Since Roman times, chandlers have toiled over steaming, stinking CAULDRONS TO MAKE CANDLES THAT GIVE BUT A MEAGER GLOW TO DIM INTERIORS. ALTHOUGH TODAY'S LAMPS ARE BRIGHTER, MORE RELIABLE, AND ODOR-FREE, OLD-FASHIONED CANDLES CAN STILL ADD WARMTH, ROMANCE, AND PERIOD AMBIENCE TO ANY SETTING.

orget the romantic images of colonial homes awash in mellow candlelight. Early settlers burned candles sparingly, if at all. Darkness was a burden that set the daily schedule because candle making was arduous work.

For three hundred years, Americans saved the stinking fat from their butchered livestock, harvested bayberries from swamps, and stole wax from beehives. They boiled the goop outdoors in autumn's chill and spent hours dipping and molding the wax around pieces of cotton string so they might have something to stave off the darkness.

Candle making over the centuries is a story without a lot of plot twists. Since Roman statesman Pliny the Younger documented them in the First Century, candles—from the Latin candere, "to shine"—have been created using the same basic technique. A hard and hurnable substance is melted and adhered to a burnable wick and then cooled for use. Methods and materials have varied through the centuries, but the underlying principle remains unchanged even with today's technology

In the American colonies, most early candle making depended upon livestock for tallow, and the first settlers did not have herds large enough to provide tallow in quantity.

"There were no candles made here early on," said Jennifer Monac of Plimoth Plantation in Plymouth, Massachusetts. "There was no wax and no tallow, the two essential ingredients. Thus they were imported. During the 1620s, harvesting fish oil for lamps was more likely."

But colonists were dipping small quantities of candles by 1650 as herd sizes grew. Candle makers in rural households—usually women and children-suspended several wicks from a rod and then dipped them into the kettle of hot wax until a layer of melted wax adhered to them. They removed the rods and set them aside so the wax could cool around the wicks. By repeatedly dipping and cooling the rods, the goodwife built up layers of wax until the candles reached the desired thickness of about an inch. The process may have seemed simple, but it called for skill in clarifying the tallow,

Most colonial country homes would have relied on a tallow candle to light evening tasks such as reading or sewing in the homeowner's favorite Windsor chair. This tin sconce has a sliding thumb latch to raise the candle so all the tallow would burn. Chuck Madjeski hand dips his candles like the early settlers did, but he uses beeswax, sometimes blended with paraffin, for added strength.



This drawing from the May 1749 edition of *Universal Magazine* illustrates the various steps of a small chandler shop's assembly line: spinning and spooling the wicking; blanching beeswax to achieve a lighter color; dipping and cooling the candles.

holding the dipping pot at the right temperature, and keeping the rods organized during repeated dippings.

Few families made candles from molds, the preferred method of professional candle makers, or chandlers, from the French *chandelle* for "candle." Candle molds—sets of tapered tubes made from tin, pewter, or copper—date to 15th-Century France. The chandler suspended a wick in each tube, poured in hot tallow, and allowed the candles to cool. In theory candles shrink as they cool and can be easily pulled from the mold. In practice, getting candles to "release" can be tricky.

Because of candle making's finicky nature, settlers preferred to make a year's worth in a single day, generally 200 to 300 candles based upon the amount of tallow they could accumulate, according to multiple sources. Given the toil involved in producing candles, the makers took equal care in storing them so they would last the better part of a year. Storing candles required both

a cool place so they wouldn't melt and a secure box to keep rats and mice from feeding on the delectable tallow.

MASKING THE STENCH

Working with tallow was the most unpleasant aspect of early candle making. Households collected fat from butchered livestock yearround, storing it until late autumn when candle-making season began. The goodwife dumped the rancid fat into a kettle of boiling water to separate it from its impurities, then ladled the clarified tallow into a separate kettle.

Colonists believed that a mixture of half beef and half sheep tallow produced a superior candle. They deemed the fat of butchered hogs too smelly and drippy. Even so, candles made from beef and sheep tallow had relatively low melting points and were prone to bending on warm nights. And all tallow stank.

Candles gained strength and fragrance in the mid-1600s when settlers around Cape Cod Bay discovered bayberry wax. The bayberry bush-English settlers called it the "candleberry tree" and Swedish the "tallow shrub"—grows wild in bogs and coastal swamplands from New England to Louisiana, Women and children traditionally gathered the gravish-white berries in late fall and dumped them into a boiling pot. They skimmed the aromatic greenish-gray wax-sometimes called "myrtle wax"-and added it to tallow. Because bayberry wax has a higher melting point than tallow, it makes candles less prone to bending.

