Towards the end of a long, inventive life Benjamin Franklin conceded that the best solution to the problem of artificial illumination was to do without it. The light of candles was “smoky, unwholesome, and enormously expensive,” and for ages past up to that point nothing better had been proposed. Daylight-saving time, he urged, offered the only answer for sensible people.

In a genial letter to the Paris press in 1784 Franklin claimed it his discovery, not that the sun rose early—the ancients as well as contemporary almanack makers knew that—but that “he gave light as soon as he rose.” Chiding Parisians for their slug-abed habits he admitted that this fact might not be credited by people whose first sight of daylight came only upon opening their shutters at noon. But he had confirmed it by carefully timing the dawn through his open window with a reliable watch morning after morning. It could not possibly be, as one sceptic had protested, that in leaving his own shutters open all night Franklin had let the darkness out rather than the light in.

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 about all that was asked. Anything further, such as lighting an entire room, was an enterprise that provoked comment. In 1773 Philip Fithian, Princetonian and tutor to the Carter children at Nomini Hall, Virginia, thought the dining room at that estate “looked luminous and splendid” one evening when there were “four very large candles burning on the table . . . [and] three others in different parts of the room.” Robert Carter, supported by an estate of more than 70,000 acres and 400 or 500 slaves, could well afford such a brilliant night life. But, as Fithian’s astonishment indicates, the ordinary household contrived with a lot less light.

In the course of a controversy that briefly animated the New-England Weekly Journal during the fall of 1728 several correspondents agreed that “a Family of but Middling Figure” consumed not more than three small candles a night, both summer and winter and “for ordinary and extraordinary occasions.” No one of such candles would have lasted out a whole winter’s evening and, since the average household numbered nine souls, the per capita share of light was negligible. Even so, as shown by the model budgets which Bostonians submitted to the Journal after it charged them with “Inadvertence of their own Expenses,” the cost of candles almost equaled the maid’s salary.

There may have been, as one historian points out, some causal relation between the reading habits of the colonists and their growing prosperity, *i.e.* their ability to afford, among other things, more and better candlelight. Between 1745 and 1763, a period of rising American fortunes, at least seventeen subscription libraries were founded in the colonies, aside from those associated with the colleges and schools. But even the best-read people remained sparing with candlelight. In his diary for 1743 the Reverend Edward Holyoke, then President of Harvard, noted that on May 22 and 23 his household made 78 pounds of candles. Less than six months later the diary records in its line-a-day style, “Candles all gone.” In other words the Holyoke ménage during the summer months was burning about half a pound of candles, or four to six average-size candles, each night. As market prices soared in those days of inflation Holyoke cast what must have been a nervous glance at his budget. In 1761 he computed it would cost him about £40 a year to light his house, even at the above feeble rate.
Trade card of William Parker, glass cutter (London, about 1775), showing “lustres,” “branches,” candlesticks, and hurricane shades “for exportation”
Revolving candle-dipping stand of oak, maple, and whitewood. Made in New England about 1800

and with “common sale candles,” the cheapest to be had.

Twenty-four years later George Washington, one of the most affluent of Americans, was interested enough to repeat Holyoke’s experiment twice. In his own figures it would have cost Washington about £8 a year to burn a single spermaceti candle five hours each night. Spermaceti candles were considerably more expensive than tallow. But they lasted longer, their odor was less disagreeable, and in spite of his love of economy, Washington preferred them, even if a dozen a night probably didn’t go very far in such a hospitable house as Mount Vernon. Washington himself habitually retired from his stream of visitors and went to bed “soon after candlelight,” getting up at dawn as wealthy Romans had done two thousand years before. Poor Richard’s “early to bed, early to rise” was just ancient common sense that appealed to rich and poor alike.

From the earliest days of settlement the colonists had supplemented firelight with open lamps, usually of wrought iron, of a type that had been used time out of mind. The very simplicity of such an arrangement, with a cotton or tow wick resting in almost any kind of illuminant, from fish oil and kitchen grease to the better kinds of whale and vegetable oils, encouraged its use until well into the nineteenth century. Quite possibly New York’s street lamps, until the introduction of gas in the 1820’s, were of this sort, no different in principle from the example illustrated. They “exhibited the somnified gloom of a sepulchral taper,” one contemporary New Yorker observed, and that only on moonless nights. But a feeble light was only one of the inconveniences for those who burned midnight oil over their books and papers in such
ABOVE: Early American wrought-iron lighting devices and a XVII century English pewter candlestick. BELOW: Types of brass candlesticks used in America during the XVII and XVIII centuries.
devices. They also must have smelled of the lamp more or less unpleasantly according to the grade of oil used.

