

The Spermaceti Candle and the American Whaling Industry

Emily Irwin

Burning longer, cleaner, and brighter, the spermaceti candle was the height of candle-making technology for Americans in the 18th and 19th centuries. Important figures in American history, including Benjamin Franklin and George Washington, are believed to have favored the spermaceti candle for its superior burning ability.¹ The spermaceti candle represents a changing society and an evolving culture; a culture that was constantly striving for a clean burning and more efficient means by which to light the darkness.

The spermaceti candle holds even greater historical importance than simply a new artificial lighting source. Demand for spermaceti dramatically impacted the American East Coast whaling industry, as spermaceti can only be found in one species of whale: the sperm whale.² The perils associated with retrieving spermaceti from sperm whales, as well as the lengthy production process, kept the cost of the spermaceti candle high and allowed only the richest of Americans to fully enjoy the benefits of this type of candle. However, despite high cost, demand remained high through much of the 18th and 19th centuries, fueling the whaling industry well into the early 20th century. To fully understand the significance of the spermaceti candle on early Americans, the complexities of the American whaling industry must also be explored.

Early American lighting is the subject of many scholarly works. Arthur H. Hayward's *Colonial Lighting* has long been a standard on the topic of artificial lighting. Other, more general works include Leroy Thwing's *Flickering Flames* and F.W. Robins' *The Story of the Lamp (and the Candle)*. More recently, Jane Brox's 2010 book *Brilliant: The Evolution of Artificial Light* reinvigorated the subject of early forms of American lighting and discussed the spermaceti candle in more specific detail.³ Most sources associated with early American artificial lighting

Emily Irwin, of Clinton, Wisconsin, is an M.A. candidate in the Historical Administration program. She received her B.A. in History with a Museum Studies minor from Beloit College in Beloit, Wisconsin. This paper was written for Dr. Debra Reid's HIS 5330, Material Life in America 1600-Present.

¹ Marshall B. Davidson, "Early American Lighting," *The Metropolitan Museum of Art Bulletin* 3, no. 1 (Summer 1944): 3.

² Spermaceti comes from the Greek word "sperma," meaning seed and the Latin word "cetus," meaning whale. The name was given to the species because it was believed that sperm was stored in the overlarge head.

³ Arthur H. Hayward, *Colonial Lighting* (New York: Dover Publications, 1962); Leroy Thwing, *Flickering Flames: A History of Domestic Lighting through the Ages*

examine spermaceti only in general terms and do not delve further into the specific manufacturing process of the candle type or the impact on the American whaling industry.

Sources on American whaling are far more numerous. Its significance as a major industry in early American history led to a wealth of information on the subject. Eric Jay Dolin's *Leviathan* is one of the most useful sources on the subject and gives a detailed overview of whaling. Numerous primary sources allow for an even greater understanding of early Americans' fascination with the whaling industry, most notably, Herman Melville's *Moby Dick*. These American whaling sources examine the spermaceti retrieval process from the sperm whale. Such sources illustrate the impact of whaling upon the men who lived and died in the pursuit of whales.⁴

The spermaceti candle has been examined in a multitude of ways, though it has rarely been explored in great detail. This candle represents not only the changing lighting technologies of 18th and 19th century America, but its production resulted from a legendary industry that played a role in shaping the American East Coast, especially in the formation of whaling communities such as Nantucket. This paper will bring together several different considerations including the spermaceti candle as an innovative lighting type, the popularity of the spermaceti candle and the resulting influence on the American whaling industry. These factors are important in understanding how something as seemingly simple as a candle can have far-reaching effects on both American lighting and whaling. While the spermaceti candle may at first appear to be a simple innovation, its complex past reveals that it has had a significant impact on United States' history.

(Rutland, VT: Charles E. Tuttle Company, 1958); F.W. Robins, *The Story of the Lamp (and the Candle)* (Bath, UK: Oxford University Press, 1970); Jane Brox, *Brilliant: The Evolution of Artificial Light* (Boston: Houghton Mifflin Harcourt, 2010).

