

Social Meanings of Electric Light: A Different History of the United States

Mithra Moezzi, Lawrence Berkeley National Laboratory

To the consumer, using a light does not simply mean lighting a room at a given cost, but instead takes on a host of other meanings both psychological and somatic. A historical examination of lighting in the United States suggests ways in which electric lighting has influenced everyday life, and vice-versa, how everyday life and tradition may influence lighting practice.

Electric lighting, barely a century old, has brought fundamental changes in both the structure and consciousness of our lives. It has granted the opportunity of an expansion of human activity through space and time, paralleling the expansion of artificial light. Metaphoric and psychological interpretations of light and dark can provide a basis through which to understand discourse on electric lighting, perceptions of electric lighting, and how lighting affects notions of comfort, control, happiness, security, wakefulness, and desire.

The demand for lighting does not constitute a fixed need waiting for an ideal technique to satisfy it. Instead practice depends not only on the lighting techniques available but also on the meanings of such techniques and the meanings of the light these techniques provide. Therefore the social interpretations of light can guide experts in developing lighting technologies and policies, and can and should inform where energy conservation efforts are focused.

INTRODUCTION

If human behavior is considered at all in energy use modeling, it is typically accounted for as the “noise” deviating from engineering assumptions or statistical models. At best, behavior may be accounted for through reference to demographic variables such as income or educational level.¹ These approaches to behavior can be useful when the objective is statistical prediction of energy consumption and are not, in general, wrong. The paradigm underlying such approaches, however, can be misleading when it also serves as the basis, as it often does, for examining larger issues related to energy demand such as promoting energy-efficient lifestyles or designing energy conservation programs. Toward improving the effectiveness of such efforts, the foundations of energy use should be more closely examined (Kempton & Schipper 1994, 185).

The demand for lighting is, in fact, entirely based in behavior, for the very essence of all human energy use is behavioral. The challenge lies in understanding which behaviors can reasonably be modified, and which are so socially ingrained that cost savings and imposed morality are unlikely to override them. Our understanding of these issues can be furthered by increasing our familiarity with the social meanings of light as well as how and why demand for lighting is culturally constructed.

Lighting is such a naturalized aspect of everyday life that it tends to be unremarkable to the layperson except during periods of rapid technological change. It thus remains a relatively unexamined yet fundamental aspect of social life. The ultra-convenience of modern electric lighting permits constant use with minimal attentiveness. Some scholars have used cross-cultural analyses to demonstrate that very different perceptions and traditions may lie at the heart of differences in energy consumption between one community and another (Willhite et al. 1995; Prins 1993). In this paper, I examine instead the temporal dimension of light’s culture by sketching a social history of lighting in the United States over the past century, toward showing how the past informs present practices of energy use.

First, I give a brief overview of the history of lighting techniques and describe how the increasing amount and convenience of light made possible by technical progress has influenced social patterns. I then address the social meanings of light as embedded in language and other symbolic systems, and comment on possible physiological bases for social interpretations of light. I suggest possible reconstructions of our senses of sight, control, community, space, and time that may be linked to the introduction and proliferation of electric lighting. Finally, I suggest ways in which an improved understanding of the social meanings of light can help reframe lighting energy problems and thus help the energy professional better address the reduction of energy demand.

A BRIEF OVERVIEW OF LIGHTING THROUGH THE AGES

The standard technological progression of artificial lighting begins with fire, and continues on to torches, oil lamps, candles, arc lamps, gas lighting, electric incandescent lighting, and fluorescent lighting.² Oil lamps were likely in use as early as 50,000 B.C.E. (Panati 1987, 133). The candle had been invented by the end of the first century A.D. (op cit., 134). After the invention of the candle, it was at least a full 1700 years before another major lighting innovation, Argand's 1783 oil lamp and Davy's 1808 electric arc lamp (Schivelbusch 1988, 9–14). Edison's carbon filament lamp was patented in 1879, with much ensuing fanfare. His innovation did not achieve widespread adoption for several decades to come. In historical terms, major advancements in lighting technology are very recent—if you are now in your thirties or older, your grandmother was likely born in a house without electricity.

Lanterns and candles provided limited illumination: “The story of medieval lighting . . . is as dim as the lights themselves were,” writes F.W. Robins (1939, 4). Consider these before-and-after snapshots of electric home lighting: (1) in the 1830s, a typical home in Sturbridge, Massachusetts had at most three candlesticks or other lighting devices (Moss 1988, 36) and only the rich could afford more, while a typical American home today gives virtually no thought to the low cost of bathing any room in light; (2) a typical oil lamp of 1890 might have emitted seven candlepower, while a typical tungsten electric lamp of 1920 emitted 1500; (3) an Edison electric lamp of a century ago operated at an efficacy of 3 lumens/Watt, while a typical lamp used today may operate at 40 lumens/Watt (Mills & Piette 1993, 75); (4) before electrification, wicks had to be trimmed, lamps filled, and fuel collected, whereas now it is a matter of buying a light bulb once in a while and paying a monthly bill. To the consumer, the process of lighting has become mystified.

