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## THE FINANCIAL RETURNS FROM

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# U.S. WHALING VOYAGES

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By Barbara L. Coffey

**T**his year, the NHA has joined Mystic Seaport Museum and the New Bedford Whaling Museum as full partner in a major web-based initiative that documents historic whaling. Presented online at [WhalingHistory.org](http://WhalingHistory.org), the project brings together voyage data, catch totals, crew lists, digitized logbooks, and maps of whale sightings for researchers to use to better understand worldwide whaling in the past. The site aggregates data from a wide variety of American, British, and French sources, with Australia data planned to be added in the near future.

A core part of [WhalingHistory.org](http://WhalingHistory.org) is American Offshore Whaling Voyages (AOWV), a dataset by Judith N. Lund, Elizabeth A. Josephson, Randall R. Reeves, and Tim D. Smith that was published in book form by the New Bedford

Whaling Museum in 2010 and made available online by Mystic Seaport. AOWV documents whaling voyages that originated in Colonial British North America and the United States. Drawing from more than 780 sources, the dataset is updated and corrected periodically as new information is discovered. As of the end of 2024, it documents 15,686 voyages made between 1667 and 1927. About 2,350 of these sailed from Nantucket.<sup>1</sup>

[WhalingHistory.org](http://WhalingHistory.org) is opening new possibilities in whaling scholarship. In the following article, Barbara L. Coffey draws from the AOWV data and other sources to analyze financial returns from U.S. whaling voyages and calculate the risk premium for the investors who participated in nineteenth-century whaling.

<sup>1</sup> In order to account for voyages that had multiple captains, the AOWV dataset contains 17,102 entries but represents 15,686 voyages. The total number of whaling voyages ever made from Nantucket is actually higher than the 2,350 listed in AOWV, but no records survive for a great many eighteenth-century voyages.



“People in Nantucket invest their money in whaling vessels,  
the same way that you do yours in approved state  
stocks bringing in good interest.”

— HERMAN MELVILLE, *MOBY-DICK*, CHAPTER 16

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The publication of increasing amounts of data about American whaling has created new opportunities for quantitative analysis of this core nineteenth-century industry. The financial analysis that follows draws from vessel, voyage, and catch data in the *American Offshore Whaling Voyages* dataset on WhalingHistory.org, supplemented by other sources. Chief among these are the economic reports published in the *Whalemen's Shipping List and Merchant Transcript* (published in New Bedford between 1843 and 1914), which were first scanned and posted online by Mystic Seaport Museum in 2009. In 2013, the Baker Library at Harvard posted scans of Joseph Dias's *New Bedford Whaling Ships, 1783–1906*, another of many key resources made available online in the past twenty years.

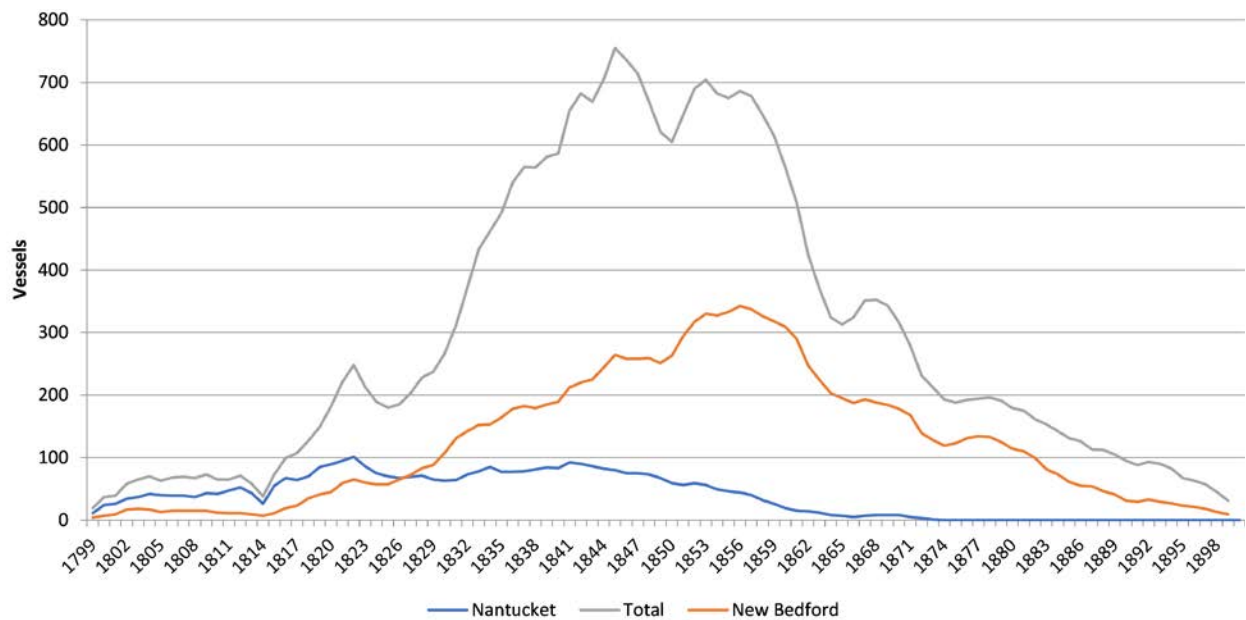
My financial analysis draws from AOWV as it stood in October 2021, representing 15,613 voyages.<sup>2</sup> I made several adjustments to this master dataset:

