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MAKING FRESH WATER BY DISTILLING SEA WATER IN 1792. EXPERIMENTS OF CAPTAIN JOHN FOSTER WILLIAMS, U. S. R. C. S.

BY REAR ADMIRAL ELLIOT SNOW (C. C.), U. S. N.

Reference: The American Museum or *Universal Magazine*, 1792 Part 1. Jany. to June. Princeton University Library 0901-164.

At a meeting of the Boston Marine Society held on the first of May, 1792,* John Foster Williams, Commander of the U. S. Revenue Cutter *Massachusetts*, communicated sundry experiments made by himself for the purpose of extracting fresh water from salt. This communication was accompanied with a plan of the apparatus† which he used while on a recent cruise also with

* From record attested by John Molineux, Secretary, addressed to Captain Mungo Mackay, President.

† A fruitless attempt to locate this sketch in the files of the Boston Marine Society was made early in the year 1928.

samples of water produced with it, which samples were found to be pure and were highly approved.

This record places the Revenue Cutter Service (U. S. Coast Guard) in the fore rank of having the credit for devising and using distilling apparatus at sea.

Upon the conclusion of the sitting a vote of thanks was given to Captain Williams, and the Society directed that his communication be printed in the *Columbian Centinel* and *Massachusetts Magazine* for the advantage of "our sea faring brethren."

It ran thus :

FRESH WATER FROM THE SEA

BY

JOHN FOSTER WILLIAMS

"To the President and Members of the Marine Society:

I enclose you the result of several experiments for the purpose of extracting fresh water from salt, made by me during the cruise of the Revenue Cutter.

You will observe that the apparatus made use of are such as are generally on board vessels at sea. I have also sent you samples of the water thus extracted, which I hope will not only meet the approbation of the Society, but prove of advantage to our sea faring brethren, in general, who may be so unfortunate as to be short of water when at sea.

I am, sirs, your humble servant

Boston,
May, 1792.

JOHN FOSTER WILLIAMS."

The first experiment to distill fresh water from salt conducted on March 6, 1792, is described as follows :

"I put four quarts of salt water in a sauce pan in the cabin stove; in fifty-five minutes I got from it near two quarts of good fresh water; one quart of water left in the sauce pan, the rest was lost. The *machine* made use of was a tin crane* with a barrel or cooler made to it of the same (material?) containing about three quarts with a hole in the top and bottom to put the cold water in.

* A siphon or bent pipe used for drawing liquid from a cask.

I let it out occasionally as it heats. I found that the barrel was not large enough to keep the tube cold. I then put five gallons of salt water in an iron pot — made the pot lid tight by putting some old canvas round it — made a hole in the middle (of the cover) with a hollow plug to receive the crane. I got from it two quarts of good fresh water in one hour and a half; but finding that my cooler was not large enough to keep the crane cool I left off for the time.”

* * * * *

“ April 11th — put in an iron pot 27 quarts of salt water and got from it

Of good fresh water.....	22 quarts
Left in pot.....	1 quart
Lost in seven hours.....	4 quarts
<hr/>	
Total	27 quarts

The *machine** made use of here is as follows, viz., I took a hand pump and sawed it angle-wise and when put together it formed a crane; a gun barrel ran through a half barrel tub of water, with the end of it fixed to the crane — the pot-lid fixed with old canvas tacked around it, and made to fit very tight and secured down to prevent its rising; and shifted the water in the tub occasionally as it grew warm — *the cooler it is kept the better it will run.*

* * * * *

April 21. Made a *wooden tube* to use in the room of (in place of) the gun barrel through the tub of water. I put in *one quart of beans* in the pot with the twelve quarts of fresh water — in about one hour I got from it one quart of fresh water — it tasted very little of beans; but I found that wood did not answer so well as the gun barrel, *it being so thick that the cold water had not power over it to keep it cool.*

* * * * *

April 23. I cast a leaden tube and put it through the tub, put in the *machine* twenty quarts of salt water — got from it, in four hours, nine quarts of good fresh water: The pot was dry and

* Italics have been supplied; they do not appear in the original.

about a pint of the last running had a disagreeable taste. I took out of the pot about a pint of dry salt. I found the lead (pipe) was so thick I could not keep it cool; which was the occasion of my not getting more fresh water, as it went off in steam. I believe *if the lead was made very thin* it would answer very well.

* * * * *

April 24. Put in the pot eleven or twelve pounds of salt beef and sixteen quarts of salt water and in one hour and a quarter I got five quarts of good fresh water—it had a little taste of the beef and a very small appearance of grease on the top, which by filtering through linen cloth was taken off. With the above I made use of the gun barrel and find that in boiling anything at sea a considerable quantity of fresh water may be saved without expending any more wood than would answer to boil the meat, by having a hole through the pot-lid with a plug to it, to supply the water in the pot occasionally as it boils away.

In the iron tea-kettle that holds when full, five quarts, I put four quarts of salt water and fixed a wooden lid that was tight; made a hole through it to receive the crane; stopt the nose (of the tea-kettle) and with my *tin* crane in the cabin stove, in one hour and a half five pints of good fresh water (were made) and (nearly) three pints (were) left in the kettle.”

JOHN FOSTER WILLIAMS.

*Revenue Cutter Massachusetts
Boston Harbour Dec^r 7 1793
John Foster Williams*

The U. S. Revenue Cutter on which these experiments were carried out had the following dimensions and characteristics:*

* Taken from an inventory dated at Newport, R. I., April 10, 1816.

Length, fifty-eight feet six and one-half inches.

Breadth, seventeen feet nine inches.

Depth, seven feet.

Tonnage, sixty-two and forty-eight ninety-fifths.

She had two masts, one bowsprit, one flying jib boom, one main boom and gaff, and one fore boom and gaff.