

Saltworks

by Jennifer Stone Gaines and John York

In Colonial days, a large quantity of salt was absolutely essential to life in New England, both for food preservation and for income. One of the best ways to preserve fish and meat was to salt it. To preserve cod, the fish were gutted, beheaded, and put into wooden barrels, layered with salt – almost as much salt as fish. The fish sat in the barrels for a week to ten days while the salt pulled moisture out of the fish. The barrels were then opened, the brine dumped out, and then the fish put back into the barrels, layered with fresh salt. After several more days, the brine was dumped out and the fish were spread on racks to dry in the sun. When thoroughly dry, the fish were put into clean dry barrels, ready for export.

In the earliest years of the New England colonies, salt was imported either from Liverpool, where naturally occurring brine was pumped out of mines and evaporated by heating it over wood fires, or from the Mediterranean where salt water was evaporated by the sun in shallow ponds walled off from the sea or carved out of the rocky shore. Mediterranean salt was superior, but was not commonly used in the British colonies due to British wars with France and Spain. Also at this time, Britain had signed treaties with Portugal giving British ships rights to harvest salt from the coastal ponds of the Cape Verde Islands. Lack of plentiful high quality salt limited the growth of New

England fisheries until the end of the 1600s when the development of Mediterranean style salt works in the British Caribbean islands made high quality salt available to all the British colonies. Salt became a common return cargo for vessels carrying New England exports, primarily timber and salt fish, to the Caribbean colonies.

This arrangement worked well until the American colonies began to chafe under British restrictions. The British government imposed not only the infamous tax on tea, but also a salt tax. Since salt was critical to the livelihood of the Massachusetts colony both for food and for one of the most important exports, salt fish, the tax hit the colonists hard.

After the Revolution broke out, the waters of both Buzzards Bay and Vineyard Sound were patrolled by British vessels enforcing an embargo on all shipping in the renegade colonies, seizing any boats they could catch, and often keeping their crew and cargo. The residents could no longer get salt, or any other goods, from afar. With the embargo on imported salt, residents of Cape Cod were hard pressed to provide themselves with adequate food, especially during the long winters. Nor could they produce salted fish, their main export and main source of income.



Saltworks Plaque by Sarah Peters. Photograph by Jacki Forbes.

Old Saltworks

Comments by Sarah Peters

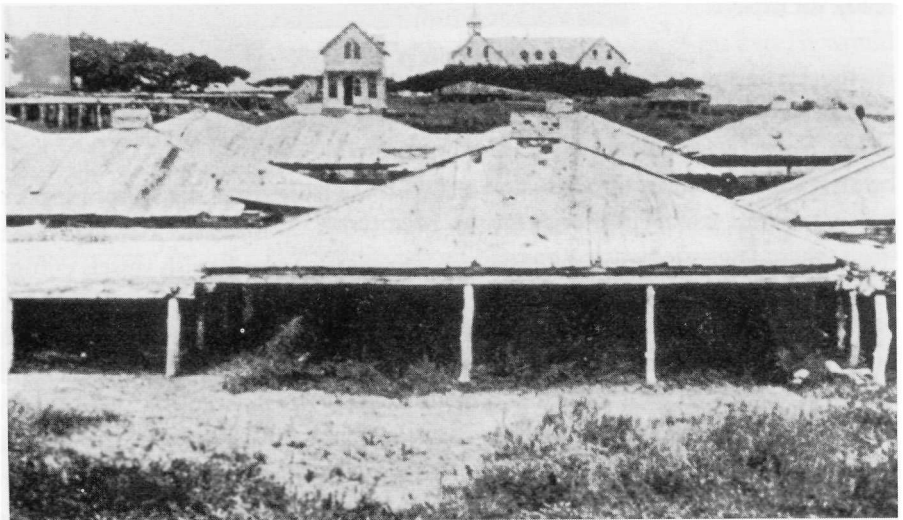
This is one of the first two plaques I made, when I was still learning the ins and outs of bas relief. When it was nearly complete, I made my first silicon mold which never cured. I had to start over. I learned the hard way that you never use silicon mold material on a sulfur based modeling clay. Now I carve and model wax, and make my molds out of polyurethane.

The figure in this plaque resembles my father. I confess using a little artistic license by having him pour some granular salt into his hand. The salt would most likely have been in large crystallized chunks in the barrels beside him, ready to load onto ships.