Bayberries also ameliorated the stench of burning tallow. In examining early candlemaking, Colonial Williamsburg researchers Lou Powers and Harold Gill noted, "In a report about Virginia prepared in 1698, the authors observed that an advantage of the colony was plentiful 'myrtle-berries.' They claimed



Using molds served as an effective method when the household lacked enough wax for the dipping process. A Colonial Williamsburg docent pours wax into a particularly complex mold.

the berries, 'boyled up to a Wax, make as good Candles as the best Wax Candles whatsoever, the Snuff Whereof instead of stinking, does really perfume like Incense'."

Bayberry was a boon to early candle making, but it had a drawback. It took 15 pounds of berries to yield one pound of wax, not even enough for a dozen candles.

Beeswax also mitigated tallow's odor, but until well into the 1800s, people could collect only limited quantities by taking honeycomb from active skeps and hives, then heating it and pressing out the honey. As with bayberry wax, beeswax added to animal tallow raised





Autumn was candle-making season, and early settlers tried to produce a year's worth of candles-about 300-in a day. That averages about three-quarters of a candle per day, highlighting the rationing in average households. A docent at Colonial Williamsburg demonstrates the dipping technique, the most popular candle-making method.



After spending an exhausting day making enough candles to last a full year, colonists would have stored them in a covered box or cupboard. Joining a pair of candles by a common wick made them easy to hang for cooling between dips. Once finished, tallow candles would not have been left hanging in the open to tempt rodents.

its melting point to produce stronger candles with pleasing scents.

OF WHALES AND WICKS

In the mid-1700s a byproduct of America's fledgling whaling industry brought the first large-scale improvement in candle making since the Middle Ages. Whale men discovered that spermaceti oil from the head cavity of a sperm whale contains a waxy component. When rendered into wax, spermaceti hardened better than either tallow or beeswax, smelled better than tallow, and burned so brightly that it became the accepted standard for photometry-the science of measuring light in relation to human evesight.

Whaling provided enough spermaceti for chandlers to manufacture greater volumes, yet the candles remained so expensive that only the affluent could afford them. In fact, Mount Vernon researcher Mary Thompson found a diary entry in which George Washington was prompted to measure the costefficiency of tallow versus spermaceti candles. He concluded that spermaceti cost twice as much in terms of burning time.

"In order to try the difference between burning Spermaceti and Tallow Candles," Washington wrote in his diary, "I took one of each and lighted them at the same instant. The first burnt 8 hours and 21 minutes; when, of the latter, there remained 14 penny weight, which continued to burn one hour and a quarter longer, making in all 9 hours & 36 Minutes. By which it appears (as both burnt without flaring) that, estimating Spermaceti Candles at 3 [shillings] pr. lb. & Tallow Candles at 1 [shilling] pr. lb. the former is dearer than the latter as 30 is to nearly 13. In other words more than 2 1/4 dearer."

A candle burns only as well as its wick, and the earliest American

candles were clearly problematic. Because of the scarcity of imported wicking, early settlers were known to spin the flimsy down of milkweed into loose threads for wicks. They also used loosely spun cotton, coarse linen, or tow. Early wicks sputtered and guttered and smoked so much that their charred ends—called "snuff," which impeded burning and produced black smoke—usually required snipping with a scissor-like device called a snuffer four or five times an hour.

Candle making changed dramatically in the first half of the 19th Century. In 1823, French chemist Michel Eugene Chevreul demonstrated that animal fats can be separated into their respective fatty acids and glycerin. His research had practical applications for candle making because stearin—the glycerin separated from tallow—produced harder candles that burned brighter and longer.

Two years later, another Frenchman, M. Cambaceres, found that when a wick is plaited and then soaked in mineral salts, it curls toward the outer edge of the flame, where the fire consumes it. The wick literally trims itself and results in cleaner flames with no need for repeated snuffing. Within a few years, American stores were selling plaited wicking by the yard.

In 1834, inventor Joseph Morgan created a machine that turned out as many as 1,500 candles an



Left to right: Bleaching and adding bits of plant material give a hand-molded candle the look of early tallow. Made by dipping, the second candle, of solid beeswax, and the third, with paraffin added for strength, vary in diameter, length, and how well they fit in a sconce. A hand-molded beeswax taper stands straighter (and smells better) than dipped tallow. Added color indicates a machine-made taper.

hour using cylindrical molds where the wax cooled and pistons that extruded the candles. With Morgan's invention, candle making entered the age of genuine mass production.