In short, lighting homes before electricity was inconvenient, costly, and technically limited. And lighting was dangerous: with candles and oil lamps there was the danger of fire, with gas there was also danger of explosion as well as unpleasant heat, oxygen depletion, and soot. These conditions limited both the amount of light used and the length of time for which light was used, and thus limited too the number of spaces in which people could gather. A typical pre-electric evening home scene has the entire family gathered around the lamp, some doing chores and talking, perhaps others reading.

To some extent, the introduction of gas lighting foreshadowed the effects of electric lighting. Gas lighting first became operational at the end of the 18th century, offering an adjustable and much-brighter light than earlier alternatives. The

earliest use of gas street lighting was in the United States was in Boston in 1819, but the technology moved only slowly westward: San Francisco streets were not gas lit until 1852.³ Gas was more popular for streets than homes. For the most part, gas was available only in urban areas, and the light it supplied was sometimes described as too harsh and glaring. Often judged unsuitable for lived-in areas, it served as a supplement to candles and lanterns rather than a sole source of artificial light (Nye 1990, 158).

By 1900, twenty-one years after Edison's 1879 patent, only about five percent of residences in the United States were electrified.⁴ By 1910 nearly 20 percent of residences were electrified. However it was not until almost 1930 that residential electric lighting was the norm in the United States. Rural household electrification rates were much lower than those for urban areas at any given time, with only 11 percent of rural residences electrified in 1935. Rural electrification was prodded along in the 1930s and 1940s by the efforts of the Tennessee Valley Authority and the Rural Electrification Administration. By the beginning of World War II, the electrification rate of U.S. housing stock in aggregate was over 80 percent. Then and now, lighting is typically the first electric end use installed when electricity is introduced; other applications take hold later. At the turn of the century, nearly all residential electric power consumption was used for lighting, though by the 1930s lighting accounted for only 40 percent of residential electricity use (Schurr & Netschert 1977, 623). In 1995, lighting accounted for an estimated 20 to 25 percent of nationwide electricity use.⁵

Once introduced, electric lighting provides immediate and dramatic changes in the environment. It makes possible much greater levels of illumination than previously feasible, both inside and outside the home. This increase in illumination, in turn, expands the breadth of what can be seen at any time, and thus increases the number of human activities possible at any time and eliminates the need to gather around a limited light source. In just one century, America went from no electric lighting to nearly complete electric lighting. This rapid proliferation led to fundamental changes in American life—where and when people gathered, where and when they could work, and their personal perceptions of comfort, safety, privacy, intimacy, and control.⁶ These both inform and are informed by the symbolism of light as manifested in common metaphors as well as in the rhetoric of lighting. These social meanings are the subject of the following discussion.

THE SOCIAL MEANINGS OF LIGHT

Metaphorical interpretations of light and darkness

Flame and light are strongly associated with religion and magic and have rich metaphoric worlds. Light symbolizes

truth, knowledge, and progress: The Enlightenment, to see the light, the Torch of Knowledge, and the brightness of an intelligent person. In contrast, darkness often symbolizes ignorance, oppression, evil, or lack of personal control: to be in the dark, Dark Ages, dark forces, lunatic.⁷ These metaphorical interpretations—in addition to the physiological effects of lighting—contribute to a fascination of the interplay between light and dark, a phenomenon applied by architects, interior designers, dramaturgists, and cinematographers. The border between light and dark, a dimness evocative of the ambiguous, “in-between” periods of dawn and dusk, is especially associated with imagination, intimacy, and the supernatural. Light also facilitates surveillance and represents power *over* and attention *to*, while darkness gives respite: to be in the spotlight as opposed to standing in the shadows.⁸ This duality is a current in the discourse on electric lighting, as will be discussed below.

Formal literary and social interpretations of electricity

Formal accounts of electric lighting embody and reinforce the traditional social meanings of light described above. Development literature consistently credits electrification with increasing productivity, literacy, and well-being. Historically, electric lighting has been described as a purveyor of happiness, knowledge and progress, cleanliness and health:

“If you put a light on every farm, you put a light in every heart.”

—Rural Electrification Administration official, 1935 (as quoted in Donovan 1990,150)

“The epic of artificial light reveals the human race born in the darkness of ignorance, emerging into the twilight of knowledge, achieving some creditable independence from Nature, and eventually reproducing and even surpassing Nature’s light and lighting.”

—Matthew Luckiesh, *Torch of Civilization* (1940:86)

“Not only did . . . lanterns foul the air—giving off dangerous and irritating exhaust fumes—but they were also all but ineffective, offering only a dim, flickering light source. Today, Navajo families have a safe, clean, power provided by the same sun they have worshiped as a deity for millennia. A Navajo mother expressed her satisfaction with this new power source: ‘My sons no longer have red eyes and chest pains from breathing in lantern fumes. They see better and can do their homework without these health hazards; they have the clean lighting provided by our sun and the sand from beneath our feet.’ ”

—Scanlon et al. (1993) in *Mother Earth News*, describing the benefits of a recent photovoltaic system installed on Arizona’s Navajo Reservation.

