

Media Resources Guide

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Abstract

Beautiful Light by internationally acclaimed lighting designer Randall Whitehead and lighting industry expert and educator Clifton Stanley Lemon is a combination of idea book, design resource, and introduction to residential lighting design. It explores the transition in residential lighting from incandescent light sources to LEDs; provides grounding in the fundamental qualities of light, and shows how LEDs can be applied in residential lighting with great success, following the enduring design principles of good lighting. It explains how LEDs differ from older light sources, with innovative graphics that show how to design with light layers, light people, and balance daylight and electric light. Every room of the house, as well as exterior and garden spaces, is addressed in 33 case studies of residential lighting with LEDs, with a wide variety of lighting projects in different styles. With over 200 photographs of dramatic interiors beautifully lit with LEDs and clear, concise descriptions of design strategies and product specifications, Beautiful Light helps both professionals and non-professionals successfully navigate the new era of LEDs in residential lighting.



Randall Whitehead

One of the foremost authorities on residential lighting, Randall has written six books on the subject. Beautiful Light will be the seventh. His work has appeared in many publications including Architectural Digest, House Beautiful, Esquire, Horticulture and Architectural Record. He writes a monthly column for Furniture, Lighting and Décor Magazine called The Lighting Doctor where he discusses lighting trends and addresses lighting dilemmas. He has given presentations for LightFair, LightShowWest, Strategies in Light, the American Society of Interior Designers, (ASID), the American Institute of Architects (AIA), the National Kitchen and Bath Association (NKBA), the American Lighting Association (ALA) and the Illuminating Engineering Society (IES). He has also appeared as a guest expert on HGTV, the Discovery Channel, CNN and Martha Stewart Living Radio.



Clifton Stanley Lemon

Clifton is CEO of Clifton Lemon Associates, a consultancy providing strategy, marketing, and education services to the lighting and energy industries. He is the Business Development Director for the California Energy Alliance and the Co-Chair of the Strategies in Light conference. He was formerly Marketing Communications Manager for Soraa; Director of Business Development at Integral Group; and founder and CEO of BrandSequence. Clifton is an active writer and speaker and has extensive experience in curricula development for professional training in lighting and energy efficiency. He is a past President of the Illuminating Engineering Society San Francisco Section, and is on the Advisory Board of LightFair International.



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Beautiful Light

An Insider's Guide to LED Lighting in Homes and Gardens

Randall Whitehead, Randall Whitehead Lighting Inc and
Clifton Stanley Lemon, Clifton Lemon Associates

Beautiful Light by internationally acclaimed lighting designer Randall Whitehead and lighting industry expert and educator Clifton Stanley Lemon is a combination of idea book, design resource, and product guide. It explores the transition in residential lighting from incandescent light sources to LEDs, and how to apply LED lighting with great success.

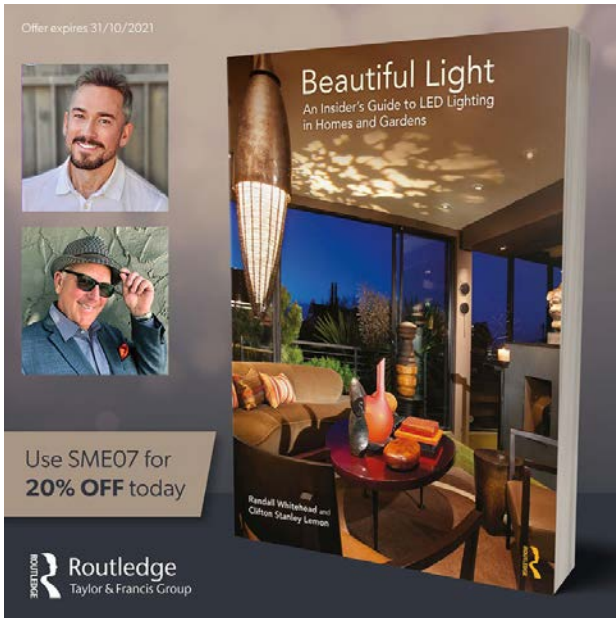
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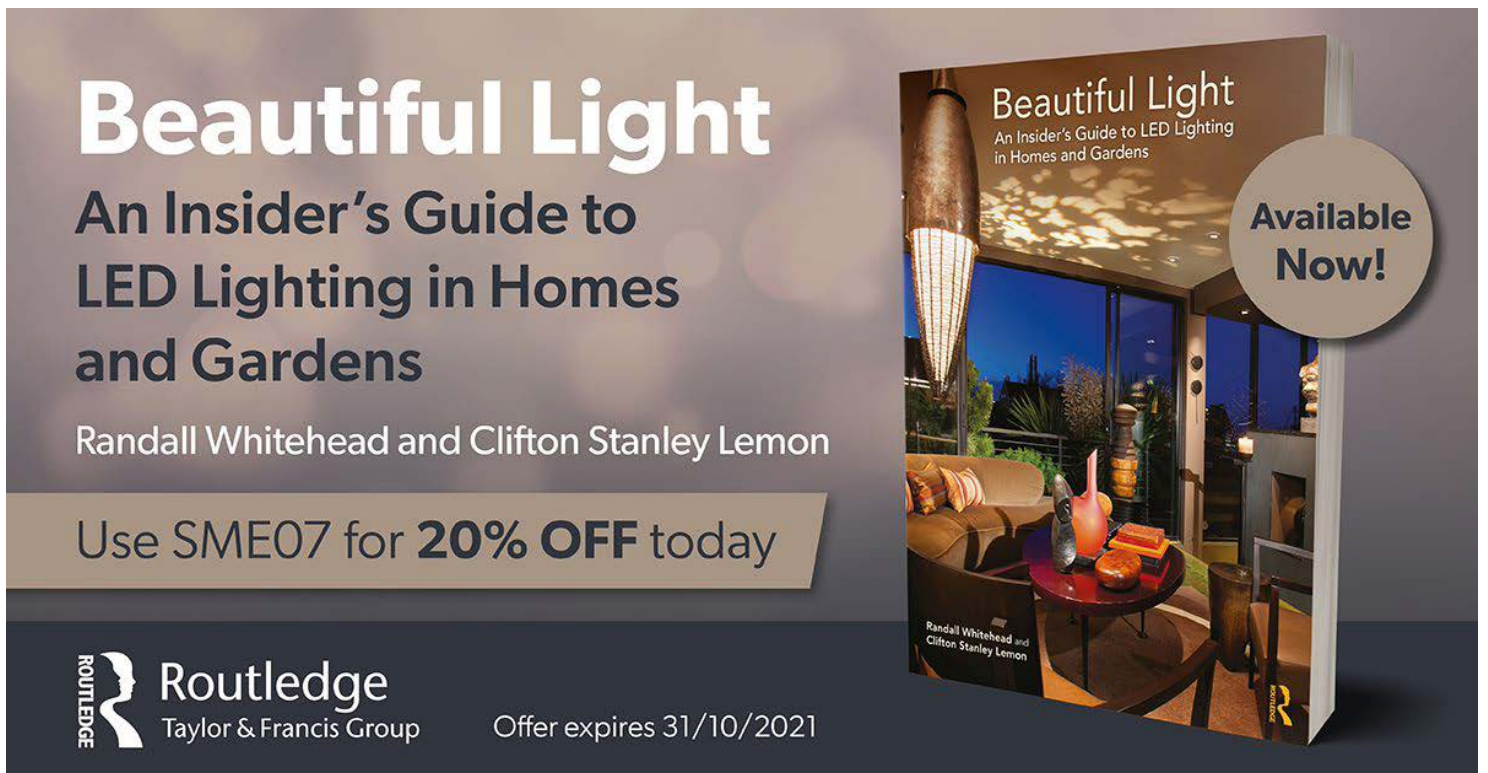
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Suggested Interview Questions

