

Interview Lighting Presentation Notes v.2

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This document consists of notes to accompany the “Documentary Video Boot Camp: Lighting for Interviews” presentation (available for download from the at Kino-Eye.com/dvb/). Underlined text indicates web links¹. Please direct comments, suggestions, and corrections (relating to the presentation or these notes) to the author via the web form at Kino-Eye.com/contact/ or call 617.216.1096.

1. Interview Lighting (title slide)

Lighting plays an important role in guiding the viewer’s attention and establishing the mood of your interviews. No matter how good the subject matter, no matter how creative your approach, you efforts can be altered, or in a worst-case scenario, might even be sabotaged, by poor lighting. These notes (and the presentation they accompany) are intended to provide an introduction to important fundamental concepts that will help you improve the lighting of your projects, whether you are shooting with, or without, lighting instruments. While we don’t have time for a comprehensive study of lighting for video, we’ll get you started and on your way. We’ll focus on tips, practical advice, and the fundamental knowledge of light, color, instruments, essential gear, and basic techniques that will help you produce video interviews with lighting that will enhance your aesthetic intentions.

2. What is light? (1 of 2)

Since light is the medium we’re working with, it might be a good idea to have some understanding of what it is. Light is electromagnetic radiation. Electromagnetic radiation are waves that have an electric and magnetic field component and they are classified into various types by the frequency of the wave, for example: radio waves, microwaves, infrared, visible light, ultraviolet, X-rays and gamma rays.

3. What is light? (2 of 2)

What we call visible light is a small portion of the electromagnetic spectrum that is detected by the human eye, which is in the range of wavelengths approximately between 400 and 700 nm. Humans are most sensitive around 550 nm, or in the green

portion of the spectrum. Other animals are able to see portions of the spectrum that humans can’t, for example, bees are able to see in the ultra-violet range of light that humans can’t see. We see colors and light from *direct* light sources (sun, light bulbs, headlights, etc.) as well as from light reflecting off an object (photographic print, painting, wall in a room, etc.) which we call *reflected* sources.

4. Human vision (1 of 2)

Our visual system provides us with perception of depth, light, contrast, edges, texture, movement, and color. One thing to keep in mind when lighting for video is that the dynamic range of the human eye (about 1,000,000:1 or 20 stops) far exceeds what any video camera can reproduce (5 stops or so), therefore we use lighting to help create scenes that appear more life-like and bring the contrast ratio under control so that our video camera can deal with it. Lighting, in some sense, is about dynamic range control, in addition to it being about controlling attention. We also depend on video monitors, zebras, histograms (in some cameras), and spot meters (in some cameras) to determine how the image is going to look on a computer or video display. The eye includes a lens very similar to what you would find in a camera, the principles of photography are based on the human visual system. The eye has an iris (a.k.a. pupil) that adjusts in a manner very similar to the aperture of a camera lens.

5. Newton’s Experiments (1 of 2)

One of the early explanations of the spectrum of visible light and colors comes from Isaac Newton’s *Opticks*. Prior to Newton’s work, Roger Bacon identified the visible spectrum using a glass of water,

¹ Poor typographic practice, but it’s the de facto indication of a link, what might be better? Cool little icons next to the text? maybe...

however, it was Newton who discovered that prisms could both deconstruct and reconstruct white light, providing an elegant proof that light of a particular color could not be “broken down” any further. Newton coined the term “spectrum” which comes from the Latin, meaning “apparition.” Newton developed a system for identifying the distinct colors of the spectrum, his color circle consisted of colors correlated with musical notes and symbols for the planets which were known in his time, the numerology was derived from Ancient Greek philosophy which made a connection between colors, musical notes, objects in the solar system, and the days of the week.