The contemporary social symbolism of electricity and electric lighting has been adapted from the traditional symbolism of natural lighting. For example, while a flame is sometimes used to symbolize knowledge, cartooned light bulbs are used to represent something similar, although less subtle—an idea, something immediate. As Garnert (1990, 1991) has demonstrated through an examination of Swedish advertisements and trademarks, there exists an “electro-cultural” symbolism of light as intelligence, power, and even love. Another property we have come to associate with electric lighting is cleanliness. This may stem in part from electric lighting’s whiteness, its ability to reveal dirt if dirt is present, and because it is much cleaner to use (in the vicinity of the light) than earlier alternatives. In such ways, the modern light bulb has become more than just a source of light: it is a tradition and a symbol imbued with a variety of meanings.

The way we socially experience light directly relates to the way we use it. Easy as it is to flick a light switch in the home, the psychological difference between a light being on and a light being off may override attempts to promote tides of conscientiousness in energy management: a room that is lit is a room that is already available and safe, possessed, ready for habitation, connected. A room’s lighting creates a large part of its personality and perhaps embodies the personality of the decorator. In contrast to bright and overhead lights, low lights, scattered like kerosene lamps of old, are associated with coziness and intimacy, at least in Norway (Willhite et al. 1995).

LIGHT’S INFLUENCE ON HUMAN HEALTH AND WELL-BEING

Medical evidence points to the fact that our positive social interpretations of light may in fact have some physiological basis.⁹ Beginning in the late 19th century, there was a great deal of interest in the links between electricity and health, including the use of electricity for treating fatigue and for promoting crop growth (Schivelbusch 1988, 69–76). Electric light itself was said to be healthier than gas lighting and kerosene lighting. Links between health and electric lighting remain under examination, and many medical journal articles as well as more popular essays report on the influence of the timing, amount, and quality of light on the mind and body.¹⁰

For example, in 1984, researchers identified a syndrome now known as “Seasonal Affective Disorder” (SAD). People with SAD experience recurrent depressions during the winter months (Schmittbiel 1994). The explanation for this syndrome is that the presence of light—either artificial or natural—inhibits the secretion of melatonin, a hormone which, at high concentrations, is believed to cause drowsiness (Melbin 1987, 125). This means that, physically, our bodies respond to light with wakefulness and other associ-

ated physiological effects. Light therapy is a common treatment for SAD (Rosenthal 1993), and farmers have long used light intensity and artificial photoperiod to manage domesticated animals (Melbin 1987, 125). It has been suggested that the decrease in the age of menarche coincident with industrialization may be linked to increased availability of light, correspondingly decreased levels of melatonin secretion, and thereby a reduction of melatonin's inhibitory effects on maturation (Melbin 1987, 124–125).

Although it would be very hard to prove, these medical findings suggest the possibility our social and technical shift towards brighter and more artificial light may have been paralleled by large-scale historic shifts in physiology, including the disruption of a “natural” circadian rhythm. The lighting industry has responded to these health concerns by developing lighting alternatives more closely allied with sunlight, such as full-spectrum lighting, daylighting, and special devices including Bio-Brite's Sun-Rise alarm clock, which features a globe-shaped light meant to awaken the user by gradually brightening, mimicking sunrise.

It is also possible that the proliferation of electric lights has changed the frequency and perhaps the nature of human intimate relationships. For example, anecdotal evidence indicates that: (1) the lights went out in New York City for a few days in 1965; legend has it that this resulted in a mini-babyboom;¹¹ (2) local birth rates have often been reported to drop soon after electrification (Garnert 1991); and (3) candles remain a traditional setting for romance. These comprise circumstantial evidence at best, but all suggest that darkness and semi-darkness are more conducive to sex.

HOW LIGHTING HAS CHANGED OUR SENSES

Over the last two centuries, and even over the last twenty years, there has been a gradual dispersion of people and of light across both the hours of the day and the landscape. Electric lighting has been fundamental in supporting this expansion, and has consequently changed the way that we experience the world around us. Below, I describe the ways in which electric lighting has influenced our senses of sight, space, community, safety, time, and control.¹²

Sense of sight

First and foremost, light permits sight. With electrification, the relative abundance and ease of use of light brings accustoms us to illumination, perhaps with such profound consequences as a reordering of the senses so that vision becomes the “most important” sense.¹³ Low lighting levels are still used to facilitate imagination, intimacy, and to build suspense: consider the campfire, making a wish by blowing out

birthday candles, and the coziness of dim lights for intimate gatherings. All these indicate that imagination is most active in the not-quite-dark—both in sensing the supernatural and, like flame, dawn, and dusk, evoking other worlds or possibilities.¹⁴

