

Tools of Light

Here's what you need to get light to do your bidding

by **John Siskin**

In Classical Greek, the word “photography” literally means writing with light. One of the most important things a photographer can do is to take control of light. Many photographers spend most of their time capturing available light; fewer photographers use lights to create their pictures. The real difficulty with lighting well is learning to write in a new language with new tools. If we want to do that well, we need to understand the tools and how to use them.

After a few decades of using lights, I have become convinced that there are two and a half important things about light. The first is color. People who have come to photography since the advent of digital and auto color often think that the camera will fix the color automatically. While current digital cameras can fix many things, they don't do well with mixed light. So if you have daylight coming into a room lit with a lot of tungsten-filament light bulbs, you will have problems with color. Perhaps the daylight will be blue and the tungsten light neutral, or maybe the daylight will be neutral and the tungsten yellow, or it could be that everything is wrong. Some digital cameras actually create more separation between colors of light than film did.

Light sources

The second important thing is the size of the light source. Although it may seem that a soft box is in some basic way different from an umbrella, the really important characteristic is size. A bigger light source has a softer look, it makes a much longer transition from light to dark, and there will be fewer shadows. A large light source actually lights each area of the subject from many different angles; it is as if each part of the subject is lit from each part of the light source. So a big source lights wrinkles and texture very differently from a small light source. The size of the light source is more important than its shape, though many people don't think so. In other words, a 4×6-foot soft box will be a softer light than a 5-foot umbrella, and both are softer than a 2×3-foot soft box. The type of light source affects the way that reflections appear in the eyes and on the surfaces of a subject, but this is less important than it was when we couldn't retouch a catch light or reflection.

The direction of light is what I'm rating as only half-important. If you have a small light source—maybe just a reflector on a light—it is totally critical; if you

move a really hard light just a few degrees in relation to your subject, the change is very visible. But if you do the same thing with a large light source, you probably won't see it at all because a large light source lights from every angle. If you move it a little bit, you are still lighting from most of the same places. One practical result of this is that if you are lighting with both hard and soft light, you know what kind of light adjustment will change your results.

In Figure 1, I have used several lighting tools to create light that makes the image visually interesting. The largest light source is on the left of the camera, a 3.5×6.5-foot light panel with a white cotton broadcloth. I bounce the light off an umbrella before it goes through the light panel, which keeps the light from the panel very even. The light is a strobe set to 750 watt-seconds. The high power is important because of the amount of light that the panel and umbrella suck up. Just to the right of the camera and above is another strobe with a beauty dish. The beauty dish is a round reflector that bounces the light off a 22-inch white reflector. The white bounces light more evenly than a silver reflector would, so the beauty dish acts more like a small umbrella than a regular light reflector. Also, the beauty dish has a cover in the center that keeps the strobe tube from illuminating the subject directly. I used this to create a catch light in the eye and to create more texture in the face. Although people often think of the beauty dish as a soft light, in this case it was far enough from the subject to act as a relatively hard light source. The further the light is from the subject the smaller the light source becomes, which gives you more texture and sharper transitions from white to black.

Strobe setup

I used strobes for both these lights. Strobes create light by jumping a spark through a clear tube filled with xenon gas—in reality, you are lighting with lightning. Strobes have several advantages: first they stop action because they only last about $\frac{1}{1000}$ second, which means

that you don't need a tripod to shoot portraits. The other big advantage of strobes is that they are the same color as daylight. This is particularly useful in architectural photos and portraits in which you mix daylight with artificial lighting. I think that strobes are the most practical light for photographers, but they do have one big disadvantage: they're so fast you can't see the light you are photographing; it's therefore necessary to proof your images. With a digital camera, it's best to use a laptop to proof the images (most cameras will tether to a laptop). Of course, it is also possible to use the camera back, but you need to be careful to evaluate the image completely; the histogram can help in this. I use all the information I can get, but I still shoot in Raw to make it easier to perfect the image after the shot.

One more thing about the way I set up the strobes: I used half-orange gels (also called half CTO) by Rosco over the lights. They split the color difference between daylight and the color of tungsten lights made for photography, and are made for lights rather than cameras. I knew that I wanted to mix light in this shot for a couple of reasons. I wanted to mix blurry and sharp areas in the shot. I also wanted to show the difference that color makes, but I didn't want the colors so far apart that they would feel unnatural. I filtered the strobes rather than the tungsten because they produce less heat and the filters won't melt. I also used two tungsten lights in the shot—a broad light and a spotlight; both had barn doors to control the spread of light.