6. Newton’s Experiments (2 of 2)

Newton’s famous experiment was not demonstrating that a narrow beam of sunlight shining through a glass prism produced different colored bands, that was well understood. What Newton did that was original was to take a second prism in order to demonstrate that the spectrum could be reconstructed into white light. Newton’s theory was that light was made up of particles of different colors and each of the different colored particles moved at different speeds, with light at the red end of the spectrum moving faster in glass than light at the violet end of the spectrum. The result was that red light refracted (bent) less sharply than violet light as it passed through the glass of the prism, creating the rainbow (spectrum) of colors. Today we consider the various colors as representing light at different wavelengths, although light is considered to consist of both waves and a particles. Whenever light enters a different medium, the speed of travel is reduced, the measure of which being the refractive index. The refractive index is dependent on the specific frequency of the light. Water and glass prisms provide the good examples of this effect.

7. Human Vision (2 of 2)

We have two types of receptors in our eyes: rods and cones. Rods are sensitive to light throughout the full visible spectrum, they help us see lines, shapes, texture, edges, but don’t differentiate between different wavelengths, or colors. Cones, on the other hand, come in three variations, each sensitive to a different range of wavelength ranges and thus help us perceive color. “Blue” cones have peak sensitivity around the short wavelengths, “green” cones have peak sensitivity around the mid-range wavelengths, and “red” cones have peak sensitivity around the

long wavelengths. Some of the colors we perceive are pure wavelengths, others are the result of a mix of wavelengths. Humans can perceive subtle differences in about ten millions of variations in color (hue, saturation, and intensity).

8. How do we describe light?

When we talk about lighting for video, we consider the following attributes of light:

Quality: The quality of the light depends on the size of the source relative to the subject. We talk about hard, semi-hard, and soft light sources. Direct sun behaves like a point source, it’s very hard, casting crisp shadows, with very little wrap around a face. On the other hand, a large window facing the northern sky without direct sunlight is a very large soft source, casting soft shadows and wrapping gently around a face. We can also think of quality in broader terms beyond hard/soft, for example: direct/indirect, sourcey/ambient, chiaroscuro/flat, strong/gentle, crisp/wrapping, focused/general, etc. The quality of light along with the contrast ratio are highly influential in setting the mood and atmosphere of a scene.

Contrast ratio: The difference (in terms of intensity) between the brightest (white) and the darkest (black) portions of the image. A low contrast scene has a low key to fill ratio, a high contrast scene has a high key to fill ratio, for example: 1:1 is flat, without any definition, 2:1 is pretty standard, what you see on television. 3:1 or 4:1 provides nice dimensionality to a scene, 5:1 or 6:1 starts to become seriously dramatic. See discussion of key and fill below.

Intensity: How bright is the light? Often we talk about this in relation to other lights, like when we are discussing contrast ratio. We often say things like, “the fill is two stops below the key,” which means that the fill has an intensity 25% of the key. Each stop is a halving or doubling of the intensity of the light. In terms of intensity we deal with the inverse square law: if you double the distance between light and subject, you have one fourth of the intensity as before. Light falls off in proportion to the square of the distance (the inverse square law). This is not true for lighting units, like Fresnels, that use a lens.

Direction: Where is the light coming from in relation to the lens/subject axis?

Beam pattern: What's the shape of the beam and the shadow pattern?

Beam size: How large of an area does the light cover? We usually talk about the beam size as either spot (a narrow beam) or flood (a broad, even beam).

Distance: How far is the source from the subject? Distance plays a key role in relation to the inverse square law.

Color: What color is the light? We also talk about the color temperature of light sources (the relative mix of blue, green, and red wavelengths). Not all white lights are perceived (or recorded on video) in the same manner.

Type: What kind of source is it? Natural? Artificial? An open face or Fresnel? Is it direct or reflected? Ambient light (a.k.a. existing light) is the light already present in a location, prior to any additional lighting which typically comes from lighting instruments. Incident light is light coming directly from a light source (lighting instrument, sky, sun, etc.). Reflected light is light from a light source after it has bounced off a surface (wall, reflector, flex-fill, etc.).

Role: What is the light doing for us creatively? How is it helping us shape the scene and create a particular mood? In three point lighting there are three major roles, key, fill, and back. More on that later.

All of these terms help us talk about the lighting we're doing and thinking about what's going on.