Sense of space and community

When humans are awake they are almost always near light. Since only a few sources of light were available in the typical American household before electrification, friends and families gathered around these isolated light sources at night, before going to sleep. The small, dimly lit, socially dense area centered at the source of light stood in contrast to the dark, empty spaces surrounding it. But once electric lighting is installed, the configuration and use of domestic space change, first socially and then architecturally. So, too, do the social dynamics of the domestic and public spheres change. The dispersed and bright light offered by electricity means that there is much less need for the family to gather together in the evening. Schivelbusch (1988, 79) echoes this claim: “Electric light not only dissolved the centre around which the family gathered, it also altered the whole appearance of the room that it lit up, or rather, inundated, with light.” This dissolution occurs not only inside the home but outside of it as well. Electric lighting has encouraged night life and urbanity, and perhaps has played a role in the increasing separation of public from private realms.

Sense of safety

Darkness is often almost synonymous with danger. Light, then, offers relative safety. As a child you left the bedroom light on when you were scared. As an adult, when you leave the house, you leave a light on to give the impression of someone being home, perhaps to create sense of welcoming, but often too for security reasons. The neighborhood association wants lights on your street. The association of darkness with danger is not limited to the 20th century, for there have always been wild animals, the possibility of misstep, criminals, and the other-worldly. However, the modern urban environment may have driven the association of darkness with danger to new heights, particularly because alternatives to darkness are so feasible. Ralph Waldo Emerson wrote in his diary, decades before electric street-lighting, that: “A good lamp is the best police” (Bouman 1991, 64). General Electric agreed: “Light is also a good fireman, a first class salesman, and a wonderful protector of human life. And at what low wages it works!” (op cit.). From the perspective of power companies and lighting manufacturers, the night and security lighting market is a profitable direction, promoting the purchase of new hardware and off-peak load. Use of motion-sensed security lighting shot up in Los Angeles in 1989, for example, possibly in response to fear

of the “Night Stalker,” Richard Ramirez. Night lighting is used not only for reasons of security and practical utility, but also for highlighting certain parts of the landscape, such as shopping areas or magnificent buildings, and for promoting urbanity and socializing.¹⁵

Sense of time

Before electrification, nights were dark. As Jan Garnert writes: “*People moved in a day-time world and a night-time world, where light and darkness set boundaries for the things they could do*” (1993, 277; emphasis original). Electricity, instead, eventually granted the possibility of bright lighting anywhere and at any time of day. The legacy of living by the dictates of the sun remains strong after these 100 or so years, and in a paradigm of productivity, early rising is still a sign of virtue—“The early bird gets the worm” and “Wake up, get ahead, get out of bed, call 1-900-976-WAKE.”¹⁶ Melbin (1987), drawing on spatial metaphor, describes night as frontier and electrification as the major factor in allowing the “colonization” of the night. Seven-Elevens were an early night-time outpost of the 1950s, but within the last two decades, suburban 24-hour supermarkets, red-eye flights, and all-night rave parties have become common—though all are still viewed with some suspicion.¹⁷

Sense of control

Symbolically, light may connote power, as suggested above. This symbolic connotation may manifest itself in strategies of light management, making the desire for individual control a particularly potent factor. Americans have a reputation of valuing individualism and control. Whether these stereotypes are correct or not, issues of a desire to control still bear consideration in the assessment of automatic control strategies such as motion sensors and timers. Remote control of electronic equipment may not be so much about “laziness” as it is about instantaneous control of the immediate environment. People may not prefer the ease of automatic adjustment, even with the smartest of fuzzy logics—the act of manual adjustment is an act of power. These issues of personal control have implications for the lighting professional, as will be discussed later.

LIFE WITHOUT ELECTRIC LIGHT

Electrification has been called the lifeblood of progress in the industrialized world (Khatib 1993, 28). Though almost all of your ancestors and about one-fifth of the population of the contemporary world lived or live without electricity, you are almost assuredly utterly dependent on it for your everyday life. What it would be like to live in the United States without electricity? The Old Order Amish community in the United States provides a peek at unelectrified living.

The Amish are a religious order numbering 125,000 scattered among scores of settlements in North America, most famously in Lancaster County, Pennsylvania. Old Order Amish are a retreatist sect eschewing much of the technology introduced in the late 19th and early 20th centuries. Members of this sect do use electricity for some purposes, but being connected to a central grid is taboo, according to an ordinance set by the Amish church in 1919. Generally, 12 volt direct current (DC) is considered an acceptable form of power, while 110 volt alternating current (AC) is not, and electric lighting is generally frowned upon. Invertors, which convert 12 volt DC to 110 volt AC in order to power electronic devices, remain controversial. Indoor lighting is provided primarily by kerosene lamps, although battery-powered lamps may be used by the elderly for reading. The refusal to accept electrification and telephony have been interpreted as a refusal, both symbolic and material, by the Amish of ominous dependencies on the outside world.¹⁸ Thus the Amish deny themselves many modern conveniences and links to the world that are otherwise taken for granted. Despite this lack, the Amish remain financially successful farmers, with homes that seem more modern than rustic. For the most part taboos are against ownership of modern technologies, rather than their use (Kraybill 1989).