- Only voyages that ended between 1800 and 1899 were included.
- Voyages for which there was insufficient data for analysis were excluded.
- Unidentified vessels and voyages from unidentified harbors were excluded.
- Voyages from foreign ports were excluded.
- Voyages with zeros or blanks in the catch were reviewed. If the information was zero in a print resource it was updated and kept. If the catch was “not recorded” the voyage was excluded. If the voyage returned clean (no whales yet caught) and it was stated as such, it was kept.
- Catch data was augmented to include ambergris.
- Days at sea were calculated from the dates of leaving and returning to port. If the voyage date data was incomplete the voyage's dates were reviewed. If the information was found in a print source, it was updated and kept. If the day was not specified, the 15th of the month was selected. If the month of leaving was not specified, July was selected and if the month returning was not specified, June was selected.

These adjustments yielded 11,578 voyages made by 2,002 vessels sailing from 68 ports between 1800 and 1899. The number of Nantucket voyages remaining after this filtering was 1,288, representing 319 vessels that made at least one whaling voyage from Nantucket.

This analysis started with 19 vessels in the fleet as of January 1, 1800, and concluded with 43 vessels in the fleet as of December 31, 1899. For Nantucket, the analysis started with 11 vessels at the start of 1800, and the last whaler returned to Nantucket in September 1872. (The last whaler to sail from Nantucket never returned but was sold in Peru in February 1873.) From 1800 to 1826, Nantucket's whaling fleet was the largest in the country; in 1822, for example, Nantucket had a 101-vessel fleet while the total U.S. fleet was 248. The maximum U.S. whaling fleet size was 755 vessels in 1845.

<sup>2</sup> The 2021 AOWV dataset contained 17,019 entries representing 15,613 voyages.



**Figure 1.** The U.S. whaling fleet over time.

	Total		Nantucket	
Abandoned	60	3.0%	4	1.3%
Burned	27	1.3%	3	0.9%
Condemned	267	13.3%	36	11.3%
End	43	2.1%	-	0.0%
Lost	474	23.7%	42	13.2%
Sold	55	2.7%	8	2.5%
War/Seized	79	3.9%	21	6.6%
Withdrawn	997	49.8%	143	44.8%
	2,002	100.0%	257	80.6%
Changed harbors			62	19.4%
	2,002	100.0%	319	100.0%

**Table 1.** How vessels left the whaling fleet. For 319 Nantucket vessels, 45 percent were withdrawn from the fleet for other service. Thirteen percent were lost at sea, while another 11 percent were condemned at foreign ports.

## METHODOLOGY

To calculate the return on investment from whaling, I used the following financial return formula

### Return to owner

$$= \left( \frac{\text{Value to owner} + \text{Vessel value} - \text{Vessel depr.} - \text{Vessel maint.}}{\text{Vessel value} + \text{Outfit cost} + \text{Food cost} + \text{Insurance}} \right)^{\frac{1}{\text{Days}}} - 1$$

where the value to the owners was calculated as

### Value to owner

$$= 0.7 \cdot (\text{Price whale oil per gallon} \cdot 31.5 \cdot \# \text{ of barrels whale oil})$$

$$+ (\text{Price sperm oil per gallon} \cdot 31.5 \cdot \# \text{ of barrels sperm oil})$$

$$+ (\text{Price per pound baleen} \cdot \# \text{ pounds baleen})$$

$$+ (\text{Price per ounce ambergris} \cdot \text{ounces of ambergris})$$

This formula is a simplification of the actual costs, and required me to make a number of assumptions, outlined below, to fill in data that is missing from the historical record.