⁴ Eric Jay Dolin, *Leviathan* (New York: W.W. Norton & Company, 2007); Louis Edgar Andrés, *Animal Fats and Oils: Their Practical Production, Purification, and uses for a Great Variety of Purposes their Properties, Falsification, and Examination* (Aberdeen: Aberdeen University Press, 1898); State Street Trust Company, *Whale Fishery of New England: An Account, with Illustrations and some interesting and amusing anecdotes, of the rise and fall of an Industry which has made New England famous throughout the world* (Boston: Walton Advertising and Printing Co., 1915); John MacGregor, *Commercial Statistics: A Digest of the Productive Resources, Commercial Legislation, Custom Tariffs, Navigation, Port, and Quarantine Laws, and Charges, Shipping, Imports, and Exports, and the Monies, Weights, and Measures of All Nations* (London: Whittaker and Co., 1847); Herman Melville, *Moby Dick: or, The Whale* (Boston: L.C. Page and Company Publishers, 1892).

The Spermaceti Candle as Innovation

Candles have a long history of use. Believed to have been invented in the time of the Romans, candles continue to be used as a means of artificial lighting.⁵ Animal fat, or tallow, and beeswax were two of the most common sources of candle fuel in early American history. Tallow candles are one of the earliest forms of candles and were far cheaper to produce than beeswax, though burned smoky and produced an unappealing smell. For the majority of contemporary Americans, tallow candles offered the opportunity of prolonging the usable hours in a day without the exorbitant expense of cleaner-burning beeswax.

Tallow candle production occurred in the home. It was a long process, involving multiple days of dipping wicks into melted tallow. The fruits of this extended labor did not last long. Reverend Edward Holyoke, the President of Harvard, noted in a 1743 diary entry that seventy-eight pounds of candles had been produced in two days. Only a few short months later, all seventy-eight pounds were gone.⁶ Beeswax candles were a cleaner alternative to tallow candles, though extremely expensive. For much of history, the use of beeswax candles was confined mainly to churches, one of the few places that could afford such a luxury.⁷ In the mid-18th century, a third option emerged in the form of the spermaceti candle.

The invention of the spermaceti candle is a mystery and several individuals have been credited with its enterprise. Jacob Rodriques Rivera, a Portuguese Sephardic Jew, is one individual credited with the candle's invention. Rivera emigrated from Portugal to Newport, Rhode Island in the early 18th century and some historians believe he began the manufacture of spermaceti candles sometime around 1748.⁸ It is also argued that it was Benjamin Crabb, a resident of Rehoboth, Massachusetts, who invented the spermaceti candle. His 1751 request to the General Court of Massachusetts for the "sole privilege" of manufacturing spermaceti candles suggests an early form of patenting.⁹ A March 30, 1748 advertisement in the *Boston News-Letter* for spermaceti candles and the *Chambers' Cyclopedia* of 1743 inclusion of "Sperma-ceti candles" suggest that neither Rivera nor Crabb can be credited with the invention.¹⁰ In any case, spermaceti candles entered

⁵ Robins, *The Story of the Lamp (and the Candle)*, 16.

⁶ Davidson, "Early American Lighting," 30.

⁷ *Ibid.*, 17.

⁸ Patty Jo Rice, "Beginning with Candle Making: A History of the Whaling Museum," *Nantucket Historical Association*, (accessed November 11, 2011), <http://www.nha.org/history/hn/HNWhalingmus.htm>.

⁹ Dolin, *Leviathan*, 110.

¹⁰ *Ibid.*

production in the United States in the mid-18th century and became increasingly popular.