Lack of electricity is far from the only unusual aspect of Amish life, but the Amish do provide a perspective through which to look at comfort and desire. In many ways the material desires of modern life seem to depend on what is perceived as available, rather than on any innate need. One Amish member, quoted by Kraybill (1989, 153) put it well: “Electric would lead to worldliness. What would come along with electric? All the things that we don’t need. . . . If you have an electric line coming in then you’d want a full line of appliances on it. The Amish are human too, you know.” Modern technology is perceived as capable of seducing even the most stalwart ascetic. The taboo against distributed electricity allows the separation desired by the Amish to be maintained.¹⁹

Not only does distributed electricity breed dependence of the home on the power plant, it also has bred dependence of the nation on the rest of the world. While these dependencies are rarely at the top of consciousness of consumers there are occasional reminders: at the level of the home, when the power goes out or surges, or at a national level, the Energy Crisis of 1973–1974 when awareness of a nation’s dependence on foreign products and limited resources became especially acute. Conserving energy became, at that time, a moral issue for many Americans, with apparent material effect. Morrison (1992, 128) notes that during this period residential energy use flattened; this was one of only two periods since the beginning of the record that growth in electricity usage did not increase.²⁰ During the mid-to-late 1970s, nearly coincident with the Energy Crisis, the “light

bulb” joke cycle was particularly popular in the United States.²¹ These jokes rely on the premise that screwing in an electric light bulb is the simplest of tasks, but one that not everyone can do “right.” The folklorist Alan Dundes has suggested that the popularity of the light bulb cycle at that time in fact reflected a nation’s tension at perceived loss of national and personal power and autonomy; it was a time at which many were asking “Will there be enough ‘power’ to go around?” (Dundes 1986, 148–149).

SOME PRACTICAL INTERPRETATIONS FOR THE LIGHTING PROFESSIONAL

Technology and society form a dialectic. As the work of many others has suggested,²² and as I hope to have provided additional support for above, the connection between a lighting technique and the consumer involves far more than the amount of money paid for fulfilling a relatively inflexible need for lighting.²³ Even perfect market information could not strip the relationship down to these engineering and economic factors. Rather than express a consumer’s failure to adopt cost-effective lighting as the result of imperfect information and other market shortcomings, and to frame these as the problems we must overcome, I suggest that we look more closely at the complex social meanings of light. A better understanding may give us a hook toward encouraging modifications to lighting behavior and toward developing lighting techniques that incorporate other social benefits in addition to the benefit of energy efficiency.²⁴ At the least it can help us recognize particular lighting behaviors even if they can not effectively be modified. Toward forging a better link between the business of promoting energy conservation and the practice of everyday life, I give a few concrete examples below.

Understanding motivations for lighting

The association of light with cleanliness and industry might help explain practices that from a energy professional’s perspective seem inefficient. Residential users, as mentioned above, may use lights not only as security measures but also as assertions of power and possession. In the commercial and industrial sectors, overlit supermarkets and mostly-empty office buildings lit up at night might also be at least partially be understood as manifestations of the symbolic language of lighting. These impressive displays convey feelings of cleanliness, power, productivity, and of availability.²⁵ So too—far beyond the security lighting market—might lighting often be used to monitor, control, and discipline, rather than to help those on which the light is shed to see.

Lighting standards

Standards propose “proper” amounts of lighting for hundreds of specific tasks, ostensibly tuned to ensure a productive and healthy space for learning and work. However what is considered to be the proper amount of light depends on culture and on the lighting techniques that are available. Bartlett has shown how different these recommended levels can be from place to place, with standards for many tasks twice as high in the United States as in Norway (1993, 173). In the United States recommended lighting levels for some specific tasks have risen dramatically between the 1930s and the 1970s: for classroom chalkboards the 1938 recommendation was 150 lux, whereas in 1972 it was 1400 lux; the 1930 recommendation for fine detail drafting was 175 lux, whereas the 1970 recommendation was 2000 lux. The latter represents an increase of over ten-fold in four decades (Mills & Borg 1993, 4,14). Since 1970, however, the U.S. recommendations for lighting levels have dropped again, by as much as fifty percent (loc cit).²⁶ Both the changes in U.S. lighting standards over time, and the often substantial variation of standards among countries, suggest that what is proper lighting is highly culturally constructed.