1. What led to your writing this book?
2. What is it that we're missing about LEDs- isn't being energy efficient good enough?
3. You talk about Light Layering in the book, can you explain what that is and why it's important?
4. You talk about lighting people in the book- this seems like it might be pretty obvious, but what are we missing in this idea?
5. Older people still probably think of incandescent lighting as the best, yet you claim in the book that LEDs are now actually better. What's your evidence for that?
6. You don't talk about lighting controls or codes and standards much in the book, why is that?
7. It seems that lighting, like almost everything else, is getting more complicated for everyone. How will this book help people to understand how to deal with that today without becoming more confused?

Clifton Lemon Associates

FOR IMMEDIATE RELEASE

***Beautiful Light* by Whitehead and Lemon Released by Routledge Taylor & Francis Group**

August 13, San Francisco CA: Clifton Lemon Associates today announced the release of *Beautiful Light: An Insider's Guide to LED Lighting for Homes and Gardens*, by internationally recognized lighting designer Randall Whitehead and lighting industry expert and educator Clifton Stanley Lemon. Published by the eminent design publisher Routledge Taylor & Francis, the book connects LED lighting technology with the time-tested tenets of good residential lighting design.

Beautiful Light is a combination of idea book, design resource, and introduction to residential lighting design. It explores the transition in residential lighting from incandescent light sources to LEDs, provides grounding in the fundamental qualities of light, and shows how LEDs can be applied in residential lighting with great success following enduring lighting design principles. It explains how LEDs differ from older light sources, with innovative graphics that show how to design with light layers, light people, and balance daylight and electric light. Every room of the house, as well as exterior and garden spaces, is addressed in 33 case studies of residential lighting with LEDs, with a wide variety of lighting projects in different styles. With over 200 photographs of dramatic interiors beautifully lit with LEDs and clear, concise descriptions of design strategies and product specifications, *Beautiful Light* helps both professionals and non-professionals successfully navigate the new era of LEDs in residential lighting.

According to co-author Randall Whitehead, "Since LEDs are still relatively new to many homeowners and designers, we wanted to write a book showing how they have been used to make really beautiful lighting designs. We also feel that rather than looking back nostalgically at the old incandescent lighting, we should embrace the newer high quality LEDs that are now widely available on the market, as they're better in every way. We show that excellent lighting design now has even more possibilities with this wonderful technology."

"Residential lighting is not given the attention it deserves in design education, and we wanted a book that corrected that. Also, since LEDs were commercialized, far too much of the focus has been about energy efficiency, usually at the expense of quality of light. Because of LEDs, residential lighting is now as efficient as it needs to be, and we don't need to make any tradeoffs whatsoever between energy efficiency, climate action, and quality light. We can now focus on what we too often forget in architecture and design – beauty," said co-author Clifton Stanley Lemon.

Beautiful Light is now available on the [Routledge website](#). More detailed information on the book is available [here](#). Download the Media Guide [here](#).

