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DISPELLING THE DARKNESS:

TYPES OF CANDLES AND THE APPROPRIATENESS OF EACH FOR THE MID-19TH CENTURY

Virginia Mescher

Today, with the variety and ease of artificial lighting, one often takes for granted an abundance of light, whenever or wherever it is desired. During the 1860s, light did not occur with the flip of a switch. People were accustomed to a much lower level of illumination; pockets of light within an area were utilized and shared among several people, rather than the entire room being brightly lit. The amount of light that one flame can produce is surprising when one's eyes adjust to a lower level of illumination.

There were a number of lighting devices used in the mid-nineteenth century but candles were probably the most prevalent. From reading various household accounts, approximately one hundred pounds of candles per year were used by an average, middle-class household. Lamps, such as whale oil, camphene (burning fluid), coal oil, and kerosene, were used to some extent but there were a greater number of references, in primary sources, to candles. With candles, one did not have to be concerned with spilled lamp fuel; broken or exploding lamps or replacement of chimneys, wicks and other lamp hardware. Candles also offered portability and were more economical than lamps.

A candle is not just a candle. In the history of candles a number of different types were developed and each type differed somewhat in size, content, hardness, rate of burning and amount of light produced, differences that depended upon substance from which the candle was made. As new discoveries were occurred and as technology advanced, candles were replaced by either fuel lamps or stationary gaslights, which were themselves superseded by the age of electricity. With the passage and funding of the Rural Electrification Act of 1936, which made electricity available in most rural areas, the use of candles or fuel lamps in most homes, was reduced to providing ambience or emergency lighting.

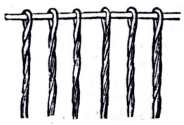
In reading Civil War period diaries, newspapers, periodicals, household books, store ledgers and official military records, one encounters references to several types of candles. Tallow, wax or beeswax, spermaceti or sperm, adamantine (stearin) and paraffine candles were all mentioned, in addition to references to composition and mineral candles in technical journals. It is helpful for the living history interpreter, whether military or civilian, to understand the difference between the types of candles. why some types of candles are appropriate for use in a particular impression and others are not, the advantages of certain types of candles, and the appropriateness of using fuel lamps.

TYPES OF CANDLES AND THEIR DIFFERENCES

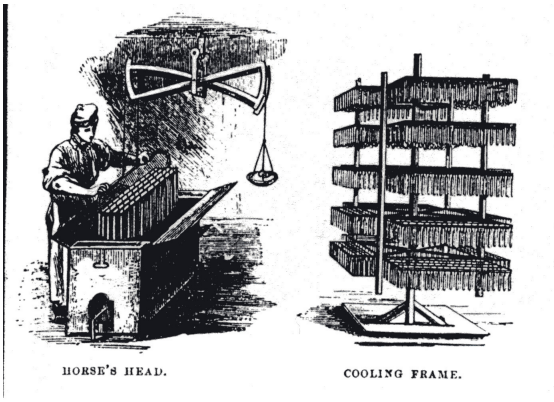
Tallow candles

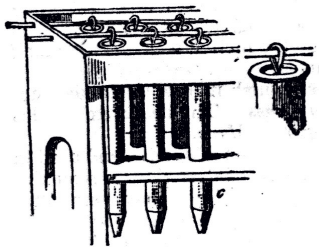
The first candles date back to ancient Egypt and were made from the core of reeds that had been soaked in tallow. It is believed that the Romans were the first to make wicked tallow candles by dipping a fiber wick into melted tallow a number of times until the desired thickness was obtained. The best tallow for candles came from the hard fat of beef or sheep but, even when the hardest tallow was used, it still softened in hot weather, because of the low melting point of tallow at 100°. These candles were greasy, sticky to the touch, produced a smoky, sooty flame as the candle burned and left an unpleasant odor when the flame was extinguished. The wicks of tallow candles had to be thick in order to produce an adequate flame. To prevent guttering [hollows or gutters in the center or edge of the candle], tallow candles needed to be frequently snuffed in order that the burned portion of the wick could be snipped off so that a clear flame could be maintained.

Tallow candles were formed by either molding or dipping, regardless of whether they were commercially produced or homemade. Factory-made dipped candles were made very much like those at home, except on a much larger scale. To prevent the wicks from being consumed, they



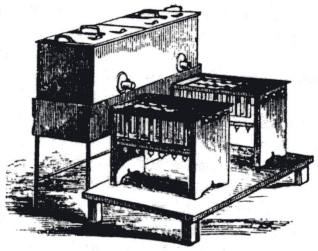
Close-up of wicks for dipping.





Close-up of a candle mold.