### Vessel Ownership

Outside of a few instances of vessels being owned by companies, vessels were owned by syndicates of investors and were not financed. *VC: An American History* by Tom Nicholas confirms that voyages were not financed but were organized financially through interpersonal relationships between banks and vessel owners. Nicholas notes that many bank owners were also whaling agents.<sup>3</sup> Often the whaling captains themselves had a stake in the vessel.

### Vessel Value

American owners used a variety of vessels to hunt whales during the nineteenth century. The dataset identifies the vessels by general size. Sloops were the smallest vessels employed in the fishery and carried the smallest crews. Schooners and brigs were the next larger, while ships and barks were the largest and carried the largest crews. Steam whalers, of which few were employed and only after 1880, were assumed to carry large crews. My analysis used a valuation for ships and barks of \$20,000, brigs and schooners of \$6,000, sloops of \$4,000, and \$65,000 for the steamers. These set values were used for the

entire time period analyzed, as the vessel valuation data in period sources showed no trends.

There was no single definitive source for the value of vessels, so it was drawn from a mosaic of data points. The Massachusetts industrial censuses compiled between 1835 and 1875 were one valuable source. These censuses detailed the capital involved and number of vessels engaged in whaling. Table 2 shows the summary data by county. Assuming that outfits account for half of the value of the total capital committed, this would suggest a range of vessel values from \$4,333 to \$17,027.

Another key resource that discussed the industry was a published speech given in the U.S. House of Representatives by Joseph Grinnell on May 1, 1844.<sup>4</sup> Grinnell was the congressman from the Massachusetts district that included New Bedford. He had been the head of the First National Bank of New Bedford. Grinnell's speech included a presentation of statistical data on the American whale fishery. His data detailed that the estimated value at sailing was \$38,000 per vessel for a 44-month voyage and \$28,000 for a 27-month voyage and \$14,000 for a 15-month Atlantic voyage. The cost of outfitting for a 44-month voyage was estimated at \$19,905.75, \$17,127.45 for a 27-month one, and \$6,557.00 for a 15-month one. This implied an underlying vessel value of about \$7,000 to \$19,000.

The *Whalemen's Shipping List* was a source of valuation data in several ways. In the February 8, 1859, issue, an article titled "The Importance of the Whale Fishery" mentioned that, in 1858, 65 whaleships sailed at an average cost of \$30,000 with an estimated voyage length of three to three and a half years. The *Shipping List* often accounted for ships sold and lost. The median value of the 628 vessels sold was \$5,200. When vessels were lost, the newspaper often mentioned how much they had been worth when they sailed. The median of the 136 mentions of "value when sailed" was \$34,500. Figures 2 and 3 show the values. The *Whalemen's Shipping List* started publication in March 1843, so the data accounts for 1843 to 1899.

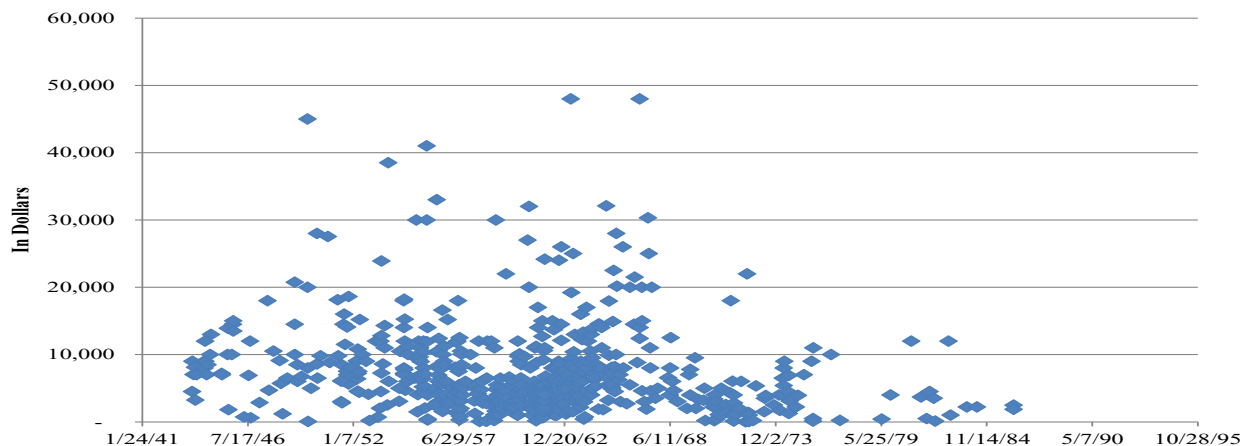
In today's dollars, the median whaling vessel going to sea in 1850 would cost about a million dollars.