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Beautiful Light

An Insider's Guide to LED Lighting in Homes and Gardens

Randall Whitehead
Clifton Stanley Lemon

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Chapter 1

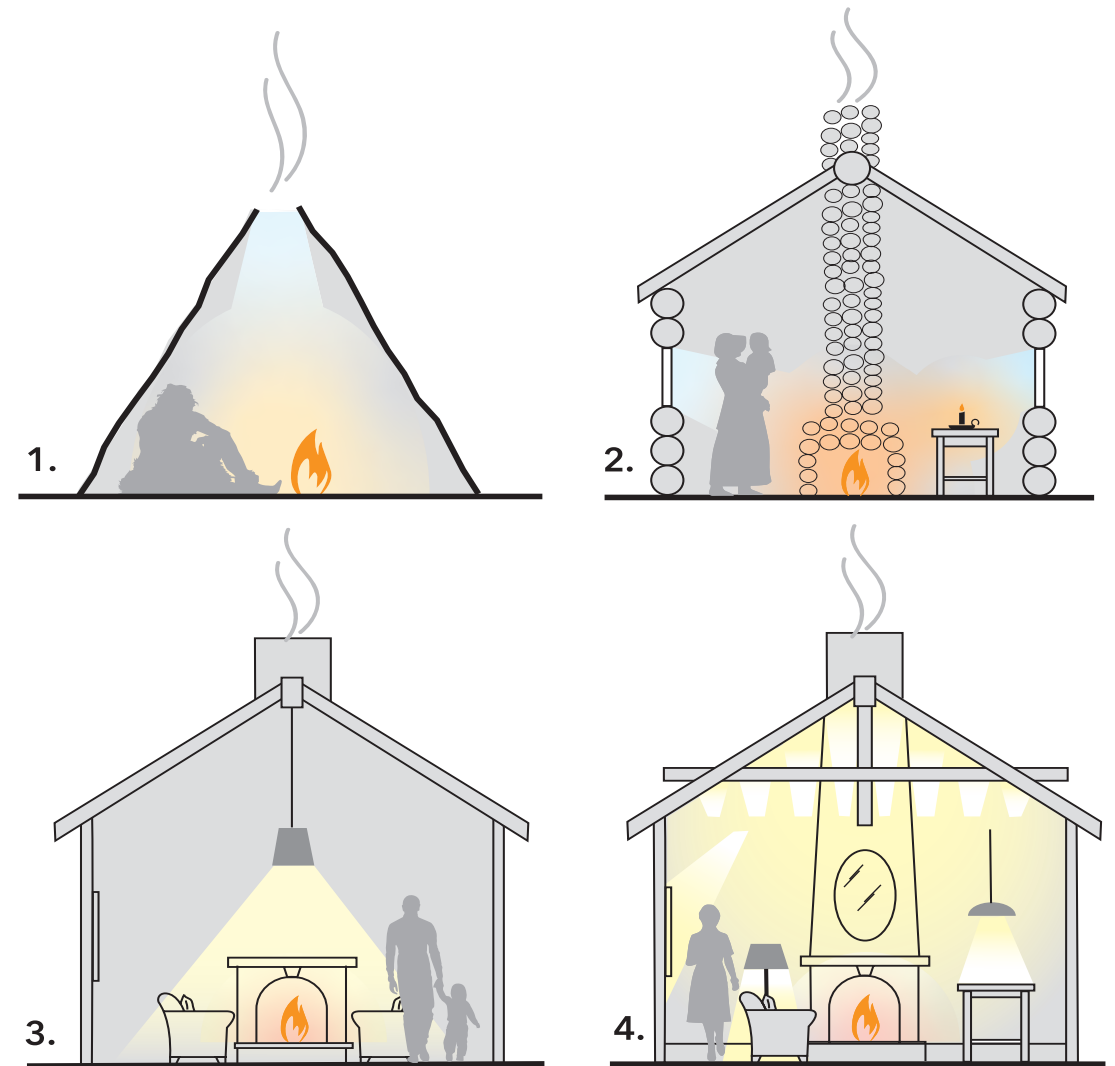
Evolution of Interior Lighting

In order to explore the evolution of lighting in the home we start with a brief examination of our modern Western concept of the home, the archetypal structures that embody it, and how they evolved. Even though the ideas of family and, indeed, "home" are fluid social and cultural constructs and are constantly shaped by the combined forces of technology, economics, and urbanization, for the purpose of focusing our discussion to perhaps the most commonly understood model in the United States today, we'll talk about the single-family home. Whether single- or multi-story with detached walls on a separate plot of land or as part of a larger multi-family building, this layout is typically comprised of a collection of single purpose rooms – living room, dining room, kitchen, bedrooms, bathrooms, multipurpose open plan rooms, miscellaneous utility rooms, and outdoor spaces. This particular arrangement has not been the norm for the majority of human history.

The most primeval dwellings made use of shelter to mitigate, and harness, the effects of the environment. Our basic physiological needs demand a roof over our heads and walls to create an envelope for protection from the elements, predators, and enemies and a place for fire, gathering, and preparing and consuming food. A completely dark enclosure is not useful. One of the earliest innovations was an opening in the top of a hut, tipi, or other enclosure that not only let in daylight but allowed for the exhaust of smoke and fumes from the cooking fire and oil lamps which were necessary to dispel the darkness.

Before advanced lighting technology (candles, gas lamps, then electric lights) humans evolved under conditions of light that centered around the daily rhythms of sunlight during the day and firelight at night. It's easy to imagine that our visual equipment –our eyes and brain – are hardwired for these two conditions and the transitions between them. Indeed, vision science has identified parts of the eye – rods and cones – that process light at different levels. There are three kinds of vision: scotopic vision, or night vision, which uses only rods to see (objects are visible, but appear in black and white); photopic vision, or daytime vision, which uses cones and provides color; and mesopic vision, the in-between vision, which we use most of the time in mid-level light conditions.