Commercial candle making process for dipping and molding.



were prepared by soaking the wicks in an alum or saltpetre solution and were dried before dipping. Wicks were looped over a bar; the line of wicks were dipped in melted tallow, and after the first few dips, the wicks were straightened by hand. Between each dip, the candles were allowed to cool for a time which yielded an even diameter along the length of the candle. Molded candles were made by pouring melted tallow into metal molds which had been strung

with wicks that extended through the middle of the empty cylinder and the finished candles were removed from the mold after cooling. Both molded and dipped candles were available in various sizes and the duration of the burn time depended upon the size of the candle, the method by which is was formed and the conditions where the candle was burned. According to Ure, molded candles tended to burn longer than dipped candles and the size also affected the total burning time. He stated that the burning times of molded 10s [ten candles per pound, etc.] burned 5 hours 9 minutes; dipped 10s — 4 hours 36 minutes; 8s molded — 6 hours 31 minutes; 6s — 7 hours 2 ½ minutes; and 4s — 9 hours 36 minutes.

Softness of the plain tallow was a major problem so; to counteract the low melting point of tallow, instructions for making the tallow harder were included in most cookbooks, household books or popular periodicals. The addition of beeswax, alum, saltpetre or rosin would harden the tallow slightly but the candles were still soft as compared to those made from other materials. Some hardening processes used by candle manufacturers were patented but generally used one or a combination of the above hardeners.

Since there were so many manufactures of candles, commercially made candles were readily available and fairly inexpensive. Purchased tallow candles were the least expensive and cost between sixteen and twenty-five cents per pound or two and two and half cents per candle.
Both soap and candles utilized tallow so the manufacturing statistics of these two products were often combined; the *Eighth United States Census* (1860) indicated that there were 614 soap and candle manufactures in the country. Some of those nineteenth-century candle manufacturers are still in existence today; William Colgate began his soap and candle business in New York in 1806 and William Proctor and James Gamble opened their business in Cincinnati, Ohio, in1837. By 1851, Proctor and Gamble's candles were known as *Star Candles* because of a recognizable logo on the exterior of the boxes. [The logo was used to aid illiterate workers or customers in recognizing Proctor and Gamble's candles.] The "The Moon and Stars" trademark was a circle with thirteen stars and a quarter moon enclosed within the circle was granted to Proctor and Gamble by the United States Patent and Trademark Office in 1882.

Beeswax candles

Sometime during the Middle Ages beeswax candles were recorded as being used in Europe. Beeswax (also called 'wax') is much harder than tallow, having a melting point of 155°. These candles did not soften as readily as tallow ones in hot weather; they produced a bright clear flame and did not smoke or have an unpleasant odor. But they were also the most expensive of all types of candles. The wick of a wax candle was smaller than that of tallow candles because a wax candle flame was brighter. Generally, beeswax candles were left in either a natural color of golden tan or the wax was bleached using a process of exposing the natural wax to sunlight which produced creamy colored white wax. It took sixty pounds of honey to produce one pound of beeswax. According to the 1860 census, beeswax and honey were considered agricultural products and the United States produced a total of 1,322,787 pounds of beeswax and 23,366,357 pounds of honey in all the states and territories in 1860.

Both Webster's and Ure's books stated that the making of wax candles, for the most part, was a commercial operation. Three different methods were employed to make beeswax candles: they

were made by hand (the only method used for home-made wax candles), by the ladle, or by drawing. The hand method involved working and rolling small bits of softened wax around a cotton wick until the candles were of sufficient size and uniformity. The ladle method, consisted of suspending the wicks from a rod and ladling hot wax over each wick until the candles are of proper size and then smoothing the shape of each candle, by hand rolling each candle, while still soft, to achieve the desired shape. Drawing of candles was the technique utilized in large scale productions. As the wicks were dipped in the wax, they were drawn through increasingly larger holes of a template. This method produced the greatest number of candles of uniform size and shape with a minimum amount of labor. The final step in making wax candles was hand polishing each candle with a soft cloth. Beeswax candles were seldom molded because they tended to stick to the sides of the molds and were difficult to release without injuring the outside of the candle. [Today molded beeswax candles are possible by the use of mold-release or coated molds.] Wax candles, used for church purposes, were called wax tapers and were of two types; those made by the ladle method and those by drawing.

Beeswax candles, the most expensive candles, sold for between sixty and seventy-five cents per pound. As an example of the cost difference between the cost of raw ingredients, a pound of bulk beeswax sold for twenty-five cents per pound while tallow cost thirteen cents per pound. *The Grocer's Encyclopedia* stated, "Wax candles are more expensive, but not much better than other grades of candles."

As with any expensive item, various ways were devised to produce an adulterated and inferior product, thus reducing cost to the manufacturer. White lead, zinc oxide, chalk, plaster, starch, or flour was added to wax, which increased the yield of candles per pound of wax. The impurities could be only detected by boiling the wax, where the adulterants would sink to the bottom, or in the case of starch; the addition of iodine would turn the solution blue. Extenders of resin, pea meal or bean meal were added to yellow beeswax in order to manufacture more candles from a pound of wax. The addition of quick lime (calcium oxide) to tallow produced imitation of a wax candle but being made from tallow, the candle still suffered from most of the disadvantages of tallow and none of the advantages of wax.