Unlike the tallow candle, the spermaceti candle could not be cheaply produced in the home and its superior lighting ability could not overcome its cost; therefore, discussion of the spermaceti candle in American society must be largely constrained to the upper echelons. Marshall B. Davidson stresses this point in "Early American Lighting":

To the ordinary American colonist, bright lighting simply was not worth the candle. The need of more light, that is, was secondary to the cost and inconvenience of providing it. Enough light for the page of a book or a section of needlework was all that was asked. Anything further, such as lighting an entire room, was an enterprise that provoked comment.¹¹

For many Americans, tallow candles were the highest quality of candle that could be expected, as they could be made from kitchen by-products, while the calculated cost of burning a spermaceti candle is twice that of burning a tallow candle. George Washington concluded that the burning of a spermaceti candle five hours each night for one full year would cost approximately eight pounds, which was far beyond the financial reach of most Americans.¹²

For the wealthy few, however, the invention of the spermaceti candle provided greater opportunities for utilizing the nighttime hours. A greater interest in the written word no doubt contributed to the demand for better artificial light sources. Wealthy Americans had little concern for the expense and lengthy manufacture of early candles. Robert Carter, the owner of 70,000 acres and 400 to 500 slaves, burned seven large candles in his dining room per night. Such a luxury would have been unheard of for the majority of Americans.¹³ For the wealthy few, however, the spermaceti candle provided the opportunity for brighter and cleaner light. While the spermaceti candle was in no danger of replacing the tallow candle in popular use, it filled a new role in the lighting market for those wealthy enough to afford it.

In 1763, only a few years after the invention of the spermaceti candle, the American whaling industry faced a crisis. Despite regular voyages, the amount of spermaceti refined and made into candles was not nearly enough to meet demand. It was estimated that three or four candle manufacturers could easily process the amount of spermaceti being brought in annually.¹⁴ This low supply and high demand, as well

¹¹ Davidson, "Early American Lighting," 30.

¹² *Ibid.*, 35.

¹³ *Ibid.*, 30.

¹⁴ Rice, "Beginning with Candle Making," <http://www.nha.org/history/hn/HNWhalingmus.htm>.

as American export of spermaceti to England and other European countries, kept the cost of spermaceti extremely high. Increased demand of spermaceti and other whale products dramatically impacted the whaling industry and led to the whaling boom of the 19th century.

The Spermaceti Candle and Whaling

The spermaceti candle could not have been produced without the influence of whaling, a national industry nearly as old as America itself. American interest in whales began at the Pilgrim's earliest moments in the New World. The sighting of whales off the coast of Massachusetts was a primary reason for the location of the Plymouth Colony.¹⁵ The earliest form of colonial whaling occurred when settlers utilized various parts from beached whales washed up on the shoreline. Beginning at the end of the 17th and early 18th centuries, ships became central to the American whaling industry. During this early period, American whaling was largely confined to the immediate East coast. Ships remained in sight of the shore, often patrolling an area in search of whales and the oil they produced. An accident of fate saw the whaling industry gain access to an even greater prize: the sperm whale.

Christopher Hussey, one of the men charged with patrolling the coast off Massachusetts, was blown out to sea in 1712, where he encountered and killed a sperm whale, which was believed to be the first sperm whale killed by a New England colonist.¹⁶ It was soon discovered that oil from the sperm whale was superior to other types of whale oil. Though the sperm whale did not produce as much oil as other types of whales, the quality was much greater. Hussey's discovery pushed the American whaling industry beyond the coast and into the deeper waters of the Atlantic, as the sperm whale is primarily a deep-sea species. While blubber and whale oil remained driving factors in the whaling industry, spermaceti would prove unique, because it can only be found within the head of the sperm whale. This knowledge led to the increased hunting of sperm whales. With the invention of the spermaceti candle and the knowledge of the sperm whale's superior oil, this species of whale became the prize of the whaling industry.

The sperm whale holds a special place in whaling history, in large part because of Herman Melville's 1851 classic *Moby Dick; or, the Whale*. While Melville's book is fictitious, his prior experience as a seaman informed his work, which was based in part on two real incidents: the 1820 sinking of the whaling ship *Essex* by a sperm whale attack and the existence of an albino sperm whale in the 1830s named Mocha Dick.

¹⁵ State Street Trust Company, *Whale Fishery of New England*, 13.

¹⁶ *Ibid.*, 19.