As tribal groups grew in size and complexity, communal dwellings evolved that were organized around a central fire. People all slept in the same large lodge or room, along with the dogs. Light was provided by oil lamps, fire, and openings which were often no more than holes in walls or ceilings that let in light and air and allowed smoke to escape.



▲Figure 1.1

Four stages of complexity in the evolution of interior lighting: 1. Sky light and firelight in a primitive hut. 2. Sky light and firelight in a log cabin with small windows. 3. Single source ceiling lighting in a modern home. 4. Balanced layers of light: ambient, task, accent, and decorative. Illustration: Clifton Stanley Lemon.

Our current arrangement of single purpose rooms seems to have begun in 12th century Northern Europe with the innovation of the chimney. This was the era of a mini Ice Age, and temperatures were much colder than what we're experiencing today. Chimneys allowed multi-story buildings to share distributed heat from one shaft. This hastened the development of smaller rooms which were more economical to heat, which contributed to the modern idea of domestic privacy – a “room of one’s own,” so to speak. Windows in these buildings were expensive and were sometimes glazed with thin sheets of animal horn, a material also used for lanterns.

The ancient Romans had developed advanced glass manufacturing methods that made glass windowpanes affordable for many buildings by 200 CE, but this technology was lost during the Dark Ages between 400 and 800 CE. In the 14th century however, French glassmakers perfected the technology of making flat panes of transparent glass, which were initially small and required assembly in lattices or window frames. Gradually window openings became larger and allowed buildings to make more use of daylight. Before gas and then electric light, an architectural tradition had developed that made skillful use of buildings’ volume, surfaces, and windows to modulate daylight for lighting the home. In fact, an archaic architectural term for windows is “lights.”

At night though, interior lighting for most homes consisted of fires, candles, and eventually more sophisticated lamps using oil and kerosene. The next lighting technology revolution was gas lamps, which produced a much brighter light and began to dispel darkness at sufficient levels to extend working hours and, along with many other rapidly evolving technologies, impact forms of social organization and family structure. Ingenious devices were invented that multiplied the fragile, precious light as much as possible – chandeliers for instance were devised to amplify candlelight and were a great status symbol as only rich people could afford candles in medieval times. The forms of these luminaires persisted long after fossil fuel-based lighting gave way to electric lighting. Also, all fuel-based lighting produced noxious, unhealthy fumes and coated interior surfaces (and lungs) with soot and other chemical deposits.

When electricity as a distributed power source emerged in the 19th and early 20th centuries, electric lighting was the first application of this ground-breaking new technology. The cost and effort involved in running power lines from the local coal gas burning power plant to the home meant that typically only one light per room was feasible, and it was placed in the center of the room in the ceiling. This remains a default lighting strategy in many homes today, even though it’s entirely inadequate for providing a well-lighted environment.

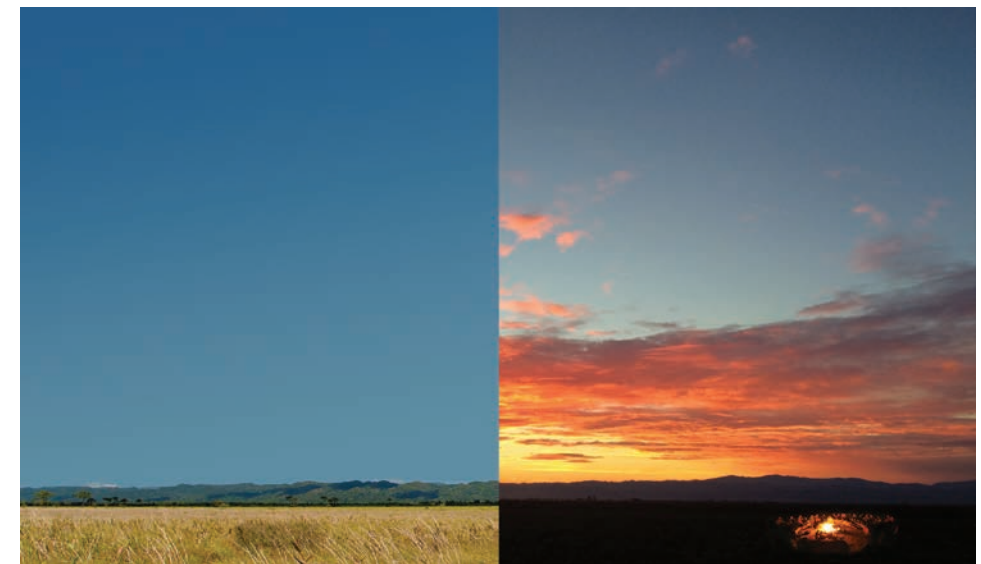
As electric lighting expanded and became ubiquitous in residential use throughout the 20th century, the modern practice of lighting design was born, exemplified by designers like Richard Kelly, who articulated the theory of light layers. Even though electric incandescent light had technical limitations we no longer have today with LEDs, designers like Kelly established a solid methodology that involves identifying the various purposes for types of lighting and blending them carefully into an integrated whole.

What LEDs have done is allow us to use the light layering approach to much greater advantage, with better light that is much more efficient, lasts longer, and can be applied easily in more locations than ever before. It also allows us to improve lighting so that people look and feel better – this is the most important benefit of beautiful light with LEDs.