One of the differences between strobes and tungsten lights is that each tungsten light is built for a purpose, such as a broad light for even light over a large area, and a spot for a small area. Strobes, probably because of their expense, have many accessories that customize the basic light to specific purposes. Tungsten lights are also hotter. They are usually around 500 to 1,000 watts, and since they are on continuously, it's important to be careful so you don't burn yourself when repositioning them.

The broad light is on the left of the camera, behind the subject. It is pointed

◀ **Figure 1.** There are four lights in this shot, two strobes and two tungsten lights. The types of lighting tools and the two types of light allow me considerable opportunity for creativity.

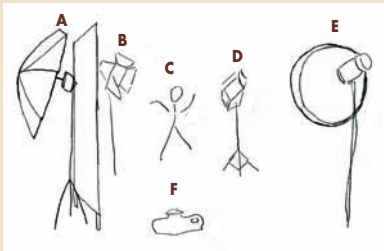


Figure 2. Diagram for Figure 1. **A:** strobe with umbrella and light panel. **B:** tungsten broad light with barn doors, lights background. **C:** subject. **D:** tungsten spotlight with barn doors, edge light on subject. **E:** strobe with beauty dish. **F:** camera.



Figure 3. A 3.5x6.5-foot light panel. These panels are very flexible lighting tools.



Figure 4. Umbrellas: 60-inch bounce with removable black back, 45-inch covered rib, and 30-inch shoot through. The biggest umbrella is softest.



Figure 5. Soft boxes: Different sizes and shapes give different reflections and control. As with umbrellas, a larger soft box gives softer light.



Figure 6. Beauty dish: A small light source, but has a perfectly round shape. It creates nice catch lights because of the shape.

at the background to add color and increase the brightness of the background. It adds color because the tungsten light is yellower than the light from the strobes. The broad light is designed to spread light over a large area evenly, and it does this well. I therefore used barn doors (see page XX) to keep light off the subject. On the right side of the shot, I had a spotlight to light the subject on the right side of the picture; this light caused a rim of light that separates the subject and creates highlights in the picture. I used the barn doors on this side to keep light off the background. One more thing about these lights: they are fitted with quartz bulbs, which have better color consistency than the tungsten lights that look like regular light bulbs. You should try to avoid regular light bulbs as an important part of the image because they are much more yellow than a professional tungsten light source. You can see a diagram of the lighting for the shot in Figure 2.

Fluorescent tubes

There is increasing interest in fluorescent tubes as a light source for photography. I can understand that a light that is continuous (such as a tungsten light) but is cooler would be a very attractive tool. But there are a couple of difficulties. The first is with color. Fluorescent tubes vary with the changes in the 60-cycle current of regular household electricity. So if you take several pictures at, say, $\frac{1}{250}$ second, the color won't be the same in all the images. Because of these changes it is better to use shutter speeds of $\frac{1}{50}$ or longer, which requires a tripod is. Also they are not very bright. I recently noted the manufacturer's specs on a soft box with fluorescent tubes: ISO 200, $f/2.8$, and a shutter speed of $\frac{1}{50}$ second. For comparison, in Figure 1 I used $f/11$ at ISO 160. That means that the strobe, even with the light panel and the umbrella, was four stops, or about 16 times, as bright as the fluorescent light. I should add that the shutter speed was $\frac{1}{50}$ second, but that only affected the quartz lights, not the strobes, as I discussed above. As a result of the prob-

lems with color and the volume of light I haven't found fluorescent lights to be well suited for photos.

Light tools

I have mentioned quite a few light modifiers, and I want to expand on this list a little. Many of these tools would work well with both strobes and tungsten lights, but a few, because of the heat, shouldn't be used with tungstens. First I'll discuss tools that make lights bigger light sources. I should also point out that these are the tools I actually work with, so they are a little beat-up in my pictures.

Light Panels: I make my own light panels, so not only are they very useful, they are very economical (Figure 3). The wonderful thing about the panels is that there are so many ways to use the panels. You can put a lamp behind them and use them to make a large diffused-light source. In this case you can use the lamp straight, you can rake it across the surface, or, if you want a very soft light you can bounce the light off an umbrella before it goes through the panel, as I did in Figure 1. You can put a reflective silver or gold cover on a panel and use it as a reflector. You can even reflect off the white cotton I generally use to transmit light. Finally you can put a black cover over the panel and use it to block light. Light panels can be used with strobes or continuous lights.