Lighting control strategies

People turn lights on and off and adjust lighting levels, not only to see, but also in order to assert control and to send messages.²⁷ As mentioned above, there is a certain psychological power in filling an area with light. Conversely, when someone or something else turns a light on or off in your presence, you are controlled. Consider the following lighting control categories formalized by Mills and Piette (1993, 83): illuminance reduction, on-off control, task-specific tuning, lumen maintenance, load shedding, and daylighting. These *may* allow the individual increased control over the local environment, but depending on the implementation, instead of the individual controlling the technology, the technology, in a sense, controls the individual. This effect is more subtle than the “control” some feel from being beckoned by telephones, electronic mail, or pagers. Nonetheless flexibility in lighting control strategies is well worth considering for psychological if not practical purposes, especially in selling for residential markets. At work, one expects to be under the control of one’s employer, and outdoors one expects to be under the control of a somewhat predictable nature, but at home one may feel strongly about controlling one’s own environment.²⁸

CONCLUSIONS

Electric lighting has changed both the structure and the consciousness of everyday life. An awareness and improved understanding of the social dimensions of lighting can fruit-

fully inform the direction of lighting research, focus energy conservation advertising, and furthermore can promote a recognition of the ways in which assumptions about the meanings of electric lighting form a basis for our own “objective” analyses.

Lights are not turned on just in order to see. The need for lighting is not fixed, but rather is a flexible and relative demand, and tied to much more than the need to work at visual tasks. To the consumer, using a light does not simply mean lighting a room, but takes on many other meanings. While lighting styles can likely be influenced by a number of social factors, the extreme and eternal importance of light in people’s everyday lives may render small cost savings and alleged increases in convenience available through the use of energy-efficient lighting products and the adoption of energy-conserving practices unlikely selling points for Americans, at least in the residential sector and very possibly in much of the commercial sector as well.

ACKNOWLEDGMENTS

My thanks to Dr. Roger Hahn of University of California Berkeley for comments on an early draft of this paper and to Dr. Deborah Hopkins of Lawrence Berkeley National Laboratory for her comments throughout. All shortcomings are my own.

ENDNOTES

1. Lutzenhiser (1993) provides examples of such behavioral studies in a review article.
2. See Schivelbusch (1988) for a good summary of 18th and 19th century Western lighting technologies in macro-social context. Robins (1939) traces lighting devices from earliest archeological evidence.
3. By the 1850s, arc lighting was used experimentally for street lighting in Europe. It was later sometimes used in the United States (Schivelbusch 1989, 114–134).
4. U.S. residential electrification rates based on U.S. census data compiled by Fischer (1992).
5. Environmental Protection Agency estimate 1996 obtained from web site (<http://www.epa.gov/docs/GCDOAR/GreenLights.html>).
6. Garnert (1993) discusses, in ethnological perspective, many of these issues for Sweden.
7. The root of lunatic is “luna,” meaning moon. This is not identical with darkness, but instead calls to mind the association of night with danger and disorder, discussed below, and thus corroborates some of the other associations of darkness.
8. As Foucault (1979, 135–228) discusses, the Enlightenment not only discovered the liberties but also invented the disciplines. Convenient bright light enables Foucault’s “gaze” full-time (op cit., 173).
9. For many academics, the distinction between the mental, the somatic, and the social have become increasingly muddled, though in practice the categories are still useful.
10. See Wilkens (1993) for a discussion of some of the scientific and medical literature on light’s physiological effects.
11. Brunvand (1993) documents this legend. There is apparently little evidence that there was in fact a baby-boom, but the legend remains interesting as discourse.
12. For more general discussions of the effects of modernity on consciousness, see Harvey (1990), Kern (1983, and Thrift (1995).
13. Here are two corroborating pieces of evidence. (1) It is often said that the blind “compensate” for their inability to see with heightened sensitivity of touch, hearing, and smell; while I have no evidence that this is “true” it is widely accepted as plausible. (2) Consider the proverb “Seeing is believing.” This is now a very common proverb in the United States, but evidence suggests that this is a truncation of an earlier version of the proverb “See is believing, but feeling is the truth.” It has been suggested that this shift reflects a particularly American world view, one that privileges seeing the truth for oneself (Dundes 1980, 89). Another possibility, however, is that it represents *electric* world view and the foregrounding of sight over other senses.
14. Falassi (1980, 23) for example, suggests that the Tuscan hearth “was the center for the transformation of Nature into Culture” and that the old woman sitting next to the fire “became an evocator and operator of images, mediator of the past and present, now and once upon a time, real truth and imagined truth, good and bad,” and comments on the difference between flame and the steady light of the incandescent electric blub.
15. There are moves to limit night lighting, however, such as mounted by The International Dark Sky Association.

This organization, founded 1988, is dedicated to building awareness about “light pollution” citing risks not only to astronomy but also to the casual observer of the cosmos. The organization promotes both dark skies and “good lighting” (<http://www.darksky.org/~ida/info14.html>).