So concerned was the Continental Congress with the young nation's lack of salt, that in 1776 they provided a bounty: for producing one bushel of salt, a person was awarded 1/3 of a dollar. Later this bounty was paid by the individual state. The colonies first responded by boiling sea water, but since it took almost 400 gallons of sea water and two cords of firewood to produce one bushel of salt, this was hardly cost-effective. The new government printed a treatise on salt-making to encourage men to start a local salt making industry. To develop a process that would produce a sufficient quantity and quality of salt here in New England was a serious challenge. The men of Cape Cod heeded the call. Using

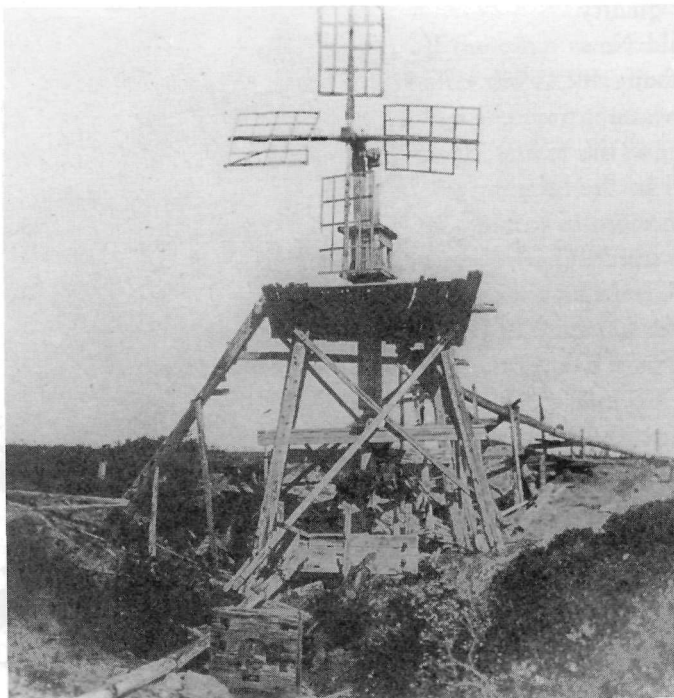
legendary Yankee ingenuity, they developed a unique method of making salt on their own shores, using sea water, sun and wind, all naturally occurring resources in great supply here.

The design for the saltworks which became so successful on Cape Cod is attributed to Captain John Sears of East Dennis, commonly known as "Sleepy John" for his habit of staring unfocused into the distance thinking his great thoughts, which in this case, was the design of an efficient saltworks. His first attempt, called "Sears' Folly" by skeptical neighbors, was a shallow wooden vat, 10' x 100', filled with sea water by manual labor and a bucket. This produced only eight bushels of salt in its first season. Over the winter he applied his skills as a boat-builder and caulked all the seams of the vat. This made a much more effective evaporating tank. In the summer of 1777 he produced thirty bushels of salt. In 1778, after a British man-of-war sank while trying to round the Cape, Sears put a salvaged bilge pump to work pulling sea water up into the vat.



Old saltworks along the shore of Deacon's Pond ca. 1871. Hotel and cottages of the new Falmouth Heights resort in background. From *The Book of Falmouth*.

Sleepy John's cousin, Reuben Sears, a carpenter and a collaborator from the start of the project, developed a rolling roof to cover the vats from rain and roll open to allow evaporation in good weather. The roofs were also closed at night to keep out dew. Hattil Kelly developed an alternative roof design with two roofs which pivoted on a central post to open or close two vats at once. At the suggestion of Nathaniel Freeman, another cousin, and a neighbor of Sleepy John, a windmill was added to pump the sea water, eliminating much of the manual labor. One "pump mill" supplied enough sea water for 20,000 square feet of evaporating vats. Wooden pipes, to carry the water from the windmill to the vat were made from pine or cedar logs 10 to 12 inches in diameter which were bored out through the center.



Typical saltworks "pump mill" which dotted the shoreline of Falmouth in 1800. Courtesy of Brewster Historical Society.

By the end of the 1790s, "Sears' Folly" had become a remarkably efficient works producing a large quantity of high quality salt. Quivet Neck in East Dennis and the nearby beach-front in Brewster became the heart of the rapidly growing industry. "Sleepy John" was now called "Salt John, the inventor of the salt works" (as is also testified on his gravestone).