▲ Figure 1.2

This home shows a well calibrated balance between cooler daylight and warmer electric light in ambient, accent, and decorative layers. Photo: Dennis Anderson, Lighting Design: Randall Whitehead.



▲ Figure 1.3

What we call the skyline/fire line theory of lighting says that humans evolved to see brighter, cooler ambient light (sky light) from above and warmer light (firelight) from below. Photos: Clifton Stanley Lemon.

Chapter 4

Lighting People

We believe that our first principle of residential lighting – lighting people – is the real “human centric lighting.” It’s not only about how light makes you feel but about how it makes you look (of course the two are obviously connected). But we are definitely in the minority – most people, including lighting designers, architects, interior designers, and homeowners, only conceive of lighting as something that illuminates furniture, art, finishes, and materials – all the stuff we are keen to show off in order to demonstrate our exquisite taste and confer status! The best designers have an intuitive understanding of the fact that for better or (usually) for worse, the need for status trumps almost all other human drives. This frequently results in poor quality lighting that can ruin an otherwise beautiful architectural, interior, or landscape design.

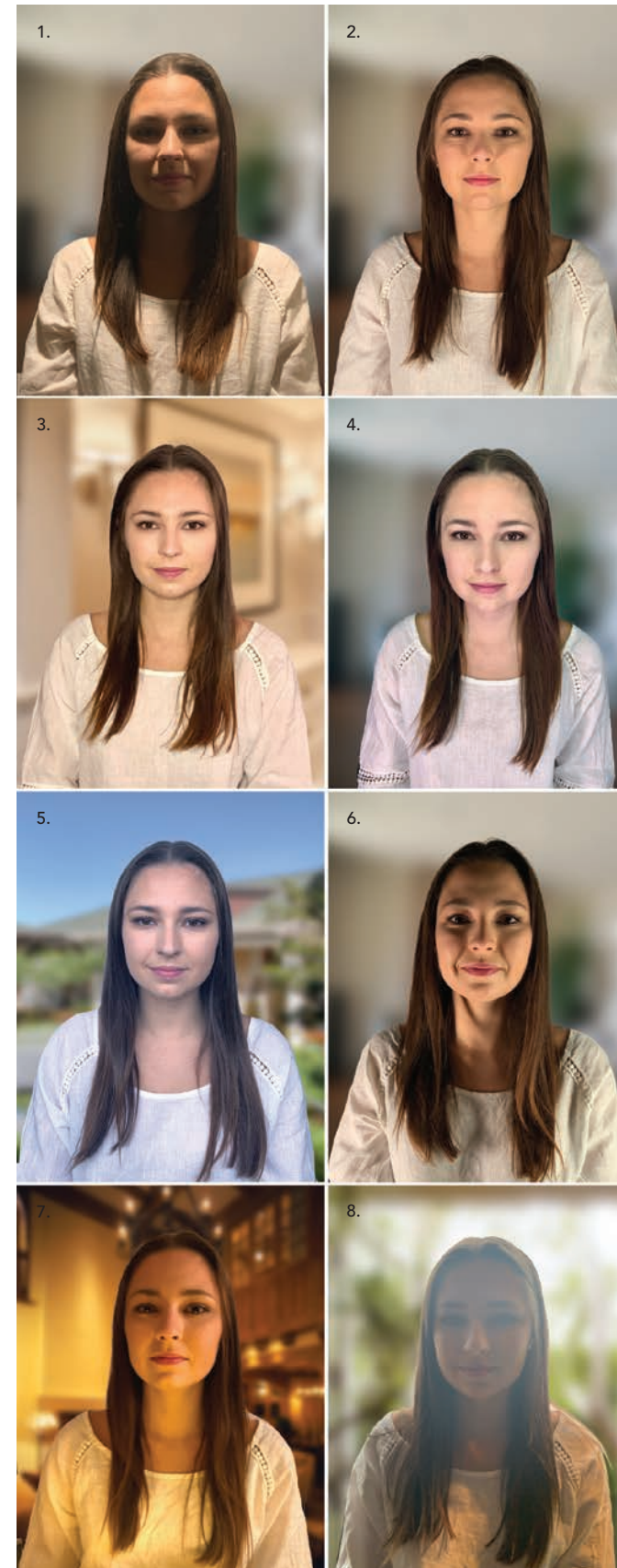
Few lighting designers today are trained from the beginning in lighting design, as the profession is relatively young and does not yet have a large academic infrastructure behind it. Most study architecture, engineering, and theatrical design, and a few study photography. It’s the designers with theatrical or photography backgrounds that best understand lighting people. Many top lighting designers consider Stanley McCandless to be the father of modern lighting design and have been strongly influenced by his work, which includes one of the seminal works on the theory of stage lighting. Many valuable lighting lessons come from the theatrical tradition, where the actor’s ability to communicate emotion relies strongly on the face.

The effects of lighting on people are almost never considered by architects and interior designers. Single source lighting is dramatic for lighting objects but is not flattering for faces. Harsh shadows distort the face and can make people look scary or unfriendly, even when they’re not, as in the first example in Fig. 4.1 with downlights only, unfortunately a “default” condition favored by architects as fixtures are recessed into the ceiling and preserve the clean lines of spare, modernist design. Gentle fill light softens shadows and makes people look better, which is why it’s used traditionally in photography and film.

Illuminating humans – especially faces – presents several specific technical challenges, many of which have been successfully met by fashion photographers and theatrical designers for decades or centuries. The areas where most of the problems lighting people happen are 1) direction and balance; 2) color rendering; and 3) color temperature.

