

BEN AVON AREA HISTORICAL ASSOCIATION

NEWSLETTER

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We have found another article which illustrates how much life's circumstances have changed in a short period of history. Some argue the electric light bulb takes first place when inventions are measured by magnitude of their impact. Read this and see what you think. This article originally appeared in Colonial Williamsburg Journal and is reprinted with the permission of the author.

Cursing the Darkness: Lighting and its Effects
on Virginia's Tradesmen
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"Last night after I had put out the Candle and gone to bed I was obliged to get up again and put on my Cloaths and sit up all night by reason of a snake having got under my Pillow, which made me afraid I having no light to clear the bed of him."

John Harrow was an indentured servant living in Virginia in the 1770's and the situation that befell him this particular evening is something which eighteenth-century minds could easily sympathize. Once your candle was out, it was generally out for the night because getting it going again required more than simply flicking a switch.

The wide variety of modern lighting available to us today has made us forget what it's like to struggle with darkness on a regular basis. Colonial tradesmen, in particular, were forced to think about light in a manner so unlike today that we have lost touch with the basics of functioning in a strictly-candescent age.

Think about it: if you could start to limit light arbitrarily, everyone's lifestyle would become very dependent on just how much light you made available. People would naturally alter their activities based on the ability to see totally at some times, negligibly at others, and sometimes not at all. In the eighteenth century, the availability of light completely controlled man instead of today's axiom of man controlling the availability of light.

Unlike modern light, eighteenth century light was *always* limited. Whether you depended on natural or artificial light, it was only there for a limited amount of time. When that time had past you either had to wait for the sun to come back up, or replenish your supply of fuel for some sort of flame. It was this consideration that was the most dominant part of a tradesman's experience: if you can't see, how can you work?

There are subtle differences between the two types of eighteenth-century light, natural and artificial. It was possible to take maximum advantage of both light sources at the same time, but this took some fore-thought about how and where you worked. Something as simple as working by sunlight required techniques that were not necessarily obvious.

For instance, you first had to make sure that the sunlight was able to reach you. Joseph Moxon, who wrote the first book in English on the art of printing (1683) stated that a printer should:

". . .take care that the Room [he works in has] a clear, free and pretty lofty Light, not impeded with the

shadow of other Houses, or with Trees. . . "

Buildings needed to face straight into that direction of the compass which allowed windows best exposure to the sun. Since windows were the only means of allowing natural light to enter, they needed to be in abundance on the East and West sides of the building.

Indirect sunlight was also important. Dormer windows, popular throughout the colonial period, were more than quaint architectural adornments. They were excellent collectors and reflectors of light. Not only did they allow light to enter the attic of a pitched roof but the sides of the dormer helped reflect and amplify.

William Pain's Builder's Companion and Workman's General Assistant (1765) mentions a specific method of calculating the amount of window space necessary to produce "proper Light for the Room, and not glare too much, nor be too dark." The formula was quite precise:

"The Proportion of Windows for light to Rooms, multiply the length of the Room by the breadth, and multiply the Height by the product of the Length and Breadth, and out of that Product extract the Square Root, which is the Light required."

In the example given, a room 12 feet long, 16 feet wide, and 12 feet high, requires 48 square feet of window space. This calculated space could be divided over any number of windows, although Pain's example suggested two, each 24 square feet in size.

Unfortunately, tradesmen rarely had the luxury of being able to design their work space from the ground up. Tradesmen were often mere tenants who could not afford to

build their own shops. In these cases, they had to adapt their work space as best they could.

One of the simplest (and most durable) ways of improving light in a room was to paint it a light color. Dark walls reduce the overall amount of light in a room by absorbing the light instead of reflecting it. This approach allows the conservation of what little illumination occurs naturally, before resorting to the cost of artificial light.

The way a room was arranged could also allow more efficient use of light. In almost all surviving eighteenth-century prints work occurs directly under windows and activities which don't require much light are usually taking place away from windows. In the cadescent age, it is much easier to move your work to the light, rather than vice-versa.

Tradesmen who chose to rely on natural light, had to realize that the ratio of day to night changed a little bit every day. Because June days in Virginia were almost half again as long as December days, a job that took two whole winter days to complete would probably require only a day and a half in the summer. Tradesmen adjusted their schedules accordingly. In 1813 Thomas Jefferson recorded the following chart in his farm book which shows how time of year could affect spinning and weaving.