The operation of the saltworks unique to Cape Cod involved a three stage evaporation process. In the first stage sea water was pumped up into a long vat or long row of square vats called the "water room" where it was allowed to evaporate. This stage was also called the "vegetable room" because of all the seaweed and

slime which grew in the vats as the water evaporated. When the brine had become salty enough to prevent any further growth of marine life, it was drained to a slightly lower row of vats called the "lime room." In this stage calcium salts (lime and gypsum) would precipitate out onto the floor of the vats. When the brine had become concentrated enough to begin to form crystals of edible salt, sodium chloride, it was drained to the third lowest row of vats called the "salt room," where the

pure white crystals grew and were harvested.

The whole process, from sea water to sea salt, or "common salt" as it was known then, took from three to six weeks. Three hundred and fifty gallons of salty Cape Cod sea water were required to produce one bushel (about 80 lbs.) of salt. The salt making season ran from March to October. In one season, a

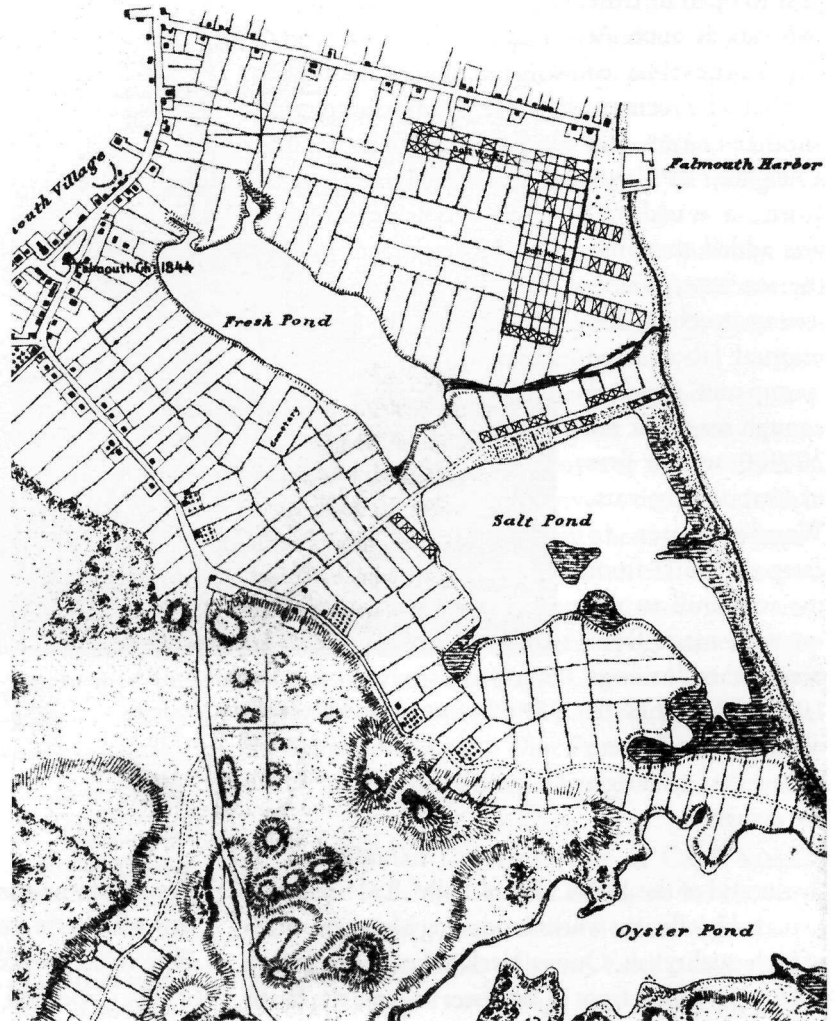
normal sized saltworks yielded about two hundred and fifty bushels of salt.

When the brine became too cold, crystals of Glauber salt (sodium sulphate) would form instead of the desired common salt. This difficulty was turned to great advantage by the clever Yankees who were able to produce high quality Glauber salt in the cold New England winter. Glauber salt was used then to make washing soda (sodium carbonate), in the tanning of leather, and in the dyeing of cloth. No other producers could compete with the quality or quantity of Glauber salt produced on Cape Cod.

After the summer salt making season, the vats were filled with sea water which would slowly evaporate during the months of November and December. When the brine had reached sufficient strength, the roofs were closed to prevent further evaporation. On the coldest mornings in January and February, the salters would return to the works to harvest Glauber salt from the super cold brine.