Spermaceti candles

By 1750, as the whaling industry grew, commercially made spermaceti (also called sperm) candles were marketed and were still being sold in the mid-nineteenth century. Spermaceti [the solid matter of sperm oil] was obtained by processing the oil from the head of the sperm whale and was used for candles, as well as an ingredient in medicines and cosmetics. These candles were only commercially made; they were either molded or dipped and burned very bright and clean with little smoke or odor. With a melting point of 112 ½°, they were only marginally harder than tallow and were softer than wax. In the *Encyclopedia of Domestic Economy*, spermaceti candles were described as nearly resembling wax candles in their appearance. "They are smooth, with a fine gloss, almost semi-transparent, and of a silvery white, while those of wax always have a slight tint of yellow. When genuine, drops of spermaceti leave no stain. They are cheaper than the best wax." Of the types of candles with documented prices, spermaceti candles were the second most expensive and sold from between forty-five and fifty cents per pound and cost thirteen cents each, if purchased singly.

With the popularity of the adamantine candles in the 1850s and the discovery of oil in 1859 with the corresponding use of kerosene lamps, the popularity and need for sperm candles dwindled. The Civil War contributed to the decline of the American whaling industry and by the 1870s it had deteriorated due to innovations in the steel and oil industries so spermaceti candles were not in as much demand as before. There was still a demand for whale oil for other uses and whale products but that is another story.

Adamantine, stearin or "Star" candles

The next common type of candle, used in the Civil War period, was called an adamantine, stearin or ceratin candle. The derivation of the word, adamantine, was *adamant* whose meaning was, "made from stone or unyielding hardness." [Diamond also comes from the same root word.] Adamantine candles were so named because they much harder than either wax or spermaceti and had the highest melting point of than any other candles made in the nineteenth century.

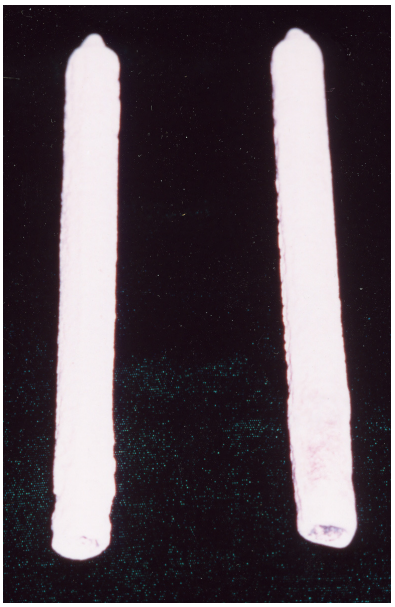
Due to the extensive processing required, these candles were only made commercially. Stearic acid (sometimes called stearin) is a naturally occurring substance in most fats and is one of the component that solidifies fat. In 1820, a French chemist, Michael Eugene Chevreuil, published his research on the separation of fatty acids and their relationship to glycerine. The process used to separate the stearic acid from the fat (usually tallow) entailed chilling the fat and compressing it until the liquid glycerine was expelled and the remaining solid was one of three fat acids. By 1825, the French chemist, M. Gay Lussac, obtained an English patent for an improvement in the process for the producing pure stearic acid. His method combined a strong alkali, such as lye, with the fat which caused saponification [the chemical reaction which produces soap]. He treated the result with an acid, such as sulphuric or muriatic, to decompose the saponified product of which four different products were the result — stearic, margaric and oleic acids, with glycerine (sweet-water) as a by-product. Stearic acid, used to produce stearin candles, was the hardest of the three acids with a melting point of between 120° and 167°. Even though stearic acid was harder than beeswax, some people thought that beeswax still made a superior candle so sometimes a small quantity of wax was added to the stearic acid, which produced a candle supposedly equal to those of wax. [Today, a small amount of stearic acid is usually added to paraffin candles which makes them harder.]

The stearin candle industry in the United States was established in 1851 by an immigrant to the United States, Antonio Meucci, of Clifton [Staten Island], New York. By 1854 Proctor and Gamble started producing stearin candles which were also called *Star Candles* and soon the brand name became a generic term for stearin candles. Advertisements for both the Proctor and Gamble brand name and generic star candles appeared in quite a number of newspapers. During the Civil War, Proctor and Gamble obtained a large contract to provide soap and candles for the Union Army. Star Candles, as well as adamantine candles, appeared frequently in military records. According to the 1860 census, there were five adamantine candle manufactures in the United States.

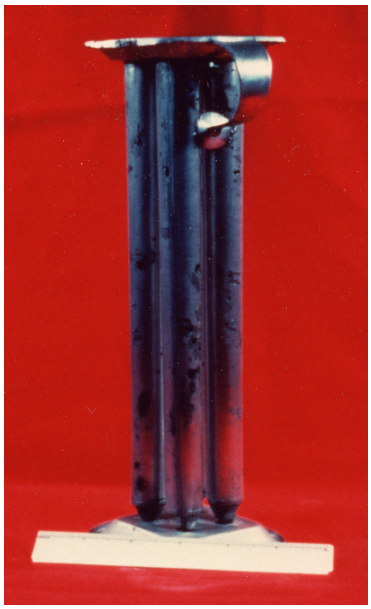
Stearin candles were a compromise between the more expensive beeswax and spermaceti candles and the cheaper tallow candles. The cotton wick in stearin candles could be hollow rather than a

solid wick of several plied threads. This construction allowed the action of air ascending through the wick to consume itself — thus the candle did not need to be frequently snuffed so the wick could be trimmed. Mr. Webster stated in his book, "They [stearin candles] have the advantage of burning without snuffing, and supposing them to have no deleterious ingredient, they are useful, being about half the price of the best wax." The usual cost of adamantine candles was thirty-eight cents per pound but if an entire box of twenty to fifty-two pounds was purchased the cost dropped to twenty-five to thirty-one cents per pound. The cost for an individual candle was six cents per candle.