To avoid expense some early colonists burned small torches, "the wood of the pine tree cloven into little slices something thin," set at an angle in the brickwork of the hearth or in specially wrought iron holders. But even as a rude shift that arrangement was too awkward and primitive for any except the poorest. It gave off much "fuliginous smoak" and dropped "a pitchy kind of substance" whenever it was placed. The common soft rush, found in moist pastures and besides streams, when stripped, bleached, and dipped in tallow might be supported in a similar holder as a modest improvement in convenience and light.

For ordinary domestic purposes, whatever the cost or other objections, candles provided the most satisfactory sort of illumination, as they had for centuries past and as they did up to less than a century ago. Those made of beeswax were luxury items too expensive for common use, although they were probably not unknown to those "damnable rich" merchants reported in Boston as early as 1663. Home-made tallow candles were the cheapest variety since they could utilize by-products of the kitchen. They smoked accordingly, especially when extinguished, and without constant snuffing, i.e. trimming, they became twice as objectionable and less than half as efficient. The most famous literary recognition of this is in Dean Swift's "Advice to Servants," in which he sardonically suggests that they snuff the candles at the supper table since the burnt wick might by luck fall into the soup, sack posset, or rice milk and thus be extinguished "with very little stink." However, domestic candlemaking added one more support to the economic independence of the home, a widely recognized asset in New World society, particularly during the blockades of the Revolution and the War of 1812.

In America the colonists found growing along the coastal strip the wax myrtle whose berries when boiled down yielded wax for bayberry candles. While these were also often made at home they at least had "a pleasant fragrancy," especially when extinguished; indeed, "nice people often put them out on purpose to have the incense of expiring snuff." A gift of bayberry wax was considered a handsome token in Europe, particularly since it could also be used as a plaster for wounds. The root of the tree was good for toothaches, too, and some New Englanders even stacked "the house round with bayes, as an effectual preservative against the power of evil spirits." Occasionally colonial legislatures had to forbid eager persons from plundering the bushes
before the berries were ripe. But the yield of wax in proportion to the weight of berries boiled was small, and unless the bushes were conveniently near by, berry-gathering was a labor-consuming procedure, as the high market prices of the candles indicated.

The spermaceti candle, which Washington preferred, was a distinctly improved illuminant. Made from a crystalline substance found in the head of the cachalot, or sperm whale, it burned longer, more evenly, and with relatively little odor, since it largely consumed its own wick. Unlike the tallow candle, it brought objects “close to the Sight, rather than causing the eye to race after them,” the advertisements claimed. Had it cost less it would have been the people’s choice as well. But the process of manufacture was for some time the secret of a group of professional American chandlers most of whom in 1761 organized the “United Company of Spermaceti Candlers” with factories up and down the coast. With the professed intention of killing off competition and fixing prices, the company was an early model for the modern monopolistic trust. It did help to develop a large foreign market for whale

_Tin chandelier made in New England in the middle of the XVIII century_
products. In 1770 over a third of a million pounds of spermaceti candles were exported to Europe and the West Indies. But it also helped to keep domestic market prices too high for general consumption. Both Holyoke and Washington computed that the cost of burning spermaceti was over twice that of tallow.

Candle light seems pleasant enough today since we don’t have to depend on it. But it was an anachronism that people had to put up with such inadequate lighting facilities so long. Within the hundred years before the Revolution other living arrangements had been completely reorganized. Cabinetmakers, potters, smiths, and glassblowers had evolved a variety of household gear that carried domestic life well forward towards modern standards of comfort and convenience. Indeed, the designs and specialized forms invented by eighteenth-century craftsmen answered their essential purposes so well and so agreeably that they still hold designers and manufacturers in thrall. A fair share of that invention was applied to lighting fixtures, which surrounded the candle with every dignity without, how-

ever, increasing its practical efficiency. Today, vice versa, with every improvement in lighting efficiency the fixture tends to become absorbed into the architecture of a room.

Particular attention was paid to special devices whereby the well-enough-to-do could amass their candles in concentrated displays. The best American houses were quick and able enough to enjoy that sort of compensation. Philadelphians still talk of the Mischianza of 1778, a fabulous mediaeval pageant staged by British staff officers in honor of General Howe, while Washington sweated it out at Valley Forge. To light the dining hall they were able to borrow from the houses of the city “one hundred branches with three lights in each, . . . eighteen lustres, each with twenty-four lights, suspended from the ceiling . . . [and] three hundred wax tapers,” which they “disposed along the supper-tables.” It was a prodigious concentration of light and one almost doubts the record when it neglects to describe the heat that must have been generated.