3 Tom Nicholas, *VC: An American History* (Cambridge: Harvard University Press, 2019), 23.

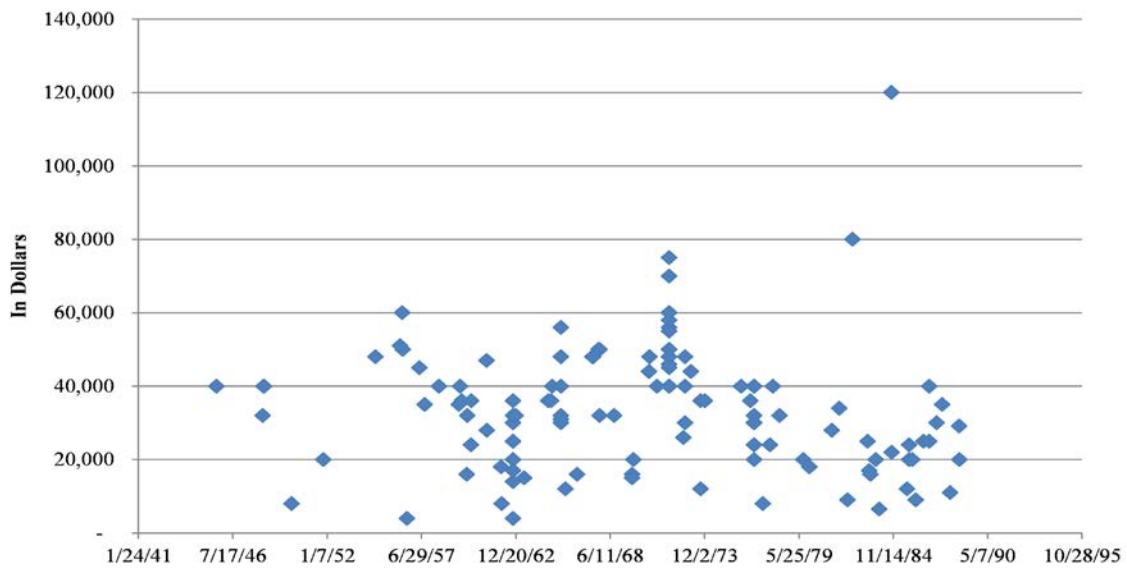
4 Joseph Grinnell, *Speech of Mr. Grinnell, of Massachusetts on the tariff: with statistical tables of the whale fishery of the United States* (Washington, 1844).

YEAR	COUNTY	VESSELS	CAPITAL (\$)	PER VESSEL (\$)
1835	Barnstable	11	274,000	24,909
1835	Bristol	222	5,479,000	24,680
1835	Dukes	9	233,000	25,889
1835	Essex	27	735,202	27,230
1835	Nantucket	74	2,520,000	34,054
1835	Plymouth	14	264,700	18,907
1835	Suffolk	5	155,000	31,000
1835	Total	362	9,660,902	26,688
1845	Barnstable	31	325,000	10,484
1845	Bristol	322	8,074,900	25,077
1845	Dukes	15	242,800	16,187
1845	Essex*	4	121,000	30,250
1845	Nantucket	77	2,660,000	34,545
1845	Norfolk*			-
1845	Plymouth	25	359,210	14,368
1845	Suffolk	2	23,000	11,500
1845	Total	476	11,805,910	24,802
1855	Barnstable	24	280,654	11,694
1855	Bristol	388	12,100,494	31,187
1855	Dukes	12	390,000	32,500
1855	Essex	6	105,000	17,500
1855	Nantucket	44	1,432,600	32,559
1855	Plymouth	18	237,800	13,211
1855	Total	492	14,546,548	29,566
1865	Barnstable	28	286,262	10,224
1865	Bristol	193	5,087,000	26,358
1865	Dukes	7	256,750	36,679
1865	Essex	3	36,000	12,000
1865	Nantucket	7	149,000	21,286
1865	Plymouth	3	26,000	8,667
1865	Suffolk	3	81,000	27,000
1865	Total	244	5,922,012	24,271
1875	Bristol	91	2,653,230	29,156
1875	Dukes	2	40,000	20,000
1875	Plymouth	2	20,000	10,000
1875	Total	95	2,713,230	28,560

**Table 2.** Massachusetts whaling vessels by county. Author's tabulation based on *Statistical Information Related to Certain Branches of Industry in Massachusetts, 1835–1875*. Asterisks indicate two vessels from Lynn and one from Quincy that did not have capital listed and so were excluded.