Both the Steamboats Arabia (sunk in 1856) and Bertrand (sunk in 1865) carried candles in their cargo. The Arabia artifact records indicate that the candles were tallow but if a chemical analysis had been performed on the candles to determine the content, stearin candles would have similar content as tallow since both candles were processed from fat. The cargo manifest of the



Candles from Steamboat Bertrand. Used with permission of the DeSota Wildlife Refuge.



Candle mold from Steamboat Bertrand. Used with permission of the DeSota Wildlife Refuge.

Bertrand state that most of the candles were "star" candles, but were manufactured by companies other than Proctor and Gamble. The size of the candles on the Arabia was nine ½ inches long and 7/8 inches in diameter and the candles on the Bertrand were eight 9/16 inches long and 11/16 inches in diameter.

An inferior type of stearin candle was made from cocoanut oil rather than tallow but these candles had a major flaw; when the flame was extinguished, an extremely unpleasant odor was produced. In 1830, William Wilson of the Edward Price and Company, in the Belmont section of London, had started making stearin candles and his son, George, improved upon the process using a combination of palm oil and cocoanut stearin, and patented the process in 1844. The products of this innovation were called Belmont Sperm (made from hot, distilled palm acid) and

Belmont Wax (the same content as the former product, but were tinted with gamboge, a reddish-yellow pigment) candles. *The Encyclopedia of Domestic Economy* noted that these candles were better than tallow ones but were not equal to stearin candles. Limited information was found describing the production process of these candles and it is unclear if they were available outside England. In the 1860 census there was only one cocoanut oil manufacturer in the country and there was no indication that any of these candles were being made in the United States.

Paraffine and paraffin candles

The name of this type of candle has produced a great deal of confusion when interpreting nineteenth century information on candles. The term, "paraffine candle," appeared in print in as early as 1857 but was NOT a reference to the modern paraffin wax candle. Paraffine, a generic term for a number of hydrocarbon compounds produced through various processes, was defined as in the 1861 edition of *Webster's Dictionary*, as "A substance contained in the products of the distillation of the tar of beech-wood; a tasteless, inodorous, fatty matter, fusible at 112°, and resisting the action of acids and alkalies. It is so named from its little affinity for other substances."

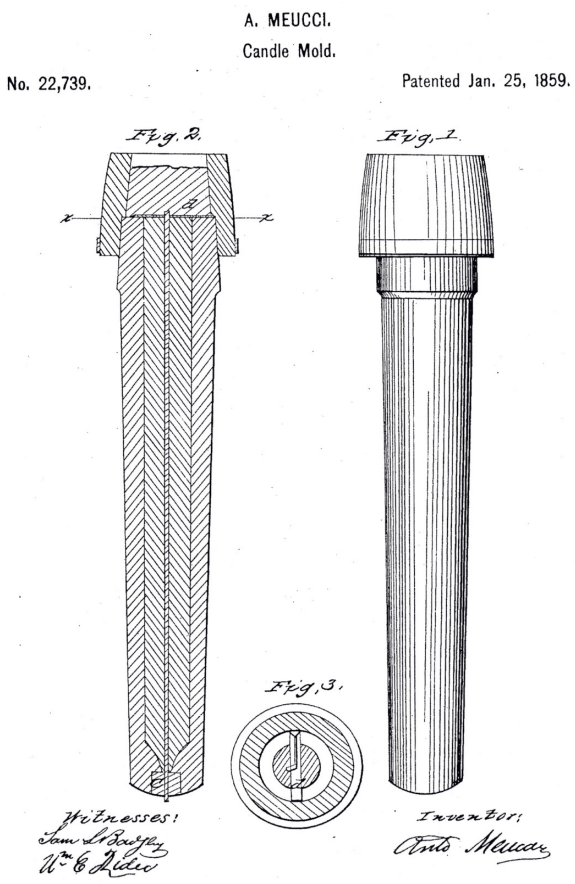
The substance, paraffine, developed in 1830 by Drs. Christison and Reichenbach, was first called *petrolin.* It was distilled from peat found in the bogs of Ireland. (One ton of peat yielded two hundred and twelve pounds of paraffine.) In the early stages of its production, the usefulness of the product was debated and Andrew Ure, in 1839, described it as a distillation of beech-tar and stated, "Paraffine . . . It has not hitherto been applied to any use, but it would form admirable candles." In 1860 Michael Faraday, in a lecture on candles, defined paraffine as, "a substance made from the bogs of Ireland." By the time a supplement to Ure's work was published in 1864, the editor wrote, "The solid obtained [paraffine] is manufactured into beautiful candles . . . It has been obtained from the destructive distillation of peat."