While *Moby Dick* is a fictionalized account, Melville's description of a sperm whale illustrates whaling views on the species:

In the great Sperm Whale, this high and mighty god-like dignity inherent in the brow is so immensely amplified, that gazing on it, in that full front view, you feel the Deity and dread powers more forcibly than in beholding any other object in living nature. For you see no one point precisely; not one distinct feature is revealed; no nose, eyes, ears or mouth; no face, he has none, proper; nothing but that one broad firmament of a forehead, pleated with riddles; dumbly lowering with the doom of boats, and ships, and men.¹⁷

Behind Melville's evocative language is the recognition of the very real danger presented by the sperm whale and the whaling industry. Melville's description of the whale remains a fascinating, yet dramatized, account of the sperm whale, a species which would have a large impact on both the whaling industry and the development of new artificial lighting techniques.

The head of the sperm whale takes up nearly a third of the body. Inside this massive head, which Herman Melville described as "at least twenty feet in length," rests the spermaceti.¹⁸ Located in the top cavity of the animal's head, spermaceti or "head matter" is an oily, whitish substance. It is not known precisely why sperm whales produce this material, though it has been suggested that it allows for the sperm whale's head to more easily rise to the surface.¹⁹ The spermaceti floats in a sea of oil in the whale's skull and this oil must be completely removed from the spermaceti before it can be made into a candle. The spermaceti hardens and crystallizes once removed from the whale and is then exposed to colder temperatures. Up to 500 gallons of spermaceti could be removed from the head of an average sperm whale, though larger whales could provide as much as 900 gallons.²⁰

The process by which spermaceti was extracted from the head of the sperm whale was both dangerous and arduous. After a whale was killed, seamen tied its head and tail to the ship. After the retrieval of the blubber and other usable body parts of the whale, the head was severed, allowing the body to sink to the ocean floor. A hole drilled in the side of the whale's head provided access to the spermaceti, which seamen then removed with buckets. The size of the whale's head allowed for men to crawl inside the skull for easier access to the prized matter. This process of spermaceti removal continued ceaselessly until the last usable part was removed, sometimes lasting several days. It was far from hygienic

¹⁷ Melville, *Moby Dick*, 327.

¹⁸ *Ibid.*, 328.

¹⁹ John George Wood, *Animate creation* (New York: Selmar Hess, 1898), 434.

²⁰ Brox, *Brilliant*, 44.

and “when they eventually finished, both the men and their ship would be caked with grease, blood and soot.”²¹ Once aboard the ship, the spermaceti was squeezed by hand to separate the spermaceti from the sperm oil before it was placed in barrels to be transported to New England candle manufactories.

Regardless of the dangers associated with whaling and the lengthy voyages, which occasionally lasted up to five years, the whaling industry did not suffer from a lack of men. In some instances, the promise of riches appealed to men of the lower classes, though the average seaman could only hope to receive about 0.6% of the ship’s take.²² Other seaman were servants or slaves, forced by their masters to work on a whaling ship and return with their wages. Still others were middle-class men, often living in whaling communities, for whom whaling became a lifelong career. Very few of the seamen who hunted the sperm whale could regularly afford the spermaceti they worked so hard to acquire.

Despite setbacks caused by the Revolutionary War and the War of 1812, the whaling industry continued to be profitable. High spermaceti demand contributed to the industry’s prolonged profitability. Nantucket, Massachusetts and New Bedford, Massachusetts were the two biggest centers of whaling in the United States, each with whaling ships numbering in the hundreds. The peak of whaling in the United States occurred in the mid-nineteenth century and saw between 8000 and 10000 whales killed per year. While spermaceti was only one of the products removed from the sperm whale, its importance in artificial lighting and its significance in the increased hunting of the sperm whale marks it as a major factor in the history of whaling. Spermaceti was also significant for reasons unrelated to lighting. Its refined form was used in the medical field, in ointments for inflammation, chapped lips, and as a cold cream. It was also taken orally for coughs and colds.²³ The expanded use of spermaceti suggests that the increased importance placed on the whaling industry produced an increase in society’s uses for whale products.

Spermaceti Candle Manufacture

The retrieval of the spermaceti from the sperm whale is merely the first step in the lengthy production of manufacturing a spermaceti candle. Unlike tallow candles, an extensive refining process occurs

²¹ Sarah Lazarus, *Troubled Waters: The Changing Fortunes of Whales and Dolphins* (London: Natural History Museum, 2006), 40.

