Why were his charts so fantastically and elaborately delineated, and was there enough background information and material for a dedicated exhibit?

### John William Norie

Starting in the late eighteenth century, John William Norie (1772–1843) worked in a London shop selling navigation books, supplies, nautical charts, and instruments. A hydrographer—or scientist of waterways—he taught navigation as early as 1797. In that same year his employer, William Heather, published the first *Marine Atlas*, a large bound volume of charts covering the world. Norie also published books on shipbuilding and practical navigation. When Heather died in 1812, Norie and a partner bought his business, renaming it J. W. Norie & Co. Among his prestigious clients were the British Admiralty and the East India Company, but his best custom-



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*John Norie taught navigation and sold navigation instruments in his shop. This octant is inscribed "NORIE LONDON" and is made of ebony, ivory and brass.*

ers were commercial sailors. Norie placed his own imprint on Heather's *Marine Atlas* chart plates and continued to update and publish them. Although Norie died in 1843, his influential book *Norie's Nautical Tables* remained in print as recently as 2007.

### Chincha Islands

Next we studied what had been written on the charts by hand by those who were using them. The part of the charts where the notes had been written focused on a group of islands off the coast of Peru. Beginning in the early 1840s, the three tiny Chincha Islands off the southern coast of Peru began international sales of their remarkable seabird guano as an almost miraculous fertilizer. What made the Chincha guano so valuable was its nitrate content, higher than any other natural substance known to mankind. The high concentration was caused by the islands' offshore location in the middle of the cool Humboldt Current bathing them from the north. This chilly, nutrient-rich current kept the Chinchas completely dry. It also filled the local waters with limitless quantities of sardine-like fish, which in turn fed the islands' pelicans, boobies and guanay cormorants. With the offshore isolation, absence of natural predators, and plenty of rich seafood, millennia of millions of seabirds had pooped on the

islands, and their guano had accumulated to a depth of up to 200 feet in places. The dry air had desiccated the guano and prevented the washing out of the nitrates that made the fertilizer so highly prized. Other tropical islands situated around the Equator in the Pacific and Atlantic Oceans also had lots of guano, but rains had washed out the nitrates.



DIVISION OF MEDICINE AND SCIENCE, SMITHSONIAN NATIONAL MUSEUM OF AMERICAN HISTORY

*Guano's properties were so respected that it was made into a homeopathic medicine for human consumption. It was suggested for use in 1854 for "violent headache as from a band around head. Itching of nostrils, back, thighs, genitals. Symptoms like hay-fever."*

German, French, British, and American ships began visiting the Chinchas for cargoes of guano from the early 1840s, and they also sought other guano islands in the remote Pacific and Atlantic islands that they could claim for their own. So valuable was the stuff, that in 1856 the United States passed the Guano Islands Act (48 US Code Chapter 8). In effect, this law stated that a US citizen could claim any guano island in the world as long as it wasn't claimed or occupied by anyone else. Any guano found thereon had to be sold at a low price to American citizens, and US land and naval