► **Figure 4.1**

The same person lit from different angles: 1. Downlight only, 2. 45° side light, 3. Cross-illumination (Vanity), 4. Even ambient, 5. Even daylight, 6. Harsh side light, 7. Candlelight, 8. Backlit by window. Photos: Randall Whitehead.



Direction and Balance

The same person can look dramatically different under different lighting conditions. When the face is lit with direct overhead light only, harsh shadows appear under the eyes and in other areas of the face, an unflattering effect at best. In full backlit conditions, unmitigated glare from daylight or other sources can obliterate the face. Ambient light softens the face and makes it much more appealing. Well-executed vanity lighting provides cross-illumination that renders the face at its best for the activities focused on attending to it – doing makeup and shaving. Balancing directional and ambient can shape the face and give it character.

Color Rendering

One of the best reasons to use high color rendering LEDs is that they render the tones of skin, hair, and eyes much more accurately and naturally. In choosing LED light sources, narrow your options. CRI is the only current metric for color rendering you can find, but it’s not always accurate. Use your own judgment and test everything before you specify and install.

In Fig. 4.2, which shows shots taken in a specially designed photography studio setup, the women’s faces are lit with two different 3000K LED light sources – on the left low color rendering (80 CRI, 80 R9), and on the right high color rendering (95 CRI, 95 R9). In real life we never compare light sources like this, and in this direct side-by-side comparison the low color rendering appears somewhat sickly and greenish. This simply demonstrates that our eyes



◀ **Figure 4.2**

The effect of high color rendering light sources on skin. On the left the subjects are lit with a 3000K 80 CRI LED, on the right with a 3000K 95 CRI LED. Photos: Russel Abraham, courtesy Soraa.



▼ **Figure 4.3**

Left: 4000K for daytime use. Middle: 3000K for vanity lighting. Right: 2400–2700K for evening use. Photos: Randall Whitehead.

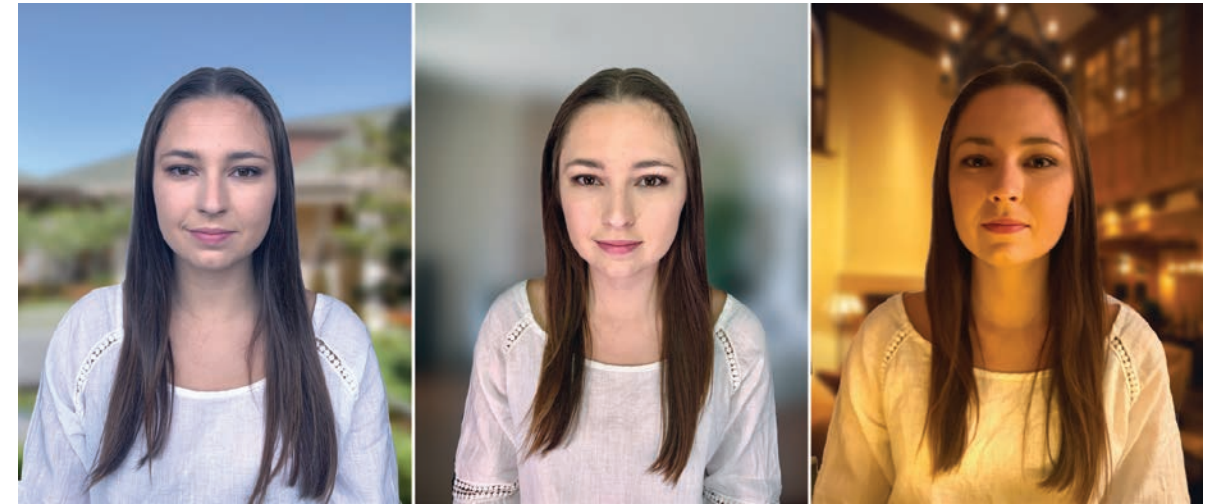


are very good at detecting subtle but powerful color differences. The dramatic comparison emphasizes what we're really missing with poor color rendering in LEDs. In our experience, we've found that this is still not widely understood, and even the cosmetic industry doesn't recognize it to the extent you might expect, as evidenced by the lighting in a typical department store cosmetic counter.

When lighting people you want everyone to look as good as possible. A subtle rosy glow that suggests a few hours outside in the sun enjoying yourself is flattering to most skin types, and all benefit from optimal color rendering.

Color Temperature

Choose the temperature that's best for the use of the room – if it's used mostly at night, warmer temperatures are better, if during the day, cooler.



Chapter 14

Living Rooms

Is your living room a natural gathering place? Or is it the space that people pass by on their way to the media room or the kitchen (where the food and drinks are)? In the home of decades past, the living room was only used when guests arrived. This “living” room was essentially a kind of surreal museum diorama separated by an invisible braided rope that kept the kids out until allowed entry only on special occasions and of course on their best behavior. Most of the time, its fancy furniture and appointments were kept unused, mostly for show, in the service of maintaining status. To work successfully with people in designing their ideal homes means understanding the powerful emotional drivers behind gaining and maintaining status. In humans (as well as many other species) status can take precedence over food, water, territory, sex, or other elements essential to life. The drive for status also explains many seemingly irrational design decisions.

Today many living spaces are now open plan rooms that connected to each other rather than distinct rooms separated by walls. The kitchen, living room, and dining room are often part of one large area. The living room areas within these open plan spaces are being used more, so we should make them comfortable and inviting and a part of daily life, where the real “living” happens.

Oh the Humanity!