**Figure 2.** Records of sales. Author's illustration from data published in the *Whalemens' Shipping List*.



**Figure 3.** Value at time of sailing. Author’s illustration from data published in the *Whalemen’s Shipping List*.

### Crew Pay

Whaling crews were paid a percent of the total catch, called a lay, less the crew member’s cash advances and purchases from the ship’s slop chest. For this analysis, the owners were assumed to take 70 percent with the crew taking the remaining 30 percent.

### Outfitting

The data used to estimate the value of the outfit comes from several sources. Grinnell’s statistical tables detail outfitting costs. The cost of outfitting excluding food and repair costs was calculated at \$11,500 to \$13,100 in 1844. The data from the Massachusetts Industrial Census pointed to the full cost of outfitting being \$4,333 to \$17,027. As food usually accounted for about 25 percent of the overall outfit this would reduce the range to \$3,250 to \$12,770 for the outfit without food. The cost for outfitting was estimated at \$9,500 for ships and barks, \$3,000 for brigs and schooners, \$2,000 for sloops, and \$9,500 for steamers.

For voyages that were shorter than one year, the outfitting costs were halved. This assumption was based on

the fact that many of the items purchased had a longer lifespan than a year and could be resold after a short voyage. For instance, sails usually lasted two years. This data was adjusted for inflation using the estate year of 1844 as the base year.

### Food

Feeding sailors was a substantial expense. The food costs were calculated by estimating the number of crew, the cost of the food by month, and the number of days at sea. It was assumed that there were 30 men on a ship and bark, 22 on a brig, 18 on a schooner, 14 on a sloop, and 40 on a steamer. It was assumed that no voyage would leave without a six-month supply of food.

The food costs from Grinnell showed \$4,617 for a 44-month voyage and \$3,326 for a 27-month voyage. Grinnell shows 28 crew members on each of these types of whaling trips. This resulted in a range of \$3.50 to \$4.11 per man per month.

A business magazine of the time, *De Bow’s Review*, cited \$1,200 a year for foreign provisioning in 1859 without mentioning the size of the crew. Historian David

Moment cites a 50-month voyage ending in 1875 that had a \$1,900 cost for foreign provisions.<sup>5</sup> Adjusting this data for inflation, this created a range of \$1.07 to \$3.70 a month per man for food in 1844. Assuming the mid points of the Grinnell data and the fresh-food estimates resulted in a cost per month of \$6.19 per man in 1844 or \$74.28 a year per man for food.

## Pricing

In addition to purchasing, fitting out, and provisioning their vessels, owners had the costs of provisioning, piloting, port fees, cargo handling, and advances to the crew. There were also interim cashflows during every voyage, such as buying fresh provisions and paying for repairs at foreign ports. The dataset does not include this level of detail. Accordingly, all costs were assumed to occur at the start of each voyage and all profits were assumed to accrue at the end. The analysis used the annual published prices for whale oil, sperm oil, and baleen. The value of the ambergris was taken from the *Whalemens Shipping List* and other newspaper accounts of ambergris sales.

## Depreciation and Maintenance

Vessels of the 1800s were each custom made and each was maintained differently. These vessels traveled the world for years at time and encountered a wide variety of climates and conditions. Establishing the average lifespan for such vessels and estimating their annual maintenance costs were imprecise, particularly given that many vessels transferred in and out of whaling service. As fifty-year lifespan was assumed, and a two-percent depreciation was used.

Maintenance was another substantial cost. For instance, as the century progressed, an increasing number of vessel bottoms were sheathed in copper to protect against ship worms and other sea life. This copper needed to be replaced every few years. Sails only lasted a couple years. The same was true of other parts of the rig and equipment. A six-percent annual maintenance rate was assumed. This may be modest given that even owners of today's watercraft are guided to assume 10 percent of the boat's value as annual maintenance.

## Insurance

Insurance was optional. This analysis calculated the returns with and without insurance. Insurance was assumed to be 2.5 percent of the vessel's value annually. If the vessel had insurance and was lost, abandoned, burned, seized, or condemned, the value of the vessel and any recorded catch was accounted for as if the ship had returned to harbor on the day of the vessel's demise or condemnation.

The insurance return for vessels that did not return to harbor was calculated with this formula:

$$\text{Insured return} = \left( \frac{\text{Value to owner} + \text{Vessel value} - \text{Vessel depr.} - \text{Vessel maint.}}{\text{Vessel value} + \text{Outfit cost} + \text{Food cost} + (\text{Insurance})} \right) \frac{1}{365} \text{Days}$$

Without insurance, there was no insurance charge. If the vessel did not have insurance and was lost, abandoned, burned, seized, or condemned, the value of the catch sent home was kept, and the value of any other catch and the vessel was zeroed.