The word "paraffine" could also refer to a liquid oil used in paraffine lamps. In 1850, a Scot named James Young discovered that coal oil, when distilled, burned with "brilliant illuminating power." The paraffine oil industry did not intensify until 1854 when rock oil or oil shale was discovered in Burma. The Price Patent Candle Company of England (formerly the Edward Price Company), used a variation of Young's process and developed the "mineral candle" which was called, *Belmontine* or *ozocerite*. A hard candle with a melting point of 140° was produced but there was a drawback of these candles; when snuffed the wick smouldered and produced an extremely unpleasant odor. The January 14, 1854 issue of *Scientific American* described the process for making mineral candles from oil shale or peat.

Paraffine candles had other major problems to overcome; they were brittle and difficult to remove from molds. A quote from *Eighty Years of Progress in the United States,* published in 1868, best illustrated the problem: "When obtained [paraffine] perfectly pure and white, difficulties have been encountered in running it into candles, which are not common to other materials used for this purpose. When cooled in ordinary moulds, the paraffine would crack in lines radiating from the wick, and the exterior would present a clouded, mottled surface." A solution to the problem was discovered in France in 1859; a special two-part piston mold was heated to the same temperature of the paraffine and the filled molds were immediately plunged

into nearly freezing water, where they remained for three or four minutes. The molds were then placed in a current of cool air for about twenty minutes, after which the candles could be removed from the mold. "This method is successfully introduced in the United States. Paraffine candles have been made at some of the coal oil works, as at those of New York, New Bedford, and Portland [Maine]. They are of beautiful appearance, resembling the best sperm candles, and at the same time are more economical for the amount of light they afford."

In 1860, Meucci began producing paraffine candles, using coal oil as the base. He changed the name of his company to "The New York Paraffine Candle Co." Advertisements appeared on June 9, 1860 and December 10, 1860, *Harper's Weekly* as well as in the June 9, 1860, issue of *Frank Leslie's Newspaper,* for Meucci's candles which referenced his 1859 patent.


A. MEUCCI.
Candle Mold.

No. 22,739. Patented Jan. 25, 1859.

Fig. 2. Fig. 1.

Fig. 3.

Witnesses:
Sam'l Bailey
Wm E Rider

Inventor:
Antd Meucci

Meucci's patent for the mold, not the candle. 1859.

CANDLES FROM COAL.
MANUFACTURED BY THE
NEW YORK PARAFFINE CANDLE CO.
Under MEUCCI'S Patent.

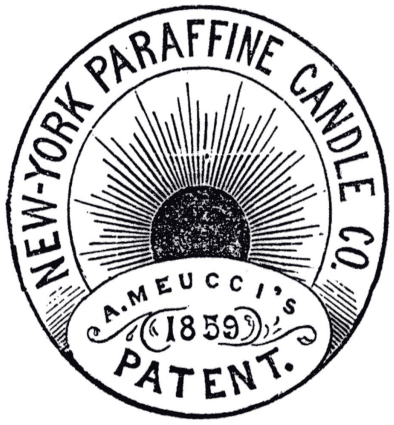
The above Company having recently made great improvement in their mode of manufacture, now offer to the public a Candle superior to any other in the market.

THEY GIVE A SOFTER AND MORE BRILLIANT LIGHT AND BURN SIX HOURS TO THE POUND LONGER THAN THE BEST WAX AND SPERM, AND CONSIDERING the STRENGTH OF THE LIGHT, ARE

The most economical Candles in use.

CAUTION.

As unscrupulous persons are already offering imitations of these Candles, purchasers should bear in mind, that every box sold by this Company is stamped with the annexed trade mark, to counterfeit which is felony.



For sale by all first-class grocers and to the trade by
WM. E. RIDER,
General Agent of the Company,
16 Beekman Street, New York.

Advertisement from *Harper's Weekly*, December 1, 1860.

Patent number 22,739 was issued to Meucci on January 25, 1859 but was not granted for paraffine wax candles. The patent was for an improved mold used in the manufacture of coal oil candles. He had discovered that, rather than using metal molds, that when a plaster of Paris mold was saturated with a lubricant, the candle did not stick to the interior surface of the mold. In the September 12 and November 15, 1861, issues of the *Gallipolis* [Ohio] *Journal*, paraffine candles were offered for sale but no brand or price was indicated in the advertisement. In the 1860 census, there were sixty-four coal oil manufactures in the country but the manufacture of paraffine was not mentioned in the census statistics. Only one price for paraffine candles was found in primary sources. The November 19, 1862 issue of the *Louisville Daily Journal* indicated that the price of paraffine candles was sixty cents per pound, which made them the second most expensive of all candles in actual cost. But when compared with the cost of all types of candles their real cost [taking the performance, burning time, and amount of light into account] paraffine candles were the most expensive. No reference to these candles were found store ledgers or military records.