In 1850, inventor James Young patented the process for distilling paraffin during petroleum refining. The combination of paraffin, stearin, and a braided wick produced candles that burned cleanly and brightly with no unpleasant odor. These were also the least expensive candles available-and the swan song for the candle industry. With the discovery in 1857 of kerosene as a cheap and plentiful fuel for household lamps, candles moved from necessities to decorative items.

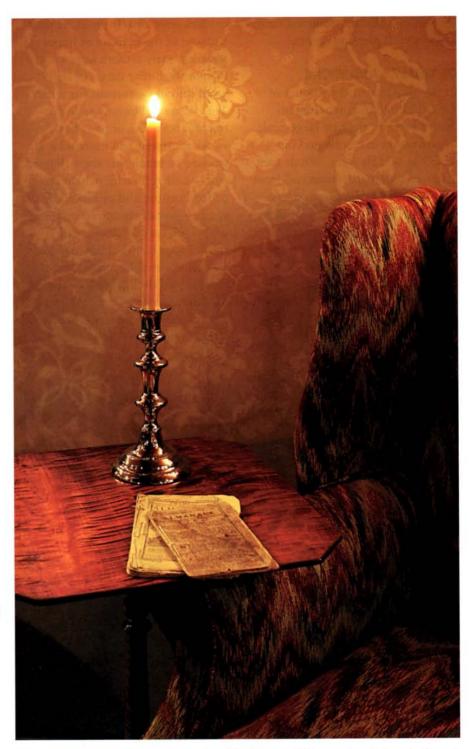
CANDLE MAKING TODAY

Despite kerosene and then electric lighting, commercial candle-making has boomed since Morgan's first candle-making machine. Today some 350 commercial and religious candle manufacturers in the United States sell more than \$2.3 billion in candles each year. Seven out of 10 American households have candles-fairly close to the 18th-Century statistic-although the average burning time is one to three times a week instead of nightly. Many candles merely await the unexpected power failure.

For this article, we talked to two artisans who still practice traditional candle-making techniques and a representative from one of America's foremost traditional candle companies.

CHUCK MADJESKI

After dipping beeswax candles for more than 20 years, Chuck Madieski remains convinced that the real challenge is keeping the pot at the right temperature. That's not easy when your heat source is a fire subject to the whims of the weather. If the pot is too cool, the wax won't adhere to previous layers. Too hot



Only wealthy town homes—characterized by fine furnishings such as this upholstered wing chair and maple table-could afford molded candles made by a professional. Madieski also offers a refined version of early molded candles.

and it melts them off and leaves you with a group of stringy wicks hanging from a stick.

Madjeski is a regular participant at several East Coast livinghistory festivals-most notably the 18th Century Crafts Fair at Mount Vernon and the James River Batteau Festival in Lynchburg, Virginia-where he dons colonial garb and demonstrates the art of early candle making. Few people know more about dipping candles by hand than Madjeski, but like most skilled

artisans, he didn't learn his craft overnight.

"The candles I dipped in the beginning were pretty bad-they looked more like hot dogs," he recalled. "That's the only way I can describe them. It took about two years to get out of the hot-dog syndrome."

For his demonstrations, he uses two pots, just as the settlers did-one for melting raw beeswax, the other for dipping. The first pot is half-filled with water and heated to boiling before the raw wax goes into it for rendering. "When you slowly melt the wax, the debris-the bodies of dead bees and little flecks of straw and all that stuff-sinks to the bottom," he explained. He then ladles the clarified wax into the other pot.

"Pot temperature is critical. It's the hardest thing to learn," Madjeski said, noting that it took him about 10 years to become proficient at maintaining a constant, optimum heat in the dipping pot. "When the coals under the first pot are right, I'll take one or two shovelfuls and put them under the dipping pot and just keep doing that as needed."



Re-enactor Chuck Madjeski of Richmond. Virginia, demonstrates his handdipping method for making beeswax candles at various historic sites.