In 1784 the first radically improved lighting device in history was put on the market. Franklin’s letter to the Paris newspaper had been prompted by his interest in the new lamp, an invention of a Swiss, Ami Argand. Argand’s lamp fed oil from an elevated container to a tubular wick in a way that gave air to both outer and inner surfaces of the wick. Franklin himself had toyed with the same idea a few years earlier, using a hollow rush for a wick, but had not developed his
experiment. When, also in 1784, a Frenchman named Quinquet pirated Argand's invention and added a glass chimney to the lamp which served as a blower, lighting entered a new era.

As the first American edition of the Encyclopædia Britannica was quick to demonstrate, the new lamp not only provided illumination equivalent to that of six freshly snuffed tallow candles, but it operated at a relatively economical rate and consumed its own smoke. It became at once the fashionable lamp. Franklin and Jefferson, both in Paris at the time, bought several and shortly afterwards Washington was using them at Mount Vernon. Americans were manufacturing as well as importing handsome examples well into the nineteenth century (see ill. p. 40).

For all that, Franklin's reservations about artificial light were still valid. Being "the thing," the Argand or Quinquet lamps were usually made up in bronze, silver, porcelain, crystal, and other expensive materials that kept them well out of reach of the ordinary purse. Even the modest versions that Yankee tinsmiths were advertising as early as 1786 did not win any broad popularity. Absurd as it sounds they gave too much light. That is to say, it was impracticable to make them so small that they had no greater flame than that of a single candle and, as Franklin intimated in his letter, anything that burned more oil proportionately, whatever its brilliance and efficiency, was uneconomical for ordinary domestic purposes. Not only that but for people long accustomed to lesser lights the glare of the new lamps was "frequently too vivid for weak or irritable eyes," so that special screens were recommended for protection. Until there was brighter lighting little consideration was given to shades and even the direct light of candles was a trial for many, as the frequent purchase of "spektakls" suggests.

Meanwhile, in 1787 John Miles of Birmingham patented a lamp more congenial to the common purse and irritable eyes alike. Miles proposed an advanced model of the simple oil lamp in which the oil well was enclosed and the wick, instead of hanging over the side, was held upright. It was a neat apparatus which, if constantly trimmed, gave no less light than a small candle at a reasonable cost. Advertisements spoke of it as an "agitable" lamp, "so constructed as to prevent oil from spilling, although the lamp be overturned or thrown in any direction." That convenient portability was no small asset when the light reached scarcely an arm's length into the general obscurity of a room. These lamps did in fact become immensely popular in America. In the middle of the last century an English commission, referring to them as "lamps peculiar to the country," reported that American pressed-glass manufactories were putting vast quantities of cheap, attractive, easy-to-clean models on the market in addition to those of pewter, tin, and other materials. Most were made with double burners following Franklin's suggestion that two small wicks close together gave more light than one large wick.

While they never surpassed candles in popular favor the lamps did enormously increase the demand for burning oil, largely for whale oil, which remained the most important illu-

Minant in this country, aside from tallow, up to the Civil War. The whaling industry had already grown to impressive proportions, supplying not only the local market with spermaceti, various grades of oil, and whalebone, but exporting huge quantities to England and the continent as well. Twice American whalers were beached by the blockades of the Revolution and the War of 1812, but each time they returned to the seas in greater fleets than before. In 1787 Burke, in a memorable speech, traced their explorations to places which seemed “too remote and romantic an object for the grasp of national ambition” but which were only “a stage and a resting place in the progress of their victorious industry.” It was true. An occasional whale might still have been seen sporting in the Hudson and East Rivers but all the wiser ones, it was said, had learned to avoid Nantucket by a much wider margin. Before the end of the eighteenth century Nantucket and New Bedford men had chased their game around Cape Horn into what Melville called “the remotest secret drawers and lockers of the world.” By the beginning of the next century American whalers had virtually staked out the Pacific as their own green pasture. With the China traders they made Hawaii practically a suburb of Boston.

It was one by-product of that epic seafaring, as Professor Morison points out, that the Pacific is studded with islands named for the Starbucks, Coffins, Bakers, Folgers, Husseys, and Howlands of New England. It was another that when the United States was planning transpacific air travel it had the use of many an “insignificant” island along the route. The immediate result was that vast quantities of whale oil and spermaceti poured through American ports, both for home consumption and for export. Even such up-river towns as Newburgh, Hudson, and Poughkeepsie joined the chase.