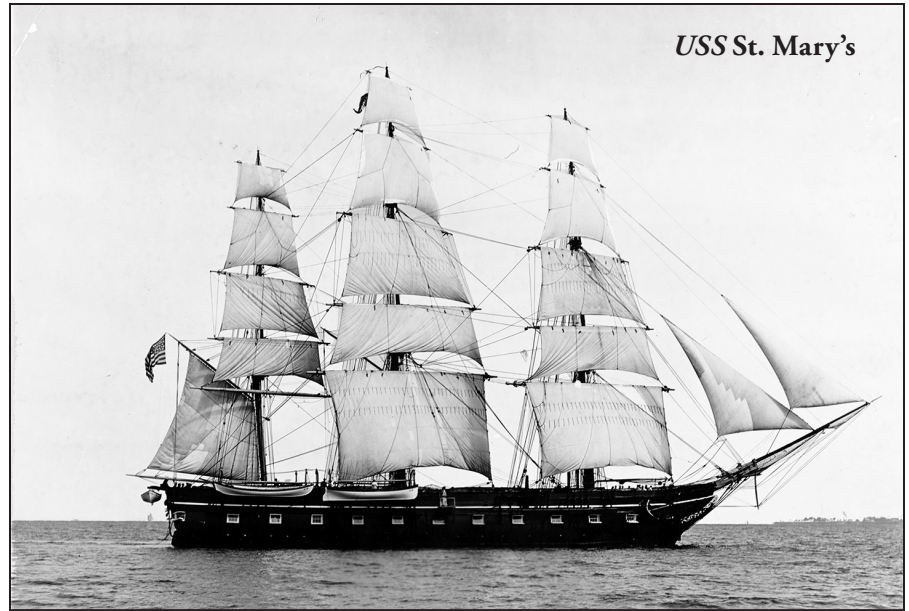
forces would protect their citizens' rights in this matter. In effect, our nation's first imperialistic claims to lands outside our continent were for bird poop. Or, as any properly erudite and credentialed authority might say, "aquatic avian excrement."

Claims began to pour in to the State Department, and suddenly the US Navy's Pacific Squadron had a new and quite impossible task: defending American citizens' claims to remote, tiny Pacific guano islands. Many of these claims were conflicting and were—or appeared to be—for the same islands. While defending US citizens' rights in August 1857, the 22-gun warship *USS St. Mary's* visited New Nantucket and Jarvis Islands in the remote Pacific. Her commander, Charles Davis, collected seventeen guano samples that were sent back to Washington, DC, for analysis.

And this is how the Smithsonian first became involved in the guano business, for the Navy contracted with the Smithsonian's first secretary, chemist Joseph Henry, to analyze the samples for fertilizer suitability. In late May 1857, Henry sent his analysis under a cover letter to Navy Secretary Isaac Toucey, together with the Smithsonian's invoice for \$350 for services rendered. Henry's letter synthesized his findings: "...the deposits submitted to examination do not possess the peculiar characteristics of Peruvian guano...and are not equal to it in value...they might be considered as valuable as bone dust, but not generally. They differ from the latter in being almost entirely deficient in nitrogenous matter, and therefore their importance for agricultural purposes depends upon their mineral ingredients...being the same as the inorganic matter of bones." In more modern language, as fertilizer the poop from these islands was crap, because the nitrates had dissolved out due to the regional rain.

By the late 1850s, foreign ships visiting the Chincha islands were waiting up to eight months for their turn to load the precious guano. Some of the most famous American clipper ships, including *Great Republic*, *Challenger*, *King Philip*, *Red Jacket*, and their ilk, made guano trips to the Chinchas to avoid deadheading back to the East Coast after dropping off California Gold Rush prospectors.

Once a ship arrived at the Chinchas, she'd anchor offshore to stay off the steep



*In August 1857, the twenty-two-gun warship USS St. Mary's, under Commander Charles Davis, visited New Nantucket and Jarvis islands in the remote Pacific Ocean. The ship collected guano samples that were sent back to the Smithsonian for analysis.*

cliffs. At the height of the trade, ships waiting offshore would have boxing matches, rowing races, and other diversions to pass the time until their turn. One American ship captain died while awaiting his cargo, and his body was packed in a barrel of guano to preserve it until his ship sailed home to New England.