9. Additive color model

Most any color that the human eye can detect can be created with a mix of blue, green, and red light. Digital imaging systems are modeled after this. These colors are the additive color primaries. If we mix the right amount of red, green, and blue light, we'll see white (in the slide we depict what you'd see if you projected spotlights of different colors onto a white wall in a dark room). All colors that are combinations of two primaries are known as secondary (or complimentary) colors:

Red + Green = Yellow

Blue + Green = Cyan

Red + Blue = Magenta

Mixing the secondary colors gets you back to the primaries:

Yellow + Magenta = Red

Cyan + Yellow = Green

Magenta + Cyan = Blue

And mixing a primary with its corresponding secondary gets you back to white:

Red + Cyan = White

Green + Magenta = White

Blue + Yellow = White

Video and computer displays mix pixels of red, green, and blue light in order to create colors (using what we call the additive color model). And while red, green, and blue can be mixed to create the sensation of most colors, there are some shades (like unsaturated pinks and purples) that are impossible for video and computer displays to reproduce correctly because they require multiple wavelengths outside the capabilities of the display.

10. Subtractive color model

We can look at color mixing from the perspective of starting with white light, and subtracting colors (e.g. using gels or filters). When we look at light from this perspective, the complimentary colors are known as the subtractive primaries. Illustrated in this slide is what you would see if we placed various colored gels on a white light table. Thus,

Yellow (Red + Green) = White - Blue

Cyan (Green + Blue) = White - Red

Magenta (Red + Blue) = White - Green

And note that:

Cyan + Red = neutral density

Magenta + Green = neutral density

Yellow + Blue = neutral density

So if a light source is too blue, we can take some blue out using a yellow gel. If a fluorescent light fixture appears too green, we can use some magenta gel around the tube. Gels are available in a wide range of colors for controlling the color of lights. We'll revisit this when we talk about color temperature and gels for lights.

11. Color Temperature: what is white light?

Some light sources are rich in the blue end of the spectrum, but deficient in the reds (sky light), while others are rich in the red end, but deficient in the blue (incandescent household lamps).

What we see as white light is actually a mix of colors across the visible spectrum. Consider the three images on this slide:

1. The plaza in the image above (on the left) appears very blue, even though the white balance of the camera was set to daylight, this is because the plaza is being lit entirely by sky light, which is much bluer than direct sunlight. The color of the buildings in the upper left of the image appear normal, since they are being lit by direct sunlight. The shadows are very cool in terms of color (blue), but hotter in terms of the color temperature scale (just to keep things confusing). 1. Outdoor shadows are predominantly sky light, therefore very blue. The light energy we see passes unchanged for the most part through Earth's atmosphere, except that shorter wavelengths (in the blue region) are scattered more than longer wavelengths (in the red region), and this is why the sky appears blue. Note that the building in the upper left hand corner looks normal, that's because it's lit by direct sunlight, yet the plaza, which is not being lit by direct sunlight, is very blue, for it is being lit by skylight only. So while these two light sources are both "white" they appear different colors due to the relative mix of light of different wavelengths.

2. The car museum interior in the image above (in the middle) shows a mix of sky light shining through the skylight, which appears almost white, in contrast to the cars below lit by incandescent lights, which are much warmer. They are warmer in term of color, but cooler in terms of the color temperature (just to keep things confusing). Interior incandescent lighting is very yellow compared to daylight, since it is deficient in the blue range of the spectrum.

3. In the sunset in the image above (on the right) the sky is an intense blue while the sunset is orange and red. Why is the sky blue and sunsets orange? The blue color of the sky is the result of Rayleigh scattering: air molecules (mostly nitrogen and oxygen) cause light rays with shorter wavelengths (which appear violet and blue) to be scattered more than light rays with longer wavelengths (which appear yellow, orange, and red). During the day,

when light from the sun is overhead, light rays travels through a relatively small amount of atmosphere. But as the sun sets on the horizon, light rays travel a longer path through the atmosphere and therefore are scattered by many more air molecules. Since most of the shorter wavelengths (violet and blue) get completely scattered, only the wavelengths of the warmer colors (yellow, orange and red) are part of the sunset's palette. And what about intense red sunsets like those over Los Angeles? Droplets of pollutants in the air increase the effect of the scattering, and thus provide for even more dramatic sunsets.