²² *Ibid.*, 44.

²³ Robert Kemp Philip, *Dictionary of Medical and Surgical Knowledge and Complete Practical Guide in Health and Disease for Families, Emigrants, and Colonists* (London: J. and W. Rider, Printers, 1864), 652.

before the spermaceti is useable, which contributes in large part to the expense of the candle. Raw spermaceti is delivered to candle manufacturers who take charge of transforming the crude spermaceti into a product which gives "clear white Light, [and] may be held in the Hand, even in hot Weather, without softening."²⁴

The first step in the candle-making process requires the boiling of the spermaceti. The removal of impurities is crucial in creating high quality candles. The spermaceti is then placed in barrels and stored in an unheated shed over the winter, allowing it to fully harden. On a warm winter day, the spermaceti is removed, placed into bags, and pressed to remove more sperm oil. After a few more months of storage, the spermaceti is once again heated, hardened, and returned to bags where greater pressure is used to remove any of the last remnants of oil. The remaining spermaceti, a waxy substance brown, yellow, or gray in color is once again heated before being shaped into candles.

Due to the lengthy, complicated process of spermaceti candle-making, as well as the specific chemical makeup of spermaceti, it was deemed impossible to produce a substitute.²⁵ Each step in the process was crucial and as different lengths and temperatures of storage also impacted the quality of candle produced, shortcuts failed. Several years passed between the killing of a whale and the final stage of candle-making. The dangers associated with whaling and the time and manpower required in the production of a spermaceti candle contributed to the consistently expensive price and the seamen who risked their lives to bring in raw spermaceti remained unable to take advantage of the brighter and cleaner spermaceti candle.

Conclusion

The Civil War and the rise of petroleum in the 1860s ended New England's whaling rule. Though whaling continued on the East Coast on a significantly smaller scale, it never regained the popularity or economic importance once held. In the end, the total value of New England whaling between 1804 and 1876, only a portion of the whaling era, is approximated at \$331,947,480.²⁶ Beyond the economic considerations of whaling, the industry dramatically impacted sperm whale populations. Believed to be somewhere around one million prior to widespread hunting, the partially recovered sperm whale population is now estimated at 360,000.²⁷ The use of the spermaceti candle also diminished during the Civil War period. With the advent of electric lighting came a lesser demand for the stubbornly expensive candle and

²⁴ Brox, *Brilliant*, 44.

²⁵ Andrés, *Animal Fats and Oils*, 223.

²⁶ State Street Trust Company, *Whale Fishery of New England*, 44.

²⁷ Brox, *Brilliant*, 46.

the diminishment of the whaling industry led to lesser spermaceti availability. Though the production of spermaceti candles continued into the early 20th century, the end of large-scale whaling signaled its demise.

The spermaceti candle contributed to the American workforce, both in the whaling industry and in the candle-making industry. While it is extremely unlikely that the men responsible for the production of spermaceti candles would have the ability to afford such a luxury, the spermaceti candle became significant in the upper classes of America as an alternative to smelly, smoky tallow candles. Retrieval of spermaceti, creation of spermaceti candles, and the use of these candles touched the lives of multiple generations and economic classes. No longer was candle-making a household activity; it was instead a venture that involved multiple industries outside the home. Though the spermaceti candle was not as widely available as the tallow candle, it marked a new creation in artificial lighting and the demand for spermaceti remained continuously influential on the American whaling industry.

In fact, candles made of spermaceti were considered the best in the world, producing a bright clear flame without an excess of smoke. Spermaceti was also used, distilled in liquid form, as an oil to fuel lamps. The main American whaling port, New Bedford, Massachusetts, was thus known as "The City That Lit the World." Despite the failed sales pitch John Adams made in the late 1700s, the American whaling industry boomed in the early to mid-1800s. And spermaceti was a major component of that success. Spermaceti could be refined into a lubricant that was ideal for precision machinery. The machine tools that made the growth of industry possible in the United States were lubricated, and essentially made possible, by oil derived from spermaceti. Baleen, or "Whalebone".