Chinese miners pickaxed the acrid stuff from "The Great Heap" and used carts

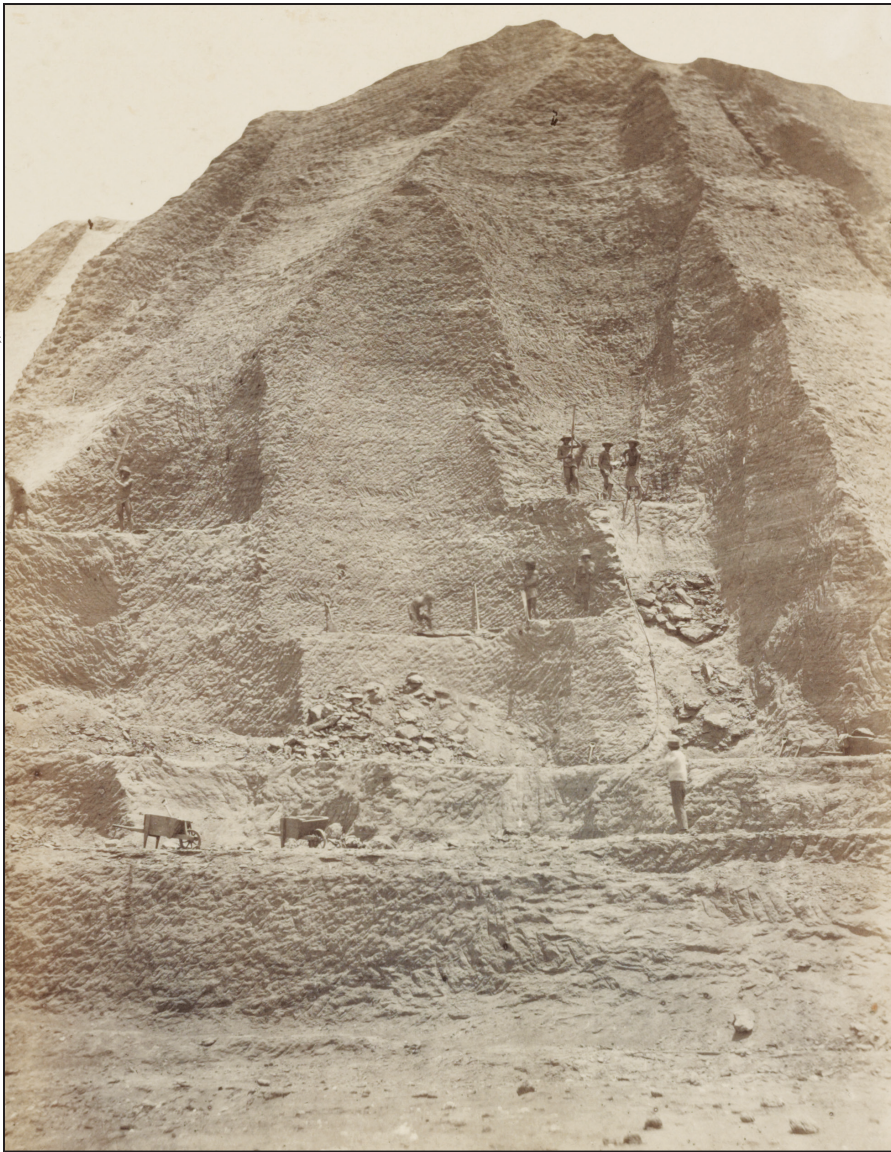
on tracks to get it to the water's edge. There it went down a "shoot" (sic) to a lighter below, which rowed it out to the anchorage where a ship had offloaded its ballast. Suicide among the impressed Chinese miners was not uncommon, accomplished by throwing themselves over the high cliffs to the sea-whipped rocks below; some 90,000 Chinese were said to have mined the Chincha Islands.



*Ships waited as long as eight months at the Chincha Islands for a cargo of the world's richest guano fertilizer. Boat races and other athletic contests passed the long idle days. Once their turn arrived, crews sealed off their ship's living quarters with sailcloth and climbed aloft to avoid the noxious dust arising from the filling holds.*

NAVAL HISTORY AND HERITAGE COMMAND

PUBLISHED IN RAYS OF SUNLIGHT FROM SOUTH AMERICA BY ALEXANDER GARDNER (1865)



*Indentured Chinese workers pickaxed the guano from the “Great Heap,” put it in wheeled carts, rolled the carts to the cliff edge and dumped the guano down a “shoot” (chute) to the lighters waiting below.*

The shifts for offloading the lighters into the ship holds were limited to 20-minutes to avoid poisoning and/or asphyxiation, and the loaders could emerge from the ship holds bleeding from every orifice in their heads. The off-duty crew would use sailcloth to cover the ship’s living quarters and any other cargoes, and then climb the masts to their highest points to avoid breathing in the billowing clouds of ammoniac guano entering the holds. Often the loading crews competed to see which could load their ship the fastest.