12. Color temperature: spectral response

Different light sources have different makeups of light of different wavelengths. What is the relative mix of "cool" and "warm" wavelengths? We use degrees Kelvin to specify the relative mix of colors that make up white light. This refers to the temperature you have to heat a theoretical black body (similar to a tungsten filament in an ordinary light) to achieve a particular color light, cooler colors (warmer Kelvin temperature) are bluish, warmer colors (cooler Kelvin temperature) are orangish.

CRI (color rendering index) is a measure of how close a light source resembles a continuous source like daylight. A CRI of 85 or better is recommended for good video lighting. Quartz-Halogen and HMI lighting as a high CRI index, fluorescent lights vary greatly so look for their CRI rating.

13. Color temperature: white balance

The kelvin temperature scale (in which 0°K equals absolute zero, corresponding to the centigrade scale °C = °K - 273.15) is used in the measure of the color temperature of light sources. Color temperature is based upon the principle that a black body radiator (a theoretical version of something like the tungsten filament in a halogen lamp) emits light with a color that varies depending on the temperature of the object. A black body radiator with a temperatures around 3,000K appears reddish, one with a temperature around 7,500K will appear bluish. Color temperature is very important in film-based photography and cinematography where a color temperature around 5,500K is required to match a daylight film emulsions and a color temperature around 3,200K is required to

match a tungsten film emulsions. In video the situation is a little different because we can white balance the camera to a wide range of color references via “White Balance” settings but we still find ourselves dealing with color temperature when we’re dealing with mixed light sources, for example daylight from a window and quartz-halogen lighting inside. Since the video camera can only white balance to one setting (assuming we’re not using automatic white balance, which is never quite right) we still need to match sources if we want good color rendition under “white” light, which is never simply white.

While our eyes are very good at compensating for differences in the relative spectral distribution of various light sources, video cameras can’t. Therefore, without adjustment, cameras will reproduce daylight as too blue and indoor lights as too orange. When we white balance a camera (by pointing the camera at a white card and “setting white balance” a.k.a. one push on the Sony Handycams), we are telling the camera that the particular balance of red, green, and blue light falling on the white card should be considered its reference point for white. This white card may have light falling on it in the range of 1,800K if we’re shooting by candle light, 3,200K if we’re shooting with halogen lamps, or 5,800K if we’re shooting outdoors at noon. If we don’t set the white balance properly, we’ll often have exaggerated blue or yellow in our image. The chart on this page shows the color temperature of common artificial and natural color light sources. Warm sources like candles, incandescent lamps, etc. have a cooler color temperature; cool sources like daylight, HMIs, etc. have a warmer Kelvin temperature.

Trick for “warmer” images: place a 1/8 CTB filter over the lens, set white balance, then pull filter away. This fools the white balance circuitry in the camera into thinking there’s more blue in the scene, it compensates for it, and thus makes the resulting scene appear warmer). This is what those “warming cards” that are sold for this purpose do. All you need is one white card and various gels (cut a small piece of the ends of existing gels) to suite your needs. This also works for cooling a scene when you use a gel like 1/8 CTO or Straw.

14. Color correction on the set

So for example, if a tungsten light source is too warm (point 1 on the color wheel) compared to the ambient light (daylight) we can use a color

correcting gel (“Full Blue” in this example, more on these later) to match the color temperature of the light source and the color temperature of the ambient lighting and bring the light source towards the “middle” of the color wheel (point 2 on the color wheel). So, given a tungsten light source, minus Orange (using a Blue CTB gel) gives us a source that matches Daylight, which will look white if our camera is white balanced for daylight, subtractive color model in action! The same would be true for matching daylight to interior tungsten, in this case you would want to put orange (CTO) gels on the window. Often this is better, since putting daylight gels on tungsten lights kills their output by about two stops. Gels work by filtering out their compliments, so a red gel filters out cyan, a CTO gel (color temperature orange) gel filters out daylight blue, a blue gel filters out yellow, a CTB gel (color temperature blue) filters out orange (both yellows and reds in the tungsten range), etc. Filter manufacturers publish the transmission characteristics of their gels, you can see how each filters out lights at various wavelengths along the color spectrum.