The uninsured return used this formula:

$$\text{Uninsured return} = \left( \frac{\text{Owner share of sent home}}{\text{Vessel value} + \text{Outfit costs} + \text{Food costs}} \right) \frac{1}{365} \text{Days} - 1$$

## RESULTS

These results underestimate the financial returns. As Alexander Starbuck noted in his *History of the American Whale Fishery*,

- Before about 1844/45, baleen imports were only occasionally recorded.
- Oil and baleen were often sold in foreign ports to pay for repairs and food; records of these sales were not reported.
- Oil and baleen often returned to the U.S. as freight in other vessels; these imports were not part of the record.

Assuming no insurance, 6,457 of the 11,578 voyages (55.8 percent) came home with positive returns. Assuming insurance 6,035 of the 11,578 or 52.1% were positive. For Nantucket, out of 1,288 voyages, 646 (50.2 percent) had positive returns when we assume no insurance, 583 (45.3 percent) if we calculate with insurance. The

<sup>5</sup> *De Bow's Review*, May 1859, 590; David Moment, "The Business of Whaling in America in the 1850s," *Business History Review* 31 (1957), 261–91.

## FINANCIAL RETURNS FROM U.S. WHALING VOYAGES

loss rate for the total fleet was 7.8 percent, with 907 vessels lost, abandoned, burned, condemned, or seized. Of the 319 vessels that sailed from Nantucket, 106 (8.2 percent) ended their whaling careers due to being abandoned, burned, condemned, or seized. This includes 21 Nantucket whalers lost during the War of 1812.

The returns were calculated in two ways. One was that the investor invested in every voyage. For that the returns were 5.8 percent for the total fleet and 1.8 percent for Nantucket. The second way was that the voyage data was aggregated by the year the voyages concluded. For each year, the maximum, median, and mean returns were calculated. To calculate the returns for the century

and decade, the annual maximum, median, and mean were used, and it was assumed that \$100 was invested in each category and that the results from one year became the start of the second year and so on. Then the final number, after 100 or 10 years depending, was annualized. Because the median return for uninsured vessels was -100 percent in 1813, the 1814 return was calculated off of the 1812 return.

$$\text{Annualized return for century} = \left( \frac{\text{Ending value}}{\text{Beginning value}} \right)^{1/100} - 1$$

$$\text{Annualized return for decade} = \left( \frac{\text{Ending value}}{\text{Beginning value}} \right)^{1/10} - 1$$

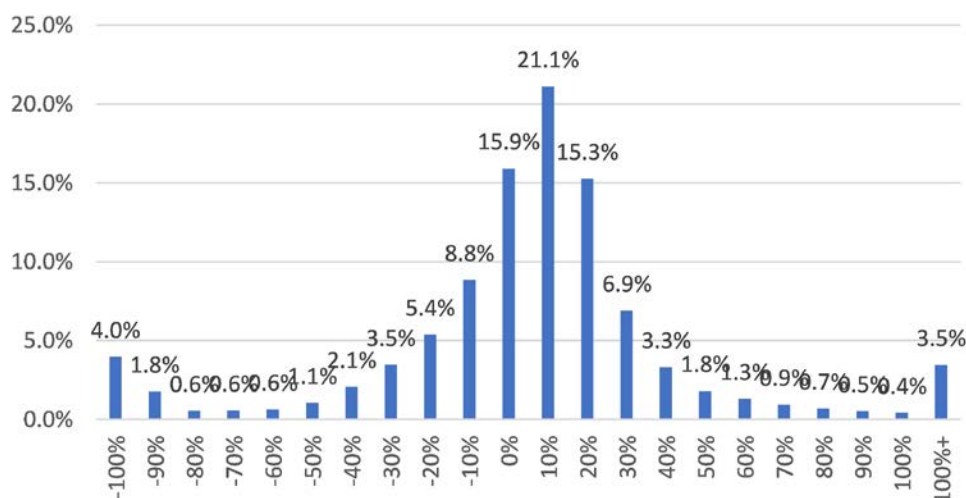
	Count	Average Days	Insured		Uninsured		
			Maximum	Average	Maximum	Average	
All Harbors	1800-1899	11,578	724	241.5%	4.2%	247.4%	3.8%
				5005.7%	5.8%	4834.6%	6.6%
	1800-09	247	428	101.9%	-4.3%	106.1%	-5.4%
	1810-19	346	420	158.3%	-10.1%	152.8%	-15.8%
	1820-29	860	574	95.0%	-3.2%	98.5%	-2.7%
	1830-39	1,802	635	195.0%	4.5%	203.7%	6.1%
	1840-49	2,455	801	263.9%	1.0%	271.4%	2.0%
	1850-59	2,238	875	395.6%	8.1%	411.5%	9.1%
	1860-69	1,468	853	463.0%	12.8%	471.0%	13.7%
	1870-79	887	774	234.0%	10.8%	247.3%	11.2%
	1880-89	810	518	418.6%	12.4%	424.6%	12.1%
1890-99	465	452	309.0%	12.8%	312.7%	12.1%	
Nantucket	1800-1899	1,288	807	47.1%	0.6%	49.5%	0.0%
				426.9%	1.5%	437.3%	1.8%
	1800-09	124	485	60.1%	-3.9%	63.5%	-5.8%
	1810-19	235	421	139.2%	-11.9%	134.2%	-17.4%
	1820-29	269	759	35.9%	-3.6%	39.4%	-3.9%
	1830-39	237	863	41.2%	5.1%	47.4%	7.2%
	1840-49	221	1,147	23.1%	2.7%	23.9%	3.7%
	1850-59	160	1,069	30.5%	3.6%	32.8%	4.2%
	1860-69	34	1,127	40.3%	13.4%	42.7%	12.9%
	1870-79	8	1,192	4.6%	-4.1%	6.9%	-1.7%