A distinct disadvantage to paraffine candles, made from petroleum, other than the problem with brittleness, was that of their fairly low melting point — 128°. This problem was alleviated by the addition of pure stearin or stearic acid to the paraffine as noted in the 1883, *Grocer's Hand-Book*. "They [candles] are made of tallow, paraffine, wax and spermaceti, and are sometimes colored with aniline dyes . . . Paraffine has, of late, been largely used. It makes a clear candle, resembling wax and gives a very good, pleasant light. A little stearin is usually added, as the pure paraffine is apt to bend or droop when warm." It was not until the 1911 revised and expanded edition, *The Grocer's Encyclopedia* that paraffin was defined as wax obtained from petroleum.

Modern paraffin wax is a white, translucent solid, hydrocarbon compound, made from petroleum by the dewaxing of light lubricating oil. According to the *New Encyclopedia Britannica*, it was first commercially produced in 1867, which was less than ten years after the discovery of oil by Edwin Drake in Titusville, Pennsylvania in 1859.

Composition candles

Composition or composite candles were made from a mixture of spermaceti, stearin, tallow, and/or wax, in varying quantities. Other names for these candles were German wax, pearl wax, imperial wax, Venetian, moulded [sic], or tropical candles. They were widely produced and many patents were issued for composition candles but little specific information or primary documentation was available, except through patent records. Some of the candles were made with tallow in the center and were then coated with stearin on the outside; while in others, specific amounts of tallow and stearin were mixed to produce a candle superior to tallow but cheaper and inferior to pure stearin candles; and still others were made of tallow with the addition of bismuth. Arsenic was sometimes added which increased the hardness of candles. The author was not able to locate any documented prices for the composition candles.

Sizes of candles

Candles came in various sizes, no matter the material. In the *Encyclopedia of Domestic Economy* the sizes and number per pound were detailed. "*Moulds* [molded candles] are of various thicknesses; *three* to the pound are the largest usually made for domestic use; *short fours* are the next size; then follow in thickness *long fours, short sixes, middling sixes, long sixes,* and *eights*. These last are chiefly used as bedroom lights, or to carry about a house.

The dips are from four to sixteen per pound. The moderate size of the tens or twelves are such as serve best for kitchen and pantry use, and to carry about a house where oil and lamps are not used."

MILITARY USE OF CANDLES

A variety of candles were mentioned in the *Official Records of the Union and Confederate Armies*. In recommended ration lists, it was suggested that one pound of sperm candles, one and one-quarter pounds of Star or adamantine candles, or one and one-half pounds of tallow candles should be issued per one hundred rations. The difference in the recommended number of each kind of candle was due to the various burning times of each type of candle, with tallow burning the fastest and sperm burning the longest. The brand name, "Star Candles" appeared often in Union military records since Procter and Gamble had a government contract to furnish candles to Federal troops. Reference to candles appeared regularly in reports of supplies on hand, captured or needed supplies, as well as on lists of supplies donated by the United States Sanitary Commission. Prisoners, depending on the location and policy of the prison, were sometimes allowed five adamantine candles or six tallow candles per one hundred men but this candle ration was not consistently provided.

CANDLE SHORTAGES IN THE SOUTH

A discussion of candles and the Civil War would not be complete without mentioning southern shortages of this item. Before 1861, all candle manufacturers were located in the North and shortages for commercially produced candles emerged early in the war. After the war began and the effects of these shortages and inflation were felt, numerous suggestions appeared in southern newspapers and periodicals for improving homemade tallow candles. The addition of prickly pear leaves [*Catcus opuntia*]; alum or saltpetre, lye, rosin, or wax supposedly hardened the softer tallow candles and provided a better and more stable light with less guttering and snuffing. Some articles declared that with the addition of supplements, the tallow candles would be equal to or better than star candles. It was also suggested that an excellent substitute for wax candles were ones made from myrtle berry wax obtained by rendering wax from the berries of the myrtle [*Myrica cerifera*] bush. These candles were similar to ones made from bayberry wax used in Colonial America. Dr. Porcher indicated in his book, that a 25% ratio of wax to berries could be rendered from the berries. [This author has tried rendering wax from bayberries using Porcher's method but was not able to produce anywhere near the wax yield indicated my Porcher.] There

were also numerous instructions published for making "confederate candles." They were made of a long length of candle-wicking which was repeatedly dipped in a mixture of wax and rosin or wax and tallow. After the dipping was complete, the wax-covered wick was either coiled or stacked upon itself or wrapped around a corn cob or bottle. [An excellent article about these candles, written by Vicki Betts, appeared in the February/March 2000 issue of *Citizens' Companion*.]

With the scarcity of candles, other lighting substitutions were also recommended; lamps were made from saturating either sycamore or sweet gum balls [although sweet gum balls were mentioned in primary sources, the author has tried them and they have not worked because there is nothing to soak up the grease so it will burn.] in grease and lighting the ball; rush lights made from the stems of rushes saturated with suet or wax; a wick, saturated with grease, placed in a saucer, similar to the early "Betty" lamps; lard lamps that used a wick suspended in a saucer of lard; lard tapers made by tightly twisting a piece of paper, saturated with grease and lighting the tip; or button lamps made from a button, enclosed in a square of fabric, that rested in a saucer of grease. Outdoors, candlewood or pine knots were lit and used as torches. Various substitutes for common lamp oils (whale oil, camphene, coal oil or kerosene) were also touted. Pressed peanut or cottonseed oil was used in place of sperm oil and terebene oil [redistillation of turpentine] or "Palmetto oil" [pure turpentine] replaced kerosene. Despite all the improvements suggested for candles or substitutes for lamps and lamp oil, nothing was quite as good as the real thing. As with most shortages, the South struggled to maintain a remembered prewar life style and the substitutes were just inferior imitations of products from better times.