	Length of Day (hours)	Linen Task (ounces)	Wool Task (ounces)	Cotton Task (ounces)
Jan., Dec.	9	15	12	6
Feb., Nov.	10	16 2/3	13 1/3	6 2/3
Mar., Oct.	11	18 1/3	14 2/3	7 1/3
Apr., Sep.	12	20	16	8
May, Aug.	13	21 2/3	17 1/3	8 2/3
Jun., Jul.	14	23 1/3	18 2/3	9 1/3
Average	11 1/2	19	15 1/3	7 1/3

As you can see, June's daily production of wool was over half again the amount produced on a December day - a direct correlation with daylight hours.

Another conditioner of sunlight is the weather. However, unlike the regular occurrence of night, the weather was virtually unpredictable. Unexpected periods of insufficient light, especially during activities where normal artificial light was simply too dim, could ruin or seriously delay the work of a tradesman.

However, in spite of all these eccentricities, when you could get it, the sun was usually the most desirable source of light. There were some types of high-detail work where the sun had no equal its for intensity and duration. Natural light was also free; artificial sources could be a significant expense.

Evidence from probate inventories and other sources suggest that when the sun failed them, colonial Virginians turned to candles more than any other source of artificial light. Candles had one big advantage over the sun: they weren't affected by season or weather. However, this seems to be their singular blessing.

Candles have an inherent eighteenth-century problem that John Harrow pointed out to us earlier: getting the blasted things lit in the first place. Since matches are a decidedly nineteenth-century development, flint and steel or the nearest fireplace usually provided ignition. But in summer these wouldn't be readily available. James Boswell had such a bump in the night in London in 1763:

"I determined to sit up all this night which I accordingly did and wrote a great deal. About two o'clock in the morning I inadvertently snuffed out my candle, and as my fire was long before that black and cold, I was in a great dilemma how to proceed. Down stairs did I softly and silently step to the kitchen. But, alas, there was as little fire there as upon the icy mountains of Greenland. I was now

filled with gloomy ideas of the terrors of the night. I was also apprehensive that my landlord who always keeps a pair of loaded pistols by him, might fire at me as a thief. I went up to my room, sat quietly until I heard the watchman calling "past three o'clock". I then called to him to knock at the door of the house where I lodged. He did so, and I opened to him and got my candle re-lumed without danger."

Today, almost all candles are made from paraffin, an oil not developed until the early 1860's. But the colonial tradesman had to choose between two completely different types of candles: wax and tallow.

Tallow candles were by far the least expensive and most common. They were made from the fat of sheep and beef and could be purchased or made at home. Tallow candles burned unevenly, smoked (and stunk) profusely, and melted in the summer heat. On top of this, tallow candles had the added annoyance of requiring frequent snuffing. Today the term "snuff" has acquired the same meaning as "extinguish", but that was not the way our eighteenth-century counterparts knew it.

Benjamin Franklin purchased a device in 1758 for his wife Debbie which appears to have been what people today consider to be a "snuffer".

"[I have bought for you] an Extinguisher, of Steel . . . and is of new Contrivance to preserve the Snuff upon the Candle."

The "snuff" Franklin referred to was the charred end of the wick. An extinguisher, which was conically shaped, could be used to put out a candle completely. A snuffer, on the other hand, was used to trim the wick while the flame continued to burn.

The braiding used in modern wicks combine with waxes with higher melting points to insure today's wicks are consumed as they burn. Before these improvements were made, wicks had to be trimmed as they burned or they would begin to droop and fold against the edge of the candle, forming a spillway. If this happened the candle would "gutter"- the molten fat would rapidly run down the side instead of being burned as fuel. As much as 95% of a tallow candle would run away if it was not regularly snuffed with a scissors-like device: a snuffer.

If you snuffed a little too exuberantly you could end up "snuffing out" the flame altogether like James Boswell did. This common mistake may be the reason why people today expect a snuffed candle to go out instead of becoming brighter.

Wax candles did not need to be snuffed nearly as often as tallow candles because the wax did not melt as fast. Still, snuffing was necessary to get the brightest light. Wax candles were produced from bees wax, bayberries, or "spermaceti" and represented the most expensive varieties.