After the harvest of salt, there remained a small quantity of very thick, heavy brine. This brine had lost its salty taste because the sodium and calcium salts had already been removed, but it was a highly concentrated soup of the other minerals in sea water. This

brine was called “bitter water” or “bittern” because of the remaining magnesium salts. The Mediterranean and Caribbean salters would throw out the bittern, but Cape Codders figured out a way to make a useful product of it, and thus make a profit.



Saltworks are marked with an “X” in this US Coastal Survey map from 1845 showing the south coast between Falmouth’s Old Stone Harbor at the end of Shore Street and Oyster Pond. Sider’s Pond was once known as Fresh Pond. Courtesy WHHM.

Based on their success in making Glauber salt, they saved the bittern in barrels and developed methods to extract Epsom salt (magnesium sulfate) by chilling the bittern. They also produced magnesia (magnesium carbonate) by a complicated process that required boiling the bittern with pearl ash (potassium carbonate, derived from wood ash).

By 1800 saltworks dotted Cape Cod's shoreline. After the Revolution the government imposed tariffs on imported salt, furthering the domestic trade. The Continental Congress's attempts to jump start a salt making industry had proved a great success. Cape Cod became the salt basket of the new nation.

The huge hurricane of 1815, bigger even than the hurricane of 1938, destroyed many of the saltworks. But there was so much money in the business that most were rebuilt. The Cape Cod salt industry continued to grow until it reached its peak between 1830 and 1840. An observer said, "Almost every piece of level ground on Cape Cod within pumping distance of the ocean had a saltworks on it." However, a Senate report reviewing the status of salt making in the United States said that "There is room for further expansion of the industry at this region (Cape Cod)."

In 1831, on Falmouth's 67 miles of coast, there were over 1,800,000 square feet of saltworks. This was approximately 9,000 square vats. There were saltworks on stilts above the marsh of Deacon's Pond (which was later dredged to become Falmouth Inner Harbor), all along what is now Surf Drive, on the shores of Little Harbor and Great Harbor in Woods Hole, above Quissett Harbor, all along the shores of West Falmouth Harbor. Almost certainly there were saltworks along the shores of North Falmouth and East Falmouth. In 1837 Falmouth had 42 establishments producing over 24,000 bushels of salt annually.

Salt was one of the many cargoes carried on the coastal schooners and sloops that sailed out of the harbors of Waquoit, Woods Hole, Quissett, and West Falmouth. Falmouth had a particular advantage in the salt trade because it was a very short sail to New Bedford and Nantucket where salt was in great demand to provision whaleships for their multi-year voyages.

Salt making was so important to the whole community that when rain threatened school was dismissed and all the children ran to help roll roofs over the vats. The air filled with a rumble rivaling the coming thunder. In some places there were as many as one thousand squares covering five acres of land which had to be covered quickly to save the salt. The children were reputed to be happy to assist!

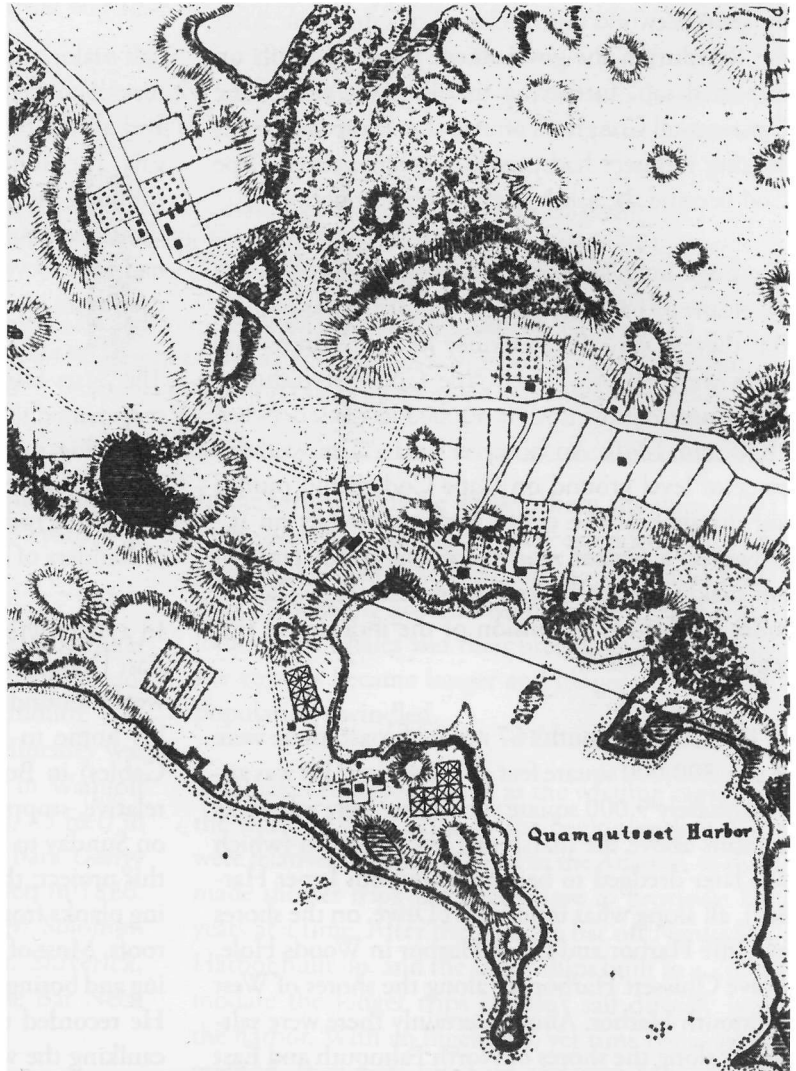
The Sears family and their neighbors and cousins maintained the greatest know-how for building and operating saltworks. Their own saltworks were as profitable as any on Cape Cod. The skilled carpenters and young men of East Dennis were in great demand as builders of saltworks all over the Cape.