LAMPS

Even though various styles of lamps were in common use and were readily available, the focus of this article has been on candles so lamps will be only briefly mentioned. Up until the introduction of coal oil and camphene [burning fluid], the most common lamp was a whale oil lamp but with the discovery of oil in 1859, kerosene lamps gained favor and whale oil lamps had all but disappeared by 1865. Purchases of kerosene lamps were noted in store records. In *Historic Accounts* lamps and parts were frequent purchases, as well as thirty-seven purchases of kerosene oil. The price of lamps ranged from $1.38 to $7.00 and a gallon of oil cost $1.25.

Military Use of Lamps

There were few references to lamps in military records. One reference was written by a surgeon. He wrote, "I have also obtained an order from the commanding general for the purchase of a brilliant kerosene lantern for each ambulance, and large sized white and red conductor's lanterns for sergeants to carry at night in conducting trains for the signal lights of field hospitals." In some of the prison correspondence there was mention of lamps and lamp oil available for purchase by some of the officer prisoners. Lamp oil cans were recorded in some reports and lamps may appear in some military images, but candles seem to be the most prevalent method of lighting used by the military.

INCORPORATION OF CANDLES OR LAMPS IN AN IMPRESSION

Commercially made vs. home-made candles

In the early nineteenth century candle making was a major industry in the United States so by mid-century commercially-made candles were commonly available in stores and were relatively inexpensive. In rural areas, tallow candles were probably still being made since there was a ready source of tallow but even in those areas, tallow and adamantine candle purchases were noted in store ledgers. As previously noted, candles could molded or dipped at home. Tallow would have been the most commonly home-made candles because of the ease of obtaining the tallow, molds and wicks. There were many instructions and recipes, in household and cook books, for making tallow candles at home. Since beeswax candles would have been dipped rather than molded they were less often made at home and no primary references were found for home-made spermaceti candles. Adamantine and composition candles were only made commercially.

Appropriate candles

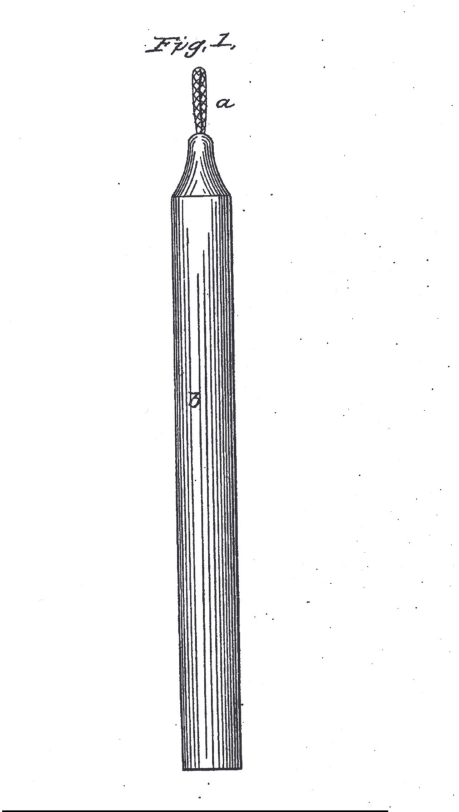
Tallow candles would be very appropriate to use a Civil War impression or at mid-nineteenth century living history events but they are difficult to locate. The author has not found a commercial source for tallow candles with the result that they would need to be home-made. All the previously mentioned disadvantages of tallow candles would still exist plus the difficulty of obtaining them and unless they are necessary for your impression, it would be easier to use stearin candles. Although purchases of tallow candles appear in store ledgers, the number of candles purchased cannot be used as an indicator of their prevalence for lighting. In the Adkisson store ledger, which appears in *Historic Accounts*, out of 215 purchases of candles in some quantity, only twenty-three of those purchases were for tallow candles. Since this store was in a rural community, it would be expected that tallow candles were probably manufactured at home; as candle molds and wicks were included in the purchases from the store. Store ledgers, from in northern cities, also documented the use of tallow candles, as well of stearin candles and kerosene lamps. There were 141 purchases of adamantine candles, of which mostly pounds or multiple pounds were purchased.

Beeswax candles are easily located and are not very expensive, but should be 100 percent beeswax, rather than a mixture of beeswax and paraffin wax. The label should give the content of the candles, but if not, beeswax candles (even the bleached wax) will have a distinctive honey scent. Wax candles seldom appear, if at all, in store ledgers, but small amounts of bulk beeswax were purchased. There was no mention of wax candles in the military records.