Despite the dirty work and polluted air, the miners found ways to create beauty in the task, as seen by the bottles of

guano art they produced and sold to the foreign seamen as souvenirs. In this rare art form resembling sand art, different colored ground-up guano grains were poured into bottles with remarkably intricate and detailed scenes and designs. The Penobscot Marine Museum in Searsport, Maine, has

*(right) Believed to have been made by Chinese miners from different-colored seabird guano, this intricate example of guano art in a bottle commemorates an early 1880s visit by the Searsport, Maine, ship Henrietta for a cargo of Chincha Islands guano. By the time of its single voyage to Peru, the islands were almost mined out.*

a beautiful example of the genre, commemorating a Chincha Island visit by the Searsport ship *Henrietta* in 1880. It was such an incongruous artifact of the grisly trade that the question arose as to how they knew it was guano and not sand art. It turned out that the ship’s logbook recorded the 1880 Chincha Islands visit and the family of *Henrietta*’s captain had kept the bottle ever since! How many other museums have examples of this unique art form lacking strong provenance, and thus probably identified as sand art? There’s an almost identical example at the Museum of the Atlantic in Halifax, Nova Scotia.

The Smithsonian’s second secretary, Spencer Baird, also was involved with the guano trade, but from a different side. As a naturalist and commissioner of the US Fish Commission working out of the port of Woods Hole, Massachusetts, Baird became acquainted with the Pacific Guano Company in the same town. With diminishing and very remote quantities of seabird guano available by the 1870s, the PGC had come up with the idea of eliminating the middleman in the production of fertilizer. After all, what was guano, but anchovies