Living rooms with high ceilings, or any rooms for that matter, can be a gift ... or a major pain. How do you make a voluminous room feel inviting? If you install accent lighting – either track, mono points or recessed downlights – who will be the brave person that gets up on that tall, tall ladder to relamp and adjust the lights? Good lighting design addresses these issues.

High ceilings can be intimidating and make people feel insignificant in the space – the same feeling of humility you get when you enter a house of worship with vaulted ceilings. This is appropriate for a church, temple, or mosque, but not how you want to make your family and guests feel in your home. It’s better to subtly draw people into a space with an elemental feeling like the glow of a crackling fire. This comes from the addition of *ambient* light, an indirect lighting source which is bounced off the ceiling and then back into the room. You can hide the light source using crown molding, an architectural cantilever, or box beams. This soft fill light helps

► **Figure 14.1**

Photo: Dennis Anderson,
Interior Design and Lighting:
Joseph Hettinger.



physically and emotionally to warm up a space. However, ambient lighting by itself is not enough. It creates what is referred to as the “cloudy day effect,” where everything in the room has the same visual value.

You need to add the other three light layers to create good lighting design: *decorative*, *accent*, and *task*. Depending on the size of the room, hanging one to three pendant fixtures can create a secondary ceiling line, which gives a more human scale to the space. If these luminaries have translucent elements they can be both decorative and ambient light sources at the same time. Reading lights would fall into the category of task lighting. Having little pools of illumination in the seating areas helps draw people into the space and enhance comfort.

Uplight and Out of Sight

A main key to successful lighting design is the addition of ambient light. It softens the shadows on people’s faces and helps create an inviting environment that welcomes people into the room. As we mentioned above, there are real and faux architectural solutions to this challenge. In more traditional homes you can have a crown molding running the perimeter of the room with indirect lighting concealed behind. For more modern homes it can be a shelf-like cantilever that hides the linear light source.

Using a linear LED product provides you with a solution providing long life and low energy consumption. You can choose your color temperature to match incandescent light at full brightness (2700K) or dimmed incandescent light (2400K). You can also choose an RGBW LED source that gives you a full range of colors, including realistic gradations of an incandescent feeling illumination. You can also specify an LED that goes from 5000K (daylight) down to 2150K (candlelight).

Another faux architectural solution is to install a series of box beams. These are non-loadbearing hollow beams, which also act as decorative elements. They should be 2 feet to 6 feet down from the ceiling, depending on the height of the room. Indirect lighting can then be installed on top of these beams to provide the very desirable fill light. The same beams could also hold recessed adjustable fixtures that would be installed into the bottom side of the beam making them more accessible for relamping and adjusting.

A quick and non-architectural solution would be to add torchère lamps, as the source of ambient light. Select a style that has an opaque or semi-translucent shade. You don’t want to draw attention to the light source. You can also use portable uplights, hidden behind tall potted plants to cast a shadow pattern up along the ceiling. Using any one of these options is a step in the right direction to create a room that says, “Hey, come in, sit down, relax, enjoy.”

► **Figure 14.2**

Photo and Lighting Design:
Randall Whitehead, Interior
Design: Kristi Will Home+
Design.



Chapter 20

Design Details

Light is a visual medium, but unlike other materials it is ephemeral and elusive. Still, understanding and communicating details about equipment, connections, locations, specifications, and hardware is an important part of lighting design – all top lighting designers learn this art and craft well.

With these diagrams and drawings, we want to show some techniques that are better explained in schematic detail. These are quick references to explain how lighting effects are produced. Sometimes schematic drawings and diagrams are expedient way of getting a concept across to a client, a contractor, or a loved one.

In design, the goal is usually for lighting to be unobtrusive and integrated into the architecture and interior design as much as possible. You want the positive effects of the lighting to be seen and felt, but not the luminaires themselves, except for the decorative ones. Again, this is why it is so important for lighting designers to get involved in the design process as early as possible and to work closely with the other team members, especially the architects. Think of these schematic drawings as visual shorthand for communicating abstract ideas.

These design details represent techniques that you will be using over and over again. Sharing these with your clients, contractor, or your significant other will help move the lighting design process along.

► **Figure 20.1**

Photo: Dennis Anderson,
Lighting Design: Randall
Whitehead.