Joe Rizzo, Proprietor

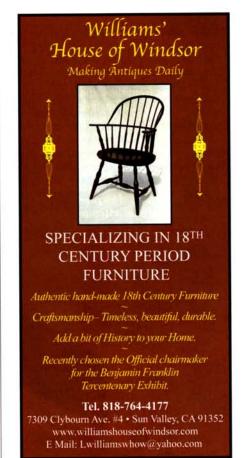
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fact is, after hard usage they tend to sprout holes everywhere and then they're hard to repair because of the waxy residue. Most people want the old molds that are still intact, but I'm happy with the ones with missing handles because they're more affordable."

Hilton began making her own candles in the 1980s when she and her mother, Marian, operated the Nantucket Northwest antiques shop in Oregon, which specialized in early New England pieces. "My mother had collected candle molds for years," she said. "I was looking at them one day and thought it'd be a good way to bring in some extra income, so I started using them." Soon she was selling her signature beeswax candles.

After her mother died several years ago, Hilton decided to resettle in the region they had traversed so often on antiques-buying trips. She moved to a house near Cooperstown, New York, and continued her candle making. In 2003 she moved to Norridgewock, about 30 miles north of Augusta, taking up residence in the former Danforth Tavern.

"I call my candles 'guilt-free' candles," she said, explaining, "I was always looking for something that looked right with antique lighting fixtures because a new, white candle tends to be jarring. What does look right is a genuine 19th-Century tallow candle. I've seen them and they cost \$100, so who's going to burn that? I've worked to get mine to look like the genuine old ones, but you can burn mine for about two dollars. That's why they're guilt free."

But getting the right distressed look has not been easy. For years she experimented with different concoctions. "I used to buy carrots in bulk and then juice them and save the pulp, which I'd bake in the oven to create a dust that I'd add to the mold. It created a good effect, but it was a lot of work and I got sick,

probably from breathing in all of that carrot dust."

Now she relies on a secret brew based on stewed leaves. The first step in her process is using the brew to treat the mold, which also aids when it's time to "release" the finished candles. "It's the key to the whole process," she noted.

Meanwhile she heats the beeswax in a double boiler on her kitchen stove. "When I left Oregon for Cooperstown I had a big wax melter of stainless steel, the kind you use outside. Using it outside in the winter was feasible in Oregon, but I couldn't picture myself using it outside in Maine's winters." She and her prized melter soon parted company.

Hilton uses a whitening agent to lighten the beeswax so it more closely resembles tallow. "I'm not doing the natural beeswax or red candles any more. My white and dark green candles have always been the best-sellers, so as a wholesale consideration, that's what I provide to my shops."

Hilton sells only to shops. About a hundred of them have stocked her candles since she began 20 years ago.

ROOT CANDLES

No other American candle company has the traditional roots of the aptly named Root Candles of Medina, Ohio. It grew out of the phenomenal success of Amos Ives Root-an innovative beekeeper and author known as "the father of modern-day beekeeping"-whose company in 1869 began manufacturing an array of innovative wooden beehive components. By the 1920s the company was selling what customers lauded as the finest grade of honey available anywhere. Because extracting honey produces a lot of scrap beeswax, by 1928 the Root family had entered the candle business.

Originally focused on fine liturgical candles, the company today-in its fifth generation of Root

CANDLE SAFETY

Fire was a common terror of the colonial household, and we certainly want to recapture the romance of soft candlelight without all its attendant potential for tragedy. Lighted candles were frequently knocked over by man. beast, or wind, and early diary accounts record how presbyopic readers set their reading material afire by carelessly pulling it too close to their light source.

Many modern manufacturers offer candles with safety in mind, featuring glass jars with lids, water moats, and protective lantern wind covers. Combined with careful use, they can rekindle the glow of the past. Here are some safety rules for family-friendly open flame:

Never leave a burning candle unattended.

Position the candle away from flammable objects-paper, tissues, or anything that could blow into its reach, such as curtains or table decorations.

Place a candle only on a level, nonflammable surface.

Remember that artificial plants. flowers, and greenery are VERY flammable.

Trim the wick to 1/4 inch to limit smoking, but keep the candle free of trimmings and match parts.

Realize that flame is mesmerizing for children and keep the two separated.

Never carry a lighted candle—hot wax burns too.

Never burn a candle that has a wick with a lead-wire core. These are banned in U.S.-manufactured candles.

Never burn a candle lower than 1/2 inch from the base of the wax.



The trend for modern candle manufacturers such as Herbal Star Candles and Root Candles is to produce long-burning, scented candles in decorative containers.