Spermaceti candles (produced from whale oil) were by far the most dear, and beyond the reach of most tradesmen. Bayberry wax candles were the second most expensive variety and enjoyed popularity second only to tallow in the colonies. This may have been due to their better light or possibly because they just smelled good. Candles using the wax attained from the honeycomb of bees were also used in the colonies. Because its melting point is higher than tallow and bayberry, beeswax could be left unattended for long periods of time.

But regardless of the *type* of candle a tradesman chose, it was hardly the bright, maintenance-free, cost-effective solution against darkness to which we twenty-first-century types are accustomed.

There were many different factors involved in the decision to work by either sunlight, candlelight, or a mixture of the two. Occupations that required close attention to detail, like copper engraving in the production of illustrations, demanded a minimum amount of light at all times. The mere presence of light in this work was not enough - the *level* of brightness was crucial. The only way to judge the quality of an engraving was to view the reflection of the surface. Direct sun was too brilliant to use on clear days, and cloudy days could not provide light that was consistent.

Diffused light worked best for this work and the use of screens made with oiled paper and placed over windows was common. This served to spread the light evenly and reduce the overall glare on the engraved surface making small details more apparent. Oil lamps were used also, with smaller screens between the flame and the copper.

However, just as there were occupations that demanded steady and therefore artificial light in order to be productive, there were also trades that demanded the use of sunlight exclusively. Those who were employed in the production of gunpowder or fire-works, for instance, could not risk the presence of open flame. Farmers and workers who toiled outside were also in the same predicament. In these occupations, the weather and season must have greatly affected production in ways that couldn't be compensated as they were in other trades.

In the face of limited competition many colonial tradesmen may have been less inclined to suffer through dim artificial light if they didn't have to. Perhaps those working in rural areas (and those located in smaller cities like Williamsburg) had the luxury of being able to delay work while waiting for more adequate natural light rather than sweat it out with a dim, drear and dear supply of candles.

And, after all, the sun did provide a respectable amount of time to in which work. Jefferson's spinning chart is a clear indicator that his workers were active only when the sun was out. Jefferson apparently sought to harmonize his workers' schedule with the actions of the sun rather than attempt to combat nature by supplementing work hours with candles.

Gilbert White mentioned in 1775 that people in Shelborne, England,

" . . . burn no candles in the long days, because they rise and go to bed by daylight."

Interestingly, in a survey of 134 probate inventories for tradesmen from all thirteen colonies over 70% of the inventories mention some kind of lighting equipment. Over half of those people kept artificial lighting around either as a primary source or "just in case".

But what may be more significant than the percentage of inventories that mentioned this equipment is the over 29% of these tradesmen who *didn't own any lighting supplies at all*. The existence of an object on an inventory list doesn't give us a clue as to how or even if that object was ever used. But almost one third of these inventories didn't even mention one candlestick. This heavily suggests that those tradesmen didn't use any artificial light at work, they relied on the sun.

Clearly, we cannot accurately say what type light a tradesman would choose to use in a given situation. Personal preference, the presence of competition, and pesky human unpredictability removes the crystal ball from our possession.

And, while we frequently imagine eighteenth-century reactions to what impresses us - computers, space travel, and such - it seems harder for us to envision the impact of something as commonplace as a

match or a flash light. Their struggle with simply being able to see their work reminds us that the differences between our two centuries isn't limited to high-tech advancements.

James W. Knox
5/4/1919 - 12/30/2001

Jim Knox died late last year after several months battling various health problems.

Jim was a valuable contributor to the BAAHA board of directors since we reorganized in 1998. The concert by "Dear Friends" (our big event in late 1999) was his idea and it generated a significant impact in our community.

Recently, of course, he finished his draft of "Dear Emsworth" which we published last summer. This book is a great sampler of his story telling abilities and also serves to put the human touch on Emsworth history for all who read it. We are glad he finished it before illness sapped his energy, but sorry it is the last of his writing.

This true gentleman will continue to inspire us by his lifetime of service to his many interests throughout the Western Pennsylvania communities and institutions.

"Dear Emsworth"

The book sold well after publication in late July through September. Then sales were more sporadic. But after a recent Post Gazette article by Gretchen McKay sales boomed again. We have fully covered the printing costs due to this recent flurry. Thank you Gretchen , and also the Post-Gazette.

It is also nice to hear from so many people with an interest or old tie to our area.

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October, 2001 through February 2002

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