Umbrellas: I first learned lighting using umbrellas. I still find them to be one of the best tools ever created for lighting. Umbrellas (Figure 4) are wonderfully easy to set up, and there are several ways to use them. They broaden light by bouncing it off the inner surface of white fabric, or you can transmit the light through the white fabric.

If you are lighting a small room, especially a bathroom, it is possible to use light from both sides at once because the light from the back of the umbrella bounces off the walls and back into the shot. Unless I am pressed for space, I use umbrellas as a bounce tool; there is less spill light if you bounce. Bigger umbrellas create softer light, and because of the

way they collapse, they are as easy to travel with or to set up as smaller equipment. I use umbrellas with a removable black back so that light doesn't spill from the backside unless I want it to. I also like umbrellas where the fabric is in front of the ribs; it makes a cleaner reflection (Figure 4).

In addition to the backing and the way the fabric is set in the interior, there are a few other options: first you can get a silver umbrella, which reflects more light, but the quality of the light is harder. You can get gold and blue umbrellas, which help correct light between daylight and tungsten. (I have found the gold to be too yellow for warming a light.) Finally there are now enclosed umbrellas, which are a cross between an umbrella and a soft box. In practice, they are like a shoot-through umbrella without the spill. There are several concerns when using umbrellas. First, be careful of reflections, as they will look like (surprise, surprise) white round umbrellas. Second, they are difficult to use in a high wind. Finally, they spread light everywhere, so they can be difficult to control. Since they have an open design, they work well with both strobes and continuous lights. Many lights have built-in umbrella holders.

Soft Boxes: the basic design of a soft box is something like a dome tent. I find both dome tents and soft boxes annoying to set up and take down. Once set up, they are a good, even light source. Softboxes offer more control than an umbrella. If you can get one with a cover with that has a round or rectangular hole in front then you can choose a round reflection as well as the rectangle the box normally creates. Most manufacturers make adapters to fit popular models of strobes. As with an umbrella, the larger ones are a lot softer than the small ones. I have one that is about 3x3 feet; you can see it in Figure 5 along with a 6x2-foot strip light. I also have one that is about 12x16 inches that is very good for putting reflections in bottles. Although there are soft boxes designed for use with tungsten light, most are not. You can see that enclosing a hot bulb in nylon fabric

might not be a good idea. With strobes you generally need a unit that has a built-in fan.

Beauty dish: These work like a small umbrella or soft box, but with a defined shape. The one in Figure 6 is 22 inches across, a good size for portraiture if placed close to the subject. I also like them for catch lights in the eyes, if placed further back. One nice thing is that the shape is truly round, which is nice in a reflection. I have not seen any of these units for hot lights, but they may be out there. I would certainly use a fan on a strobe while using a beauty dish, since the center reflector covers the tube and modeling light.

Bare bulb: In certain situations just a strobe tube or quartz bulb by itself is your best lighting tool. The advantage is that it spreads light everywhere, but because they the bulbs are small, the problem is that the light is very hard. Still, if you need a light in the corner, often this works well since you get bounce from the walls. It's not a good way to use light in spaces without white walls. Also it is generally not useful outdoors since so much of your light goes where it isn't needed. A slight variation is to place a translucent plastic bottle over the bulb, which softens the light a little. One of my strobes is set up without a reflector in Figure 7.

Small-area tools

The next group of tools makes light cover a smaller area. With the exception of the barn doors, they are really designed only for strobes. All of these units create light with hard shadows and fast transitions from light to dark, called hard light. There are various kinds of spotlights designed to do the same thing for tungsten light. I'll mention a few at the end.

A **Reflector** is a simple dish that attaches to the end of a strobe, or is built into a tungsten light. This offers control, certainly compared to a bare bulb. Most strobe manufacturers make reflectors of various sizes that offer different light spreads. The one in Figure 8 is a 60° reflector. Reflectors generally only fit



Figure 7. Bare bulb: just the light itself.



Figure 8. Reflector: really the simplest lighting tool; it gives direction to light.

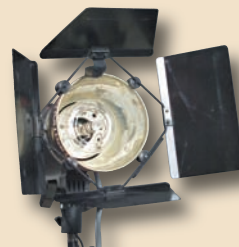


Figure 9. Barn doors: The movable blades or doors allow control over the spread of light.



Figure 10. Snoots are very dramatic lights; they create a small pool or spot of light. Some manufacturers make more than one size snoot to give different sizes of spots. The size of the light from the snoot increases the further it is from the strobe.



Figure 11. Grid or Honeycomb spot. This makes a very small spotlight that doesn't spread much. The grid is a honeycomb-shaped baffle that goes over the strobe. The small size of the individual holes keeps the light from becoming a larger spot.

the brand of strobe they are made for.