**Table 3.** Overall and by-decade returns. Author's tabulations.

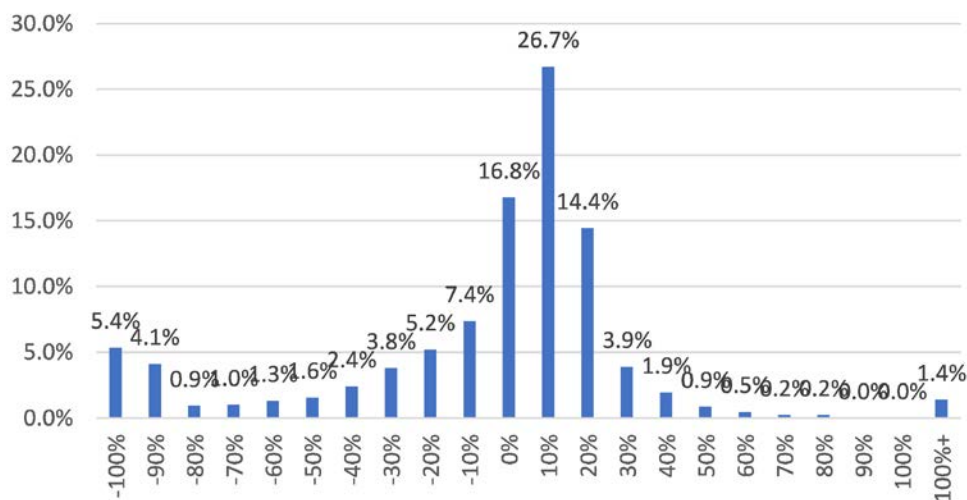


The accompanying distribution charts (Figures 4 and 5) clarify the range of returns seen by the whaling industry. The 10 percent number on the axis represents the number of voyages that were at 10 percent or below and above zero percent. This shows that 4.0 percent of voyages were total losses and 3.9 percent of uninsured voyages' returns were greater than 100 percent. The cumulative chart details the outcomes showing 44.2 percent of voyages were negative. For Nantucket, 49.8 percent of voyages had negative returns.