16. This motto is used in an advertisement broadcast on late-night television advertising a nationwide “wake up” call service. Satisfied customers are shown scuttling to work the next day dressed in fine business suits.
17. Despite the physical possibility of being nearly as active in the middle of the night as is typical for the daytime, middle-of-the-night activity is characteristically viewed as a time for impropriety—drunkenness, drugs, prostitution, and trashy television.
18. Kraybill (1989, 1994) provides support for this interpretation.
19. See Kraybill (1994, 35–50) for a discussion of the Amish people’s “war against progress.”
20. The other exception is 1933, which showed a two percent reduction in electricity consumption (Morrison 1992, 128).
21. For example, “How many Californians does it take to change a light bulb?” Answer: “Ten. One to change the bulb and nine to share in the experience.” How many Berkeley graduate students does it take to change a light bulb?” Answer: “Only one, but it takes her ten years.” Or: “How many Harvard men does it take to change a light bulb?” Answer: “Just one to hold it up while the world revolves around him.” The premise of these jokes is that changing a light bulb is so easy that anybody can do it, and failure is a sign of gross incompetence or a flawed personality; this characterization may rest in the comparison between use and maintenance of earlier lighting devices and the modern lamp.
22. For example, Okólski (1995) for lighting, and Palmborg (1995), Hall et al. (1994), and Willhite et al. (1995) for other electric end uses.
23. See Hinchliffe (1995) for a discussion of the limitations imposed by relying on the outlook that energy efficient techniques are the key to energy conservation.
24. Mills and Rosenfeld (1994) discuss the use of such “non-energy benefits” as a means of encouraging the adoption of energy-efficient products.
25. In comparison, early public lighting displays seemed most attuned to conveying splendor (see Schivelbusch 1988 and Nye 1990, for example). Patterned lighting can also convey messages. Clearly this is the case with lit signs or letters composed of lights, but also in less obvious cases, such as observed in Atlanta where the windows of an office building were lit in the pattern of a Christian cross.
26. Mills and Borg (1993) also provide data showing that specific lighting standards for European countries generally rose gradually from initial standards to those of 1990.
27. For example, a motion-sensed light turning on as one walks by may have a disruptive, unpleasant effect.
28. This is not to say that people will not rely on automatic controls. However, if previously “active” lighting managers are coerced into submission, the strategy may not only build resentment but also fail to save energy.

REFERENCES

- Bartlett, Sarita. 1993. “Shedding Light on Residential Consumers.” *Energy* 18(2):171–183.
- Bouman, Mark J. 1991. “The ‘Good Lamp is the Best Police’ Metaphor and Ideologies of the Nineteenth-Century Landscape.” *American Studies* 32(2):63–78.
- Brunvand, Jan Harold. 1993. *The Baby Train and Other Lusty Urban Legends*. New York: W.W. Norton.
- Dundes, Alan. 1987. *Cracking Jokes: Studies of Sick Humor Cycles and Stereotypes*. Berkeley, Calif.: Ten Speed Press.
- Donovan, Gregory. 1990. “Rural Electrification.” *Kenyon Review* 12(3):120.
- Falassi, Alessandro. 1980. *Folklore by the Fireside: Text and Context of the Tuscan Veglia*. Austin, Texas: University of Texas Press.
- Foucault, Michel. 1979. *Discipline and Punish: The Birth of the Prison*. Translated from the French by Alan Sheridan. New York: Vintage Books.
- Garnert, Jan. 1990. “The Cultural Charging of Electrical Metaphors.” Paper presented at American Folklore Society Meeting, Berkeley, Calif.
- Garnert, Jan. 1991. “The Cultural Charging of Electricity. On a Folkloristic Approach to Technology and Culture.”