Barn doors, which are two or four metal blades attached to the reflector, are the most useful tool in this group and give you the most options. By moving them you can control the spread of light,



Figure 12. Cine foil is made of black aluminum foil that doesn't burn. It can be used in many ways to control light. This is wonderful stuff to have in the studio.



Figure 13. Optical Spots are tungsten lights that use a lens to keep the light focused. The position of the bulb is adjustable so the size of the spot can be changed.



Figure 14. Spot. This is a tungsten light that throws a reasonably tight beam. Often these are adjustable, changing the size of the beam. Not as tight as an optical spot.

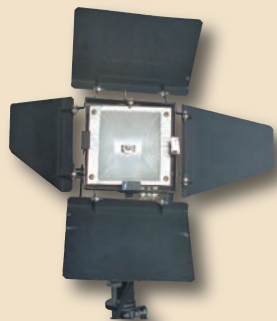


Figure 15. Broad Light. This tungsten light throws a wide, even light over a large area. It can be useful in the studio and on location.

from everything the reflector can do down to a small strip of light. Keep in mind that the metal blades become extremely hot in use. I have seen sets of barn doors in which the shape of the blades can be changed, which can be useful. Depending on the way you set up barn doors, you may need a fan with a strobe. I have barn doors on a strobe in Figure 9.

Snoots are very small reflectors designed to throw a small round light at your subject. I like using a snoot because the light is very dramatic. Light spreads when it leaves the snoot, so the size of the light changes depending on the distance from light to subject. One reason the snoot is so dramatic is that the light doesn't bounce around the shooting space, so you go from light to shadow very quickly. You would always want to use these with a fan on a strobe. Snoots are often available in different sizes. The one in Figure 10 is a stovepipe snoot, about 4 inches across.

A **grid spot** also makes a small round light, similar to the snoot; but since the light goes through a honeycomb-shaped series of tubes the light doesn't spread as much. This is just the thing for adding a very small highlight, making the strobe act more like a small tungsten optical spot. These lights are extremely useful for adding sparkle and drama to a shot. You can mix them with soft lights to add highlights that you won't get from a large light source. Once again, use this with a fan. The one in Figure 11 has a honeycomb with 1/4-inch holes and fits a 6-inch reflector. Grids are available for larger reflectors and have different-sized holes to offer options in controlling the size and spread of the light. A bigger grid with bigger holes throws a bigger spot that spreads faster.

Cine foil is essentially black aluminum foil (Figure 12). It won't burn, so you can use it to make custom light-control devices for specific needs. Keep in mind that it will get hot and the black coating may smoke, so you need a fan on your strobe, and you need to be careful when shaping it on the light. You can use this with tungsten light also. Cine foil is really a useful thing to have around the studio.

Spots and optical spots are the key tools to make light smaller for hot lights. These lights are often used in making movies, so they are sometimes built in ways that are not suited to still photography. For instance, you can get an optical spot that uses 10,000 watts with a front lens only 18 inches across. I am sure it is useful for lighting a movie set, but it's not well suited to most still photography. The lens causes these lights to cover a very small area. I have a very small optical spot that I find useful as a tabletop light and for illuminating a microscope (Figure 13). It is worth noting that Norman made a strobe designed after an optical spot a few years ago. I don't know how successful it was.

One other point about optical spots—when I did more work with hot lights and film I often used Kodak slide projectors as small optical spots; they were terrific for tabletop work. Spots are more useful for the portrait and architectural lighting I do with hot lights. The bulb moves in a polished reflector to make the spot tighter or broader, but it doesn't have the lens of the optical spot. Figure 14 shows the spotlight I used in Figure 1. These are really excellent lights, but as with all tungsten lights, very hot. The broad light spreads light evenly over a large area. If you have one of these with barn doors, it can be very useful for lighting backgrounds, as in Figure 1, or for architectural lighting. Figure 15 shows a very useful tungsten broad light.

Of course this seems like a lot of tools, but as I mentioned at the beginning, if we are going to write with light, we need the tools that work best for our circumstances. I find that the ability to create shots in the studio, shots that begin in my mind and can only take form using light-shaping tools, is tremendously rewarding. ■

John Siskin is a commercial and fine-art photographer specializing in product images and portraiture, as well as macro and architectural photography. He has taught photography for more than 25 years. He currently teaches lighting and portraiture photography at BetterPhoto.com. His Web site is www.siskinphoto.com.