15. Color correction in post

You will come across this when you’re color correcting video. The color wheel below shows the primaries in relation to the secondary colors. In the middle is neutral white, as we move towards any of the colors along the edge of the wheel, we’re increasing the amount of that color, while at the same time subtracting the color on the opposite side of the wheel. So we have an interesting mix of the subtractive and additive color system in action, we can color correct through addition of additive primaries, or by subtraction of subtractive primaries. To make something more reddish, for example, it’s about either increasing the level of red, or reducing the level of cyan. To make something less reddish, for example, it’s about either reducing the level of red, or increasing the level of cyan in the mix. This activity is pretty clear when you look at the color correction controls in programs like Adobe Photoshop, Final Cut Pro, Adobe Premiere, Sony Vegas, etc. Shown here is the three way color corrector in Final Cut Pro, will allows you to adjust colors in the shadows, mid-tones, and highlight areas separately, this three color wheels.

Don’t always plan to “fix it in post,” get the color right. The reason you want to get the color right in the first place when you shoot video is that all of the

video formats used by small to medium-sized camcorders (e.g. DV, HDV, AVCHD, XDCAM EX) involve high levels of video compression and therefore have lots of noise in the color channels of the video signal. It's not just the video format, however, consumer and prosumer cameras with smaller 1/3-in. chips produce more noise in the image than their larger, professional, 2/3 -in. chip counterparts. You especially want to avoid wild amounts of color correction with these formats. Extreme color changes in these formats brings out some ugly video noise. These formats are very brittle when it comes to color correction compared to uncompressed video formats or very lightly compressed video formats.

16. Quality of light: soft or hard

As we discussed before, the quality of light, soft or hard, depends on the size of the light source. On a cloudy day the entire sky acts as a huge soft light, casting very soft shadows, however, on a sunny day the sun acts like a point source (while it's many times larger than the earth, it's looks quite small at a distance, so it's a small source, relatively), casting very crisp shadows.

17. Quality of light: soft light

Soft light characteristics include:

- Soft-edged or no shadows,
- De-emphasizes surface texture and detail,
- Difficult to control (can't easily be "cut").

Soft sources include:

- Indirect Sun,
- Overcast Sky,
- Light Fixture w/ diffusion or spun or through a silk,
- Soft box ("Chimera"),
- Lantern (e.g. Chimera lantern),
- Soft lighting unit (e.g. Diva-Lite),
- Bounced light (a wonderful way to turn hard lights into soft lights), and
- Window light (no direct sun).

18. Quality of light: hard light

Hard light characteristics include:

- Focused beam,
- Distinct shadows,
- Accentuates surface texture and detail, and

- Easy to control ("cut").

Hard light sources include:

- Direct sunlight (distinct shadows with soft edge),
- Fresnel (clean cuts w/ soft beam edge),
- PAR (which I call "dirty light"),
- Open Face (I don't like them as much as I like Fresnels because they are "harder to control" than a Fresnel and less versatile),
- Dedo Light (high-tech efficient focused beam), and
- Ellipsoidal (spotlight effect, sharp beam edge, clean cuts, long throw, used in theatrical lighting for these reasons).

19. Chiaroscuro

Chiaroscuro. n., [It., lit., clear, dark < L. clarus, clear + obscurus, dark] 1. the treatment of light and dark in a drawing, painting, photograph or shot in a video, etc., to produce the illusion of depth, a dramatic effect, etc. 2. a style of drawing, painting, photography, or videography etc., emphasizing such treatment.

By simply turning the subject or moving the key light, you create more or less chiaroscuro, which can be flattering and offers visual impact and sense of depth. How hard or soft the shadows are is a matter of style and intent. You can work with soft or hard light. Learn to look for chiaroscuro, the lights and darks and how they interact. In contrast, standard television lighting is the exact opposite of chiaroscuro, it is flat with minimal shadows, everything is visible.