Beeswax has become scarce in recent years because the tracheal mite has decimated the North American honeybee population. Madjeski's solution was to raise his own bees for their wax, which over 20 vears has evolved into an avocation for the Richmond, Virginia, man. His demonstrations can consume nearly 200 pounds of beeswax, which he often mixes with paraffin to create stronger candles.

"The beeswax and paraffin are very compatible and make a very nice candle," he said.

Madjeski drapes his wicks over a wooden rod so that each length becomes two candles. He uses several wicks per rod to dip into the pot. "I'll do 60 to 80 dips over three hours to get a normal-sized candle of about an inch in diameter," he said.

If he were to use pure beeswax, the number would drop to between 30 and 40 an hour. So far he has never dipped tallow candles. "I'm curious about what it would be like, and I know that using tallow would

be about 100 dips over about five hours."

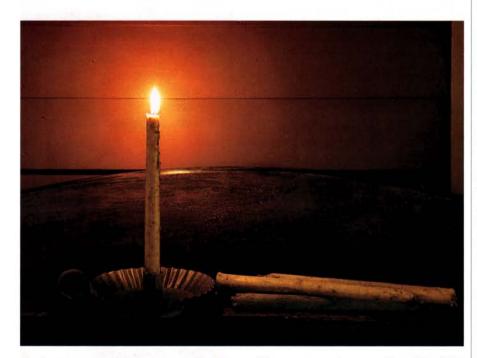
Festival attendees buy most of the candles Madjeski makes. Lantern-sized candles sell for about \$6 a pair and larger ones for \$10 a pair. He has been contemplating expanding his candle making by marketing to specialty shops whose clientele would want quality beeswax candles that are truly made by hand.

TERESA HILTON

Teresa Hilton constantly searches for old candle molds—preferably less-than-pristine examples from the 1800s-because over the course of a few years, she'll wear them out.

Working from her 1807 home in Norridgewock, Maine, Hilton pours enough beeswax candles to feed the commercial needs of dozens of antiques shops in the East and Midwest. Her candles are naturally fragrant and have the look of those that somehow survived a couple of centuries.

"I'm always looking for the original old molds," she said. "The



Few homes molded their own candles. Teresa Hilton coats antique candle molds with a leaf-based concoction to distress her beeswax candles and simulate tallow's impurities. She adds a whitening agent to some to replicate the look of early tallow and dyes others to mimic bayberry candles. She combines the look of tallow-expensive now and suitable only for dipping-with the production ability of molding.









family ownership—sells 45 percent liturgical and 65 percent decorative candles. Root offers an extensive catalog of decorative taper, pillar, and container candles, as well as altar, Advent, and sacramental candles. For people seeking an early ambience, Root has hand-dipped, beeswax-blend tapers in a variety of suitable colors.

While the fundamentals of the wick candle remain basically the same since Roman times, recent technology has changed the methods of production and what constitutes the wax, according to Bob Krulik, the company's vice president and general manager.

They still dip candles at Root, he said, but on a different scale. "We make them on large racks and the machine automatically dips them, about 1,200 candles at a time." Molds produce other candles. "The molds are aluminum, and there are large tanks with hoses fed by gravity so we can fill 600 molds at a time," Krulik explained. Root also employs an extrusion process—reminiscent of Morgan's first mass-production machine—so a continuous strand of cooling candle wax can be cut into desired lengths.

"The newest technology is compression candles," he noted.
"The machine sprays a liquid wax, which falls onto a cold drum where the granules harden, and then they're run through a compression machine where they're pressed into shape.
That's the best technology we have at the moment."

The other major development is the shift to agricultural-based waxes. For its liturgical candles, Root still uses beeswax—some 50,000 tons a year—with paraffin added for strength. Many of the company's decorative candles have been paraffin alone, but in the last five years the company has been adding soybean wax. Hydrogenated soy wax is gaining advocates among individual and

industrial candle makers because it burns even cleaner and slower than paraffin, is readily available, and holds a scent well.

"Fragrance is the key driver in the market today," Krulik said. "Candles that aren't fragrant have lost their importance. Fragrance is here to stay and so are candles in containers, with a lot more interesting styles of containers." *

Gregory LeFever, an Oregon writer specializing in historical subjects, is a contributing editor to Early American Life.

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SOURCES

Hezekiah's Candles

Teresa Hilton 14 River Road Norridgewock, ME 04957 207.634.2374

Chuck Madjeski

1006 West Franklin Street Richmond, VA 23220 804.323.1109 E-mail: batteau@yahoo.com

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