In a diary written in 1823 by Samuel Chapman of East Dennis, he records building and repairing saltworks around the Cape. He walked two days from his home to Monument Neck (now called Gray Gables) in Bourne to build a new saltworks for a relative, stopping along the way in West Barnstable on Sunday to hear a preacher. Four men worked on this project; they spent their first month hand-sawing planks from pine logs to be used for the vats and roofs. Most of the second month was spent de-barking and boring out more pine logs for the water pipes. He recorded that they spent Friday, July 4, 1823, caulking the vats, filling the first string of vats with sea water, then "at 4:00 we gave a heap of oysters a little bit of a touch. At sunset, knocked off and call

it Independence Day.” The next day they continued the work on the vats, and on Sunday went to church three times. On Monday, in their first real break from work, they rowed a skiff across the Bay “to spy on the town of Wareham” and returned to Back River to go huckleberrying and to visit “Uncle Caleb’s house.” It took the four men five months to build the saltworks of 23,000 square feet, probably about 100 square vats. During that time, Chapman did take time off to walk home to Quivet Neck in Dennis for a one week visit. Upon completion of the salt work, he also spent two weeks in Falmouth where he stayed at “Uncle Stephen and Aunt Celia’s” [probably Stephen and Celia Nye of North Falmouth] and did “every sort of work that can be done about salt works” in the town of Falmouth.

In 1837, Cape Cod still had 658 saltworks operating, producing 26,000 tons per year. But the discovery of salt deposits in upstate New York and the opening of the Erie Canal marked the beginning of the end, as the inland salt was easily and cheaply available to the major East coast markets. However, the Cape Cod saltworks remained profitable for another forty years. Falling salt prices should have been the death knell for Cape Cod salt making, but the production of Glauber salt and magnesia, which were coming into greater demand as the Industrial Revolution took hold in this country, kept Falmouth going. (Glauber salt was used for

washing, dyeing, and sizing in the textile industry. Magnesia was used to make a high temperature firebrick used in iron and steel furnaces.) The final blow to the Cape Cod saltworks was the development of refrigeration to preserve food and of modern steam-powered evaporation plants to extract magnesium and other minerals from sea water.



Saltworks are marked with an “X” in this U.S. Coastal Survey map from 1845 showing the Quissett (then called Quamquiset) Harbor. Courtesy WHHM.

The last operating saltworks in Falmouth was on the shore of Deacon's Pond, extending up the slope to Falmouth Heights. Its sale in 1871 to developers who built a resort hotel and summer community on the site marks the end of one era and the beginning of another in the story of business and industry on Cape Cod.

Today there is nothing left of this salt making industry which flourished on our shores for more than sixty-five years but a few fuzzy salt-encrusted beams in a few very old houses. Occasionally after a big storm, a wooden pipe may be exposed at extreme low tide off Surf Drive, ready to thrill the viewer who can look at that single piece of wood and see two hundred years back into our past.



Wooden pipe on beach on Surf Drive exposed at extremely low tide, a last remnant of the salt-making industry in Falmouth. Photograph by John Valois.