Painting 1: Rembrandt van Rijn (1606-1669) Self Portrait, 1652, Kunsthistorisches Museum, Vienna. Rembrandt lighting presents the challenge of creating a triangle or diamond shape of light underneath the eye of the subject usually furthest from the camera. One side of the face is lit from the key while the other side of the face exhibits the interaction of shadows and light, known as chiaroscuro, to create the diamond or triangle shape on the face as well as create the illusion of three dimensions by depicting light and shade and contrasting them boldly.

Painting 2: Michelangelo Merisi da Caravaggio (1571-1610) Supper at Emmaus c. 1600-1601, National Gallery, London. Caravaggio is known for his innovative departure from the idealized style of

the 16th century with paintings that exhibit intense chiaroscuro effects. The light often flows into dark shadowy scenes at a dramatic angle from an unknown source, illuminating the focal point which can be seen in one of his most popular works shows above. Lighting effects emphasize the shape of the face and body.

20. Basic Three Point Lighting (1 of 3)

Here is a frame from my film, *Remembering John Marshall*, it's from an interview with editor Karma Foley that appears in the film. An excerpt of the film is available for viewing at: <http://kino-eye.com/about/reel/>

Getting rid of shiny faces. In addition to lighting gear, there's one important element to keep in your kit: transparent powder. Look for hypoallergenic matte translucent face powder. You don't want any color, with translucent face powder, the subject's skin color is not changed, only the shine is removed (I prefer to have people look "natural" and I'm not into doing make-up, but getting rid of shine is critical in a formal interview). Also, use a new applicator for each person, so keep some make-up foam triangles and cotton pads in a small bag with your powder. I also have a large soft brush for application, however, it's not a good idea to mix applicators between people, some people have sensitive skin and don't like the idea of being powdered with a brush that was used on other people, and I don't blame them. So I keep the foam applicators and cotton pads (the kind that does not shed) for doing "shine management." I keep this in my camera kit, and I can't tell you how many times this has come in handy while working as a freelance camera person, and of course, I have it on hand all my own shoots too. Often I don't use it, but it's always around for when I do need it.

21. Basic Three Point Lighting (2 of 3)

Here we reveal some of the "gear and set-up behind the scenes." We often talk about light sources in terms of their creative role, or purpose, or its effect on the subject and/or how it helps us create a mood or look. These terms are never exact, but they give us a general way to talk about what various sources are doing for us. We'll discuss four common roles for light sources: Key, Fill, Backlight, and Background.

22. Basic Three Point Lighting: Key Light

Key light is the primary light source illuminating the subject. It's not always the brightest light on the subject, but it's the source that provides shape and definition to our subject. If we have only one light source in a scene, it's easy to say, that's the key. The key need not come from in front of the subject. We often talk about a side key or a side-back key. In a moving shot, the subject may move in and out of multiple key lights. In this example, a Lowel Rifa light (with a 500W lamp) was used as the key light.

23. Basic Three Point Lighting: Background Light

Background light is a light that is used to light the background and thus are called background lights, not to be confused with back lights. Often you'll make the background either lower in intensity or cooler in terms of color (blues) compared to the key (warmer, or neutral white in comparison) to increase the sense of depth in the image. Usually you want to draw the eyes attention to the interview subject, so you don't want the background competing with the subject. In this example, light coming in through the window with a ½ CTO gel was used as a source of background light, along with spill from the key light.

24. Basic Three Point Lighting: Back Light

Back light is any light that comes from behind the subject. If it comes from directly overhead, it's often called a top light. It can add dimensionality, and at the same time, unless it's motivated, it can look artificial or give the interview a theatrical feel. Sometimes this is good. It's all in the range of aesthetic choices. In this example, an Arri 300W Fresnel (with a ½ CTB gel, I think, it was a long time ago) was used as the back light.

25. Basic Three Point Lighting: Fill Light

Fill light is whatever light balances the key light. While it's often placed on the opposite side of the key, it does not have to be. The contrast of a scene is usually determined by the relative ratio of key+fill and fill alone. The fill light need not be a lighting instrument, sometimes it can be provided by the existing light in a scene or you can use a reflector (e.g. Flex-Fill, a flexible reflector that folds up into a small disk for transport and unfolds into a larger

disk for use). In this example, the matte-silver surface of a Flex-Fill was used as the fill light.