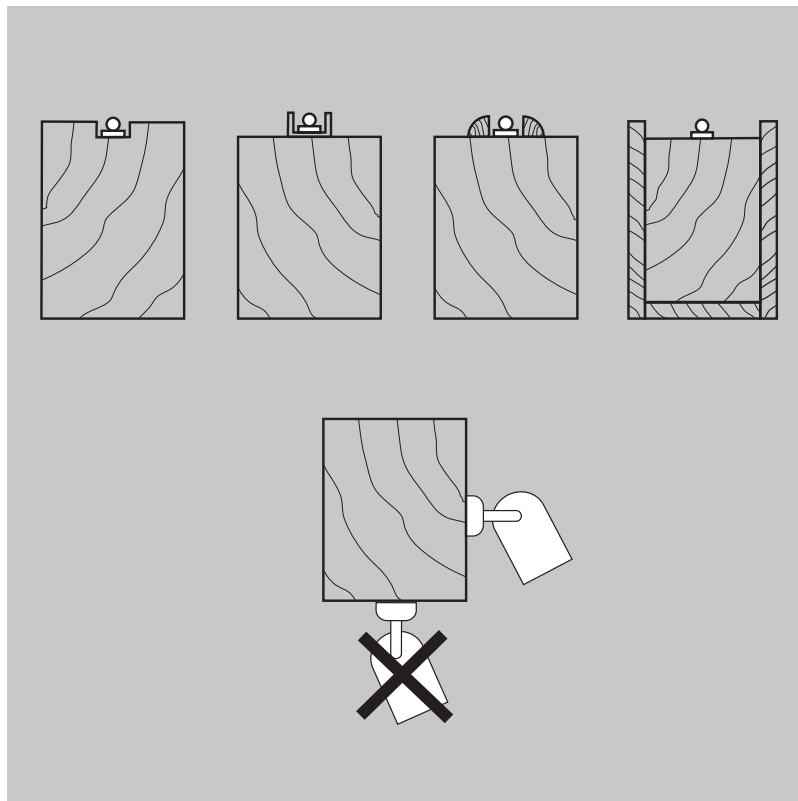
Lighting Ceilings

Figure 20.2: Making use of a high sloped ceiling and a luminaire mounted high on a wall to produce a full ambient light layer.

Figure 20.3: Structural beams can be used to locate linear LEDs that can bounce light off the ceiling, creating the ambient layer.



Figure 20.4: Top: Four mounting details for linear LED lights on the top of structural beams. Bottom: To help avoid glare, mount track and directional luminaires on the sides of beams, not the bottoms.



Cove Lighting

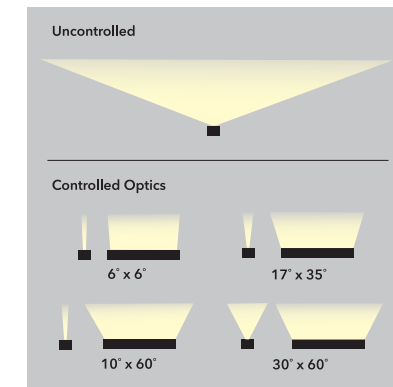
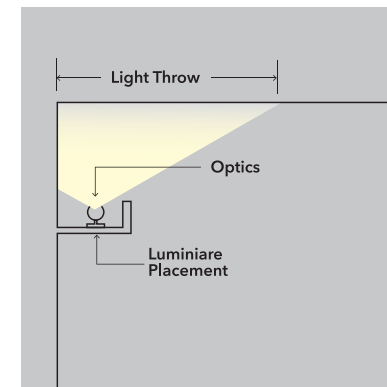


Figure 20.5: To design for the proper throw (distance from the wall), consider luminaire placement and optic type.

Figure 20.6: Linear LEDs with uncontrolled (or Lambertian) distribution have no optics to shape the beam. Many linear LEDs are available today with different combinations of the throw beam angle and the lateral beam angle, usually specified with two numbers, such as 10° x 60°.

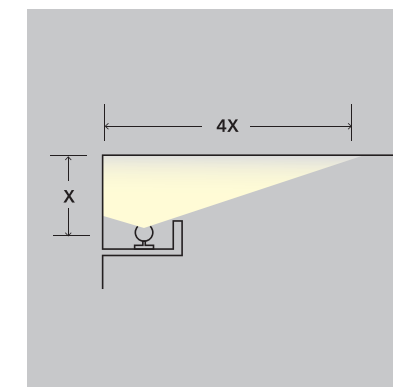
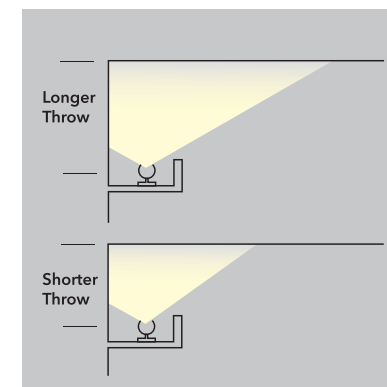


Figure 20.7: For a longer throw of light on the ceiling, position the luminaire farther below the ceiling line.

Figure 20.8: Light will throw horizontally four times the distance the fixture is mounted from the ceiling line. The throw will vary if you use a controlled beam angle. The lip of the cover should be the height of the fixture and not higher, as this will also affect the throw of the light on the ceiling.

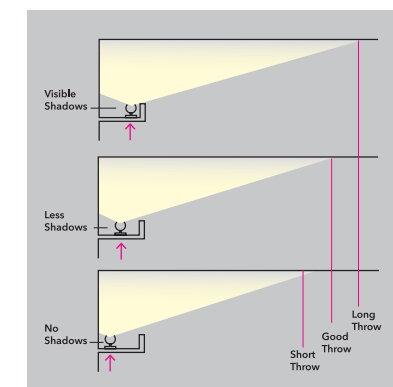
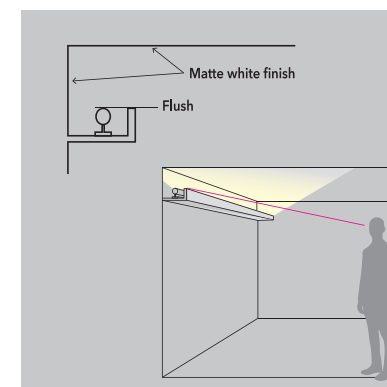


Figure 20.9: The lip of the cove should be flush with the top of the luminaire to hide the source from view while allowing the maximum amount of light out of the cove. Use a matte white interior finish inside of your cove and ceiling. Avoid shiny or reflective surfaces which can produce specular effects.

Figure 20.10: Within the cove, the closer you mount the fixture to the front edge, the farther your light will throw. However, the light will hit the back wall higher and you run the risk of getting a shadow line on your ceiling. The middle of the cove gives you a good throw and good coverage on the back wall. Placing the fixture on the back wall gives you less of a throw but no risk of a shadow line.