### RETURN DISTRIBUTION – ALL HARBORS

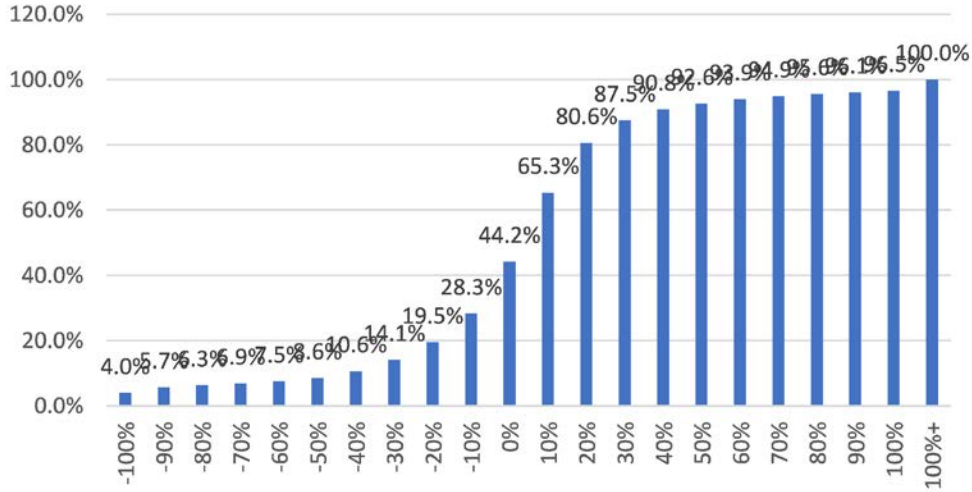


### RETURN DISTRIBUTION – NANTUCKET



**Figure 4.** Distribution of returns. Author's illustration.

RETURN DISTRIBUTION – ALL HARBORS



RETURN DISTRIBUTION – NANTUCKET

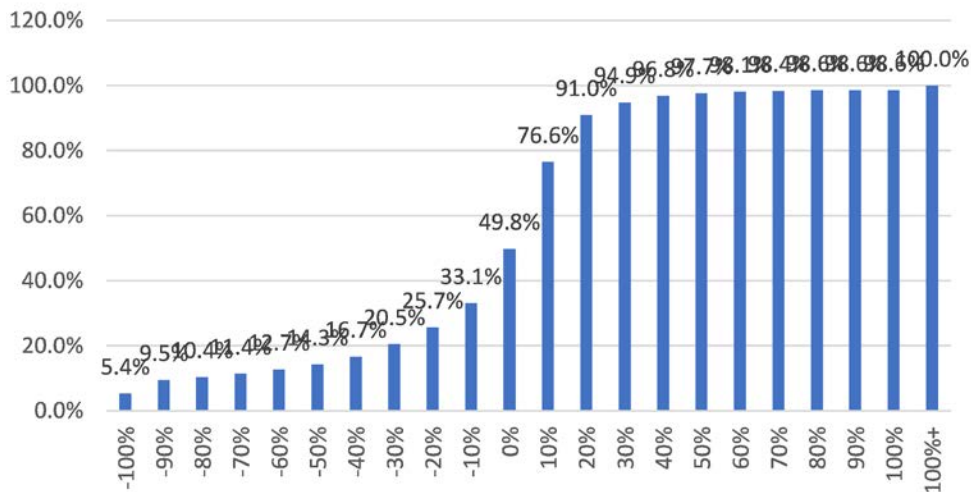


Figure 5. Cumulative distribution of returns for Nantucket. Author’s illustration.

The discovery of petroleum in Pennsylvania in 1859 eventually decreased the demand for whale oil, but the returns for whaling actually increased after petroleum was found. Over time, baleen became a greater share of the returns even as sperm and whale oil declined. The price of baleen increased in the later quarter of the 1800s, as San Francisco became the country’s dominant whaling port.

As a comparison measure, looking at the 10-year U.S. government bond, the return would be 4.6 percent for

the century and 5.3 percent for the period when Nantucket’s whaling vessels were operating. The same century and decade methodology was followed for the U.S. 10-year bond. It is impossible to know what was told to the people to encourage them to invest in a whaling voyage rather than other potential investments including government bonds. Given the business writings of the time, it is likely that the expected returns of whaling voyages were overstated, and the risks were understated.

## CONCLUSION

On May 2, 1828, Daniel Webster gave a speech in the U.S. Senate in support of building a breakwater in Nantucket.

There is a population of eight or nine thousand persons living here in the sea, adding largely every year to the amount of national wealth by the boldest and most preserving industry.<sup>6</sup>

In current investing parlance, a risk premium is associated with investing in an asset that has a risk profile above that of a non-risky asset, like a government bond, in essence to compensate for the risk assumed. Whaling voyages were known to be risky and to have a wide range of outcomes. These financial results do not show a risk premium over a government bond. This did occur in later years but not in the earlier years.

Many of the investors involved in the ownership or partial ownership of whaling vessels were also involved in other whaling supply-chain activities, such as banking, chandlery, candle making, or sailmaking. These owners often entered exclusive relationships with the vessel, such as the clothing outfitter for the voyage. An area of further research could be analyzing the related whaling industries to capture the associated economic activity. This might show that while whaling itself was not a consistently profitable venture being the outfitter was, for example. Depending on what business records survive, insight might be gained into how the investors discussed whaling as an industry overall and how they evaluated their associated investments in vessels and related business interests.

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<sup>6</sup> Daniel Webster, *Speeches and Forensic Arguments* (Boston: Perkins & Marvin, and Gray & Bowen, 1830), 435.