- Paper Presented at the *Conference on Vernacular Culture in the North Atlantic*, Memorial University, St. John's, October 21.
- Garnert, Jan. 1993. *Anden i Lampan. Etnologiska Perspektiv Pa Ljus Och Morker*. English Translation of Title: *The Genie of the Lamp: Ethnological Perspectives on Light and Darkness*. Summary Translated from Swedish to English by Alan Crozier, pp. 272–284. Stockholm: Carlsson.
- Garnert, Jan. 1994. "Seize the Day: Ethnological Perspectives on Light and Darkness." *Ethnologia Scandinavia* 24:38–59.
- Hall, David R., David H. Hungerford, and Bruce Hackett. 1994. "Barriers to Non-Compressor Cooling: Air Conditioners in Social Context." *In the Proceedings of the ACEEE 1992 Summer Study on Energy Efficiency in Buildings*, 1:59–63. Washington, D.C.: American Council for an Energy-Efficient Economy.
- Hinchliffe, S. 1995. "Missing Culture: Energy Efficiency and Lost Causes." *Energy Policy* 23(1):93–95.
- Harvey, David. 1990. *The Condition of Postmodernity*. Cambridge, Mass. and Oxford, England: Blackwell Publishers.
- Kern, Stephen. 1983. *The Culture of Time and Space: 1880–1918*. Cambridge, Mass.: Harvard University Press.
- Khatib, Hisham. 1993. "Electrification for Developing Countries." *EPRI Journal* 18(6):28.
- Kempton, Willett and Lee Schipper. 1994. "Expanding the Human Dimensions Research Agenda." *In the Proceedings of the ACEEE 1992 Summer Study on Energy Efficiency in Buildings*, 1:85–90. Washington, D.C.: American Council for an Energy-Efficient Economy.
- Kraybill, Donald B. 1989. *The Riddle of Amish Culture*. Baltimore, Maryland: The Johns Hopkins University Press.
- Kraybill, Donald B. 1994. "War Against Progress: Coping with Social Change." In Donald B. Kraybill and Marc A. Olshan (eds.), *The Amish Struggle With Modernity*, pp. 35–51. London: University Press of New England.
- Luckiesh, Matthew. 1940. *Torch of Civilization: the Story of Man's Conquest of Darkness*. New York: G.P. Putnam's Sons.
- Lutzenhiser, Loren. 1993. "Social and Behavioral Aspects of Energy Use." *Annual Review of Energy and the Environment* 18:247–289.
- Melbin, Murray. 1987. *Night as Frontier: Colonizing the World after Dark*. New York: The Free Press.
- Mills, Evan and Mary Ann Piette. 1993. "Advanced Energy-Efficient Lighting Systems: Progress and Potential." *Energy* 18(2):75–97.
- Mills, Evan and Nils Borg. 1993. *Trends in Recommended Lighting Levels: An International Comparison*. LBL-34565. Berkeley, Calif.: Lawrence Berkeley National Laboratory.
- Mills, Evan and Art Rosenfeld. 1994. "Consumer Non-Energy Benefits as a Motivation for Making Energy-Efficiency Improvements." *In the Proceedings of the ACEEE 1992 Summer Study on Energy Efficiency in Buildings* 4:201–213. Washington, D.C.: American Council for an Energy-Efficient Economy.
- Morrison, Bonnie Maas. 1992. "Ninety Years of U.S. Household Energy History: a Quantitative Update." *In the Proceedings of the ACEEE 1992 Summer Study on Energy Efficiency in Buildings* 10:125–134. Washington, D.C.: American Council for an Energy-Efficient Economy.
- Moss, Roger W. 1988. *Lighting for Historic Buildings*. Washington, D.C.: The Preservation Press.
- Nye, David E. 1990. *Electrifying America: Social Meanings of a New Technology, 1880–1940*. Cambridge, Massachusetts and London: The MIT Press.
- Okólski, Janusz. 1995. "Some Social Aspects of Energy-Efficient Lighting in Poland." *In the Proceedings of the 1995 ECEEE Summer Study: Sustainability and the Reinvention of Government—A Challenge for Energy Efficiency 2*, ID #18. A. Persson (ed.). Stockholm, Sweden: The European Council for an Energy-Efficient Economy.
- Palmberg, Christer. 1995. "Energy and Lifestyles: A Comparative Analysis." *In the Proceedings of the 1995 ECEEE Summer Study: Sustainability and the Reinvention of Government—A Challenge for Energy Efficiency 2*, ID #18. A. Persson (ed.). Stockholm, Sweden: The European Council for an Energy-Efficient Economy.
- Panati, Charles. 1987. *Extraordinary Origins of Everyday Things*. New York: Harper and Row.
- Prins, Gwyn. 1993. "On Condis and Coolth." *Energy and Buildings* 18(3–4):251–258.
- Robins, F.W. 1939. *The Story of the Lamp (And the Candle)*. London, New York, and Toronto: Oxford University Press.

Rosenthal, Norman E. 1993. "Diagnosis and Treatment of Seasonal Affective Disorder." *Journal of the American Medical Association* 270(22):217.

Scanlon, Matt, Robert Terry Epstein, and Michael Potts. 1993. "Living off the Grid: 1994 Guide to Solar Power for New Home Owners." *Mother Earth News* 141:48.

Schmittbiel, A. , M. J. Gross, P. Bujon-Pinard, M. Laxanaire. 1994. "Chronobiology and Depression: the Seasonal Depressions." *Annales Medico-Psychologiques* 152(7):444–456.

Schurr, Sam H. And Bruce C. Netschert. 1977. *Energy in the American Economy: 1850–1975*. With Vera F. Eliasberg, Joseph Lerner, and Hans H. Landsberg. Westport, Connecticut: Greenwood Press, Publishers.

Thrift, Nigel. 1994. "Inhuman Geographies: Landscapes of Speed, Light, and Power." In Paul Cloke, Marcus Doel, David Matless, Martin Phillips, and Nigel Thrift, *Writing the Rural: Five Cultural Geographies*, pp. 191–248. London: Paul Chapman Publishing Ltd.

Wilkins, Arnold J. 1993. "Health and Efficiency in Lighting Practice." *Energy* 18(2):123–129.

Willhite, Harold, Hidetoshi Nakagmi, Takashi Masudo, Yukiko Yamaga, and Hiroshi Hanada. "A Cross-Cultural Analysis of Household Energy Use Behavior in Japan and Norway." *In the Proceedings of the 1995 ECEEE Summer Study: Sustainability and the Reinvention of Government—A Challenge for Energy Efficiency 2*, ID #32. A. Persson (ed.). Stockholm, Sweden: The European Council for an Energy-Efficient Economy.