It is illegal to purchase or import spermaceti candles in the United States due to the passage of the Endangered Species Act of 1973. Even if one does possess any of these candles, it would be wise to only use them as a display as an item and comparison to other types of candles, rather than burn them. In the nineteenth century, spermaceti candles were relatively expensive and were not the most commonly used candle. Only thirteen purchases of spermaceti candles were

recorded in *Historic Accounts* and the author has seen no other reference to them in other store ledgers. Spermaceti candles were listed in the cargo manifest of the Steamboat Bertrand, but the star candles were present in a much greater number.

Adamantine or stearin candles are probably the most appropriate for use in a military or civilian, living history impression. They seem to be the most commonly used candle in the time Civil War period. Today they are commercially available, reasonably priced, are durable and produce a bright flame, and are the correct shape and color of period candles. [Adamantine candles may be purchased through Ragged Soldier Sutlery at http://www.raggedsoldier.com.]



Candle shape from 1859 patent

Modern adamantine candles

Finally, the choice of incorporating paraffine or composition candles in an impression is a question of appropriateness. The author knows of no commercial source of paraffine (those made from peat or coal oil) candles and not having examined an extant candle made from paraffine, the author can't comment on the similarity in look, feel, color and consistency between nineteenth century paraffine and modern paraffin wax. They are both hydrocarbon compounds and have similar verbal descriptions, but since their production was primarily in Europe and production, in the United States, did not begin 1860; it is unlikely that these candles were common enough to use in a Civil War impression. According to the March 10, 1901 issue of the *London Daily News*, "Until 1873 paraffin as a candle-making material had been produced almost

wholly in Scotland and Germany." The substitution of modern paraffin candles for paraffine would not be advisable because, unless stearin has added, paraffin candles tend to soften and bend and even sometimes melt, when exposed to heat or direct sunlight.

It is sometimes difficult to determine the content of candles, unless it is specified on the box or wrapping. There are several ways to ascertain whether or not the candle is stearin or mostly paraffin. Stearin candles, when shaken in the box or tapped together, make a distinctive "clacking" sound, while candles with a high paraffin content will "clunk." Stearin candles have a odor (not unpleasant) and paraffin candles have very little odor. Finally, if one scrapes a bit of a candle with a fingernail, a ribbon of paraffin will come off and the stearin candle will not release a ribbon, only flakes.

The proper shape and mode of production of period candles should be taken into account when purchasing candles for an impression. A multitude of candle shapes are available today but there were not nearly as many candle shapes in the nineteenth century. It is not difficult to find correctly shaped candles and examples of the proper shapes were previously shown. Tallow candles were either dipped or molded; wax candles were ladled, drawn or hand rolled; and adamantine candles were molded. Choose unscented and uncolored candles in either natural (golden colored) or bleached wax, or white or cream colored stearin.

Speciality candles

Although, scented candles were available, they were probably not employed for everyday use and may have been used in the sickroom to alleviate unpleasant odors. The process to make scented candles differed from the customary method of candle production. First, aromatic herbs were distilled and the scented water was combined with tallow and beaten. After forty-eight hours, the tallow had absorbed the scent and was separated from the water. Wax and alum were mixed with the tallow before molding and the wicks had been dipped in a combination of wax, spermaceti and gum Arabic. Finally, the candles were coated with glovers' size, gum Arabic and alum, which eliminated a greasy exterior. Some scents used were lavender, thyme, rosemary, camphor, gum benzoin, and balsam of Peru. If too much oil was used, the candles smoked and the light would be reduced.

Colored candles of wax, spermaceti, and stearin were common but were not likely used for everyday purposes except for small colored candles were often used on Christmas trees. Various pigments were used to color the candles and the most mentioned colors were blue, green, red, and yellow. It was not until the 1880s that one starts to see references to using colored candles in the dining room.

All colored candles produced a white flame, but in the March 15, 1862, issue of *Scientific American*, there was a request made for colored flames: "Why may not candles be manufactured by introducing certain chemicals into the material from which they are made so as to show a variety of colors, such as blue, red, green, &c.? By arranging such candles in tasteful groups, beautiful effects may be produced in illuminating buildings. The time, we predict, is not far distant when we shall have occasion to rejoice over the settlement of our national difficulties, and then will be the time for a general rejoicing and illuminations throughout the country. If

some ingenious chemist will devise a way of embracing a cheap chemical with any of the material used for illuminating candles, so as to render the light emitted from them of any desired color, we predict for him a fortune." There was no documentation that these candles were made commercially by the end of the Civil War, but in the June 1862 issue of *Godey's*, the "Chemistry for the Young" had instructions for making colored flame.

Candles may seem to be an insignificant point in an overall impression it is the little things, in combination with the more visible items, that make up an authentic impression. Most likely, spectators will not ask what kind of candle is being used, or even care about the difference between tallow, beeswax, stearin, or paraffin candles but the people we are portraying knew the difference. For an accurate impression, the living history interpreter should know about different types of candles because don't the little things such as candles deserve as much attention as the a dress, underpinnings and accessories, hairstyles, uniforms, food or any of the items use in an impression?

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