But the problem of lighting cost still remained unsolved. Strangely enough, the price
of whale oil, in spite of that flood of imports, remained high, at one point reaching a peak price of $2.55 a gallon for sperm oil, the best illuminant. Even the ordinary whale oil was expensive enough to keep the tallow candle in common use. Meanwhile, though, entirely new factors were demanding the more intense illumination which average householders had been willing to do without. Steamboats and railroads with their all-night operations and traffic signals, factories with their special new problems, and the increased practice of good street lighting all called for better lighting.

As early as 1796 novel experiments with gas lighting were performed in Philadelphia; during the War of 1812 gas was used to light the cotton mills at Watertown and Providence; and in 1816 Baltimore became the first American city to organize a company for the distribution of lighting gas.

The general public, however, was wary of the new-fangled lighting “with smoke.” In 1836 Philip Hone, New York’s one-time mayor and a self-made man of ton, reported that at the fashionable ball given by Mrs. Charles H. Russell, “the gas suddenly gave out in the midst of a cotillion,” causing much merriment and some embarrassment. In his diary Hone conceded that gas had its points but that it was “liable . . . at all times to give the company the slip, and [was] illly calculated for the ordinary use of a family.”

So the search for a better illuminant continued. When a method of combining turpentine and alcohol was worked out in the 1830’s a wide variety of “burning fluids” was put on the market which undersold whale oil and gave good results. Unfortunately they had a tendency to explode with careless treatment and were called “liquid gunpowder.” Various patented lamps were evolved to minimize the danger, the simplest of them merely altering the ordinary whale-oil burner by making the wick more compact and tight, narrowing the wick tubes, and setting them at an angle to separate the tips. The tubes were also pro-
vided with extinguishers to keep the oil from evaporating when the lamp was not in use and to minimize the odor of the extinguished wick.

Oil pressed from lard proved even a better illuminant, quite the best so far developed, in fact. But since obituaries continued to mention “burning fluids” with awful frequency, and since the price of lard oil ranged from $1.00 to $2.50 a gallon, more than a day’s pay for skilled labor, the common man went on snuffing his candles and trimming his whale-oil wicks. Not so complacently, however. The common man was changing his expectations. One or another of the new “solar” lamps designed to burn lard oil struck the new note by claiming to be “The Greatest Luminary in the World, except the Sun.” Either from the experience of factories or as a result of unreserved advertising, ordinary people at last wanted more light as well as light that was good, cheap, and dependable.

Petroleum had been known for centuries. The Indians had used as a medicine the crude mineral oils found floating on the surfaces of lakes and streams, soaking it up with blankets and, as one missionary reported, sometimes bottling it for sale to white men at four guineas a quart. Its illuminating powers had been known too, but it had never been mined in commercial quantities. When the first real gushers came through in Pennsylvania just before the Civil War, and satisfactory refining methods were shortly afterwards developed, the masses were at last assured of night lighting they could afford and enjoy. Kerosene gave cheaper and better service than any other illuminant, and the supply seemed endless. It had the further advantage that it was light and could climb a fairly long stretch of wick by capillary attraction—which made it possible to keep the oil container well below the burner and out of the way of the light.

The advent of cheap kerosene almost drove the whaling fleets from the seas and made the candle obsolescent, save for ceremonial use. Not that candles were immediately eliminated for practical purposes, any more than kerosene lamps were by improved gas and electric lighting. In the gradual transfer of production from the household to the shop and factory that has outlined the economic history of America, candlemaking was one of the last industries to retain its essential domestic status. Recently when a handomely turned candlemaking stand was placed on exhibition in the American Wing it attracted a surprising amount of attention. Only the initiate recognize it for what it is—probably a domestic version of that “new invented machine for tallow Chandlers,” with its large wheel carrying many parcels of wicks, which William Bentley saw in a Salem factory in 1791.

Since Edison developed the electric filament lamp and Dr. Welsbach introduced the incandescent gas mantle, adequate, cheap illumination has become commonplace. With such later developments as the Tennessee Valley Authority and the Rural Electrification Act it is rapidly becoming one of the basic assurances of our social system. As a matter of curious interest, the single bulb lamp at the writer’s desk provides more light in about three weeks’ working time, at a cost of a dime, than the Holyoke household enjoyed in a year at a cost of over $40.

Besides standard references to lighting and the diaries and letters of the persons mentioned, the writer has also consulted articles in the magazine Antiques, the Chronicle of the Early American Industries Association, and Old-Time New England. S. E. Morison’s Maritime History of Massachusetts has a chapter and bibliography on the whaling industry.