26. Basic Three Point Lighting (3/3)

So there you have one example of three point lighting (using four sources). We can take things to silly extremes and talk about four, five, six, seven, etc. point lighting, however, the basic concept at play here is in general called *three point lighting*, which refers more to a style of lighting, or lighting concept, that involves working with a Key light, Fill light, and Back light as the primary light sources on your subject, rather than the actual number of lights you are using.

Often you use additional lights for more finesse or specific effects. For example:

Kicker. A backlight that skims across the face (often called a $\frac{3}{4}$ backlight) is called a kicker. A kicker is different from a back light in that it bounces off the side of the subject.

Rim. A rim light is any light from the back and to the side that helps create definition. Often a rim is called a kicker if it's on a person's face, and rim is used to describe the effect on an object. But the terms are imprecise at best and they are often intermixed.

Eye light. Sometimes subjects have deep-set eye sockets that are hard to get light into. A small lighting instrument close to the camera is often used to resolve this problem. An "Obie" light is a term (originating with Merle Oberon who always insisted on the perfect eye light) for any small lighting instrument attached to the camera directly over the lens. On camera lights can be good fills, but when they become the key it can make the overall image feel flat.

Accent. Light used specifically to light an individual object (often to make it pop out from the rest of the background are often called accent lights. The term "special" is also used for lights that are focused on a specific object.

Practicals. Ordinary household lighting units that appear in the frame are called practical lights.

Ambient. Any light that naturally exists in the scene before lighting instruments are added is often referred to as ambient light. This may come from a window or overhead fluorescent fixtures. Ambient light might be used as fill light, or background light.

The overall quality of light is highly influential in setting the mood and atmosphere of a scene. This example is a little more dramatic than the typical video interview, but I have a tendency to do that. It's not about a specific formula of how to set the key, fill, and back lights, although formulas can be a good starting point to get a feel for things. But don't stop there, experiment. These "roles" exist to help us talk about lighting, but they should not be considered a set of rules or list of essential elements. Whenever you see a discussion of "three point lighting" (lighting based on a key, fill, and back light) think of it as a starting point to be tweaked to get the effect you want, and adding lights or taking away lights as you see fit is an important part of the creative process.

Don't get hung up on terms, think about effects, mood, drawing attention to the subject, and dimensionality.

27. Four examples from *Smile Boston Project*

Here are four example lighting set ups (showing an example frame and an overhead lighting plot for each). 1. Typical Formal Interview, 2. Harsh Existing Light, 3. Dramatic Chiaroscuro, and 4. Window Light as Key. The film will be available for download in the near future. We'll look at some clip in class from the DVD.

28. Four examples: 1. Typical Formal Interview

Note the nice "wrap" (gradient from light to dark) on the face due to the use of a large "soft box" style soft light. I made sure the white french doors were not too bright, this was accomplished by making sure the soft light did not spill too much on the back ground (the "waffle" style grids that come as optional accessories for soft lights are very handy for this kind of spill control), along with making sure the subject was separated from the back ground (she looks closer to the background than she really is since the interview was shot with the lens in the medium telephoto range). I also used $\frac{1}{2}$ CTB (blue) gel on the light lighting the lace curtains to make the background cooler than the subject for improved dimensionality. There was plenty of separation between the subject and the background, so a backlight was not needed. I liked the soft quality of the image, and a backlight would have added another hard edge that I did not want in this particular interview.

29. Four examples: 2. Harsh Existing Light

Here I was making the best of a difficult situation, I was shooting this interview during a party and all I had was my camera and a handheld microphone. A 150W Soft White practical provided the key and fill. Pretty harsh. The shelves behind the subject had small built-in quartz-halogen lamps, providing some sparkle in the frame. Kind of like a built-in special. In cases like this you have to move around and find the spot/position that works the best given the time and location constraints. I did not have the option to set up lights or move to another room (the rest of the party was way too crowded and loud). This was the result of making do with what you have, which is typical of many documentary shooting situations. I really like having a mix of different styles of interview lighting and locations in one film, so this worked for me.

30. Four examples: 3. Dramatic