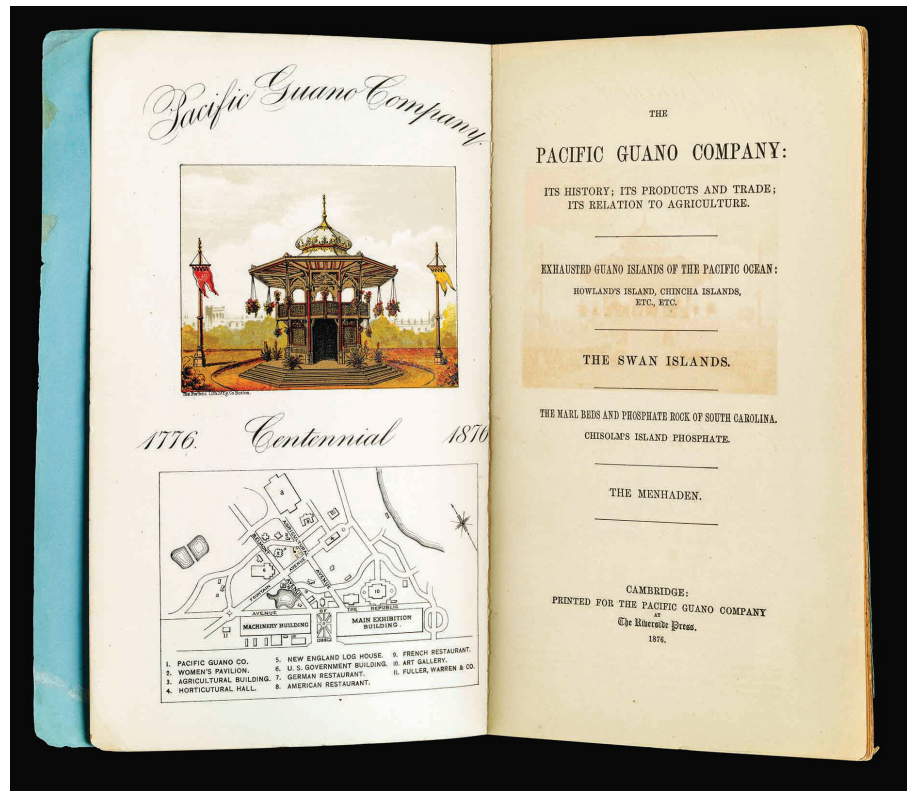


processed by seabirds? Bypass the birds and the Pacific Ocean distances, catch the abundant East Coast menhaden, and grind it into fertilizer meal, maybe blend in a little guano for authenticity. Once the PGC figured out how to remove the oil from the menhaden meal, its fertilizer was deemed pretty good. In 1875, Secretary Baird recommended that they display their wares at the 1876 Philadelphia Centennial. The only known sample of nineteenth-century guano is a fist-sized chunk at the Woods Hole Historical Museum from Swan Island, a possession of the PGC.

By 1880, the known stock of rich, natural seabird guano had been mined out pretty much worldwide. Around the same time, however, large nitrate and phosphate deposits were discovered on the mainland, and some of the earliest were in Peru and Chile, which already had the infrastructure for mining and distributing guano fertilizer. Moreover, these terrestrial mines could blend their stocks to match different soils, yielding the first synthetic fertilizers. Soon, more deposits were found all over; some, like those in the vicinity of Charlestown, South Carolina, remain active today. Thus, the transition from natural to synthetic fertilizers was relatively seamless, which is why we don't learn about it today. Although "guano wars" were fought in South America between Chile and Peru, they didn't interrupt the flow of nitrate-rich fertilizer; that's why guano isn't found in our history books.

Over the course of time, some 200 islands in the Atlantic and Pacific were claimed for their seabird guano by various interests, but of course they were impossible to track when claims might take six months or longer to get back to Washington, DC. Claim jumping was common, and some claimants would simply discard any evidence of prior claims on a remote island, load a cargo of guano, and plant their own claims. Who was out there to stop them?

Navigational precision was lacking in the nineteenth century, and many of the small bird-inhabited islands in the remote regions of the globe's waters were hard to pinpoint by longitude and latitude. The US Navy lacked the resources to verify, track, and maintain dozens of American claims, and the Civil War and other priorities drew



COURTESY WOODS HOLE HISTORICAL MUSEUM

(above) The Smithsonian's Spencer Baird convinced the Pacific Guano Company of Woods Hole, Massachusetts, to erect a pavilion at the Centennial Exposition in 1876.

(left) This rare sample of unprocessed 19th century guano is from the Pacific Guano Company's Swan Island, in the northwest Caribbean off Honduras. Guano islands were discovered worldwide, but Chincha Islands guano had the highest nitrate content.

them away from the task. Many distant isles were claimed, some by multiple owners, and corporations were formed to mine the extract. Some had elaborate bylaws, fancy printed prospectuses, and annual reports. But the smart operators sold their guano island rights before ever even mining the remote island stuff, in an early sort of get-rich-quick Ponzi scheme. Most just vanished without extracting or shipping much—if any—actual guano.

By the late nineteenth century, the world had ample supplies of synthetic fertilizer, so the whole messy industry died a quick, quiet, and agriculturally painless death. But, before this time, every level of American society had been involved—from Congress, the Smithsonian, and the US Navy, to the fast clipper ship captains and the farmers fertilizing their tobacco fields.

The United States still retains nine of the old guano islands, and the Fish & Wildlife Service maintains our sovereignty through occasional visits. And so ended our nation's earliest efforts at imperialism in the purest sense—in a cloud of countless squawking seabirds whose habitats once again are empty of any natural enemies or predators. Today, the government of Peru practices crop rotation around the three Chincha Islands to sustain the guano industry on a very small scale. Today, you can buy Peruvian seabird guano on Amazon.com, and it still has a very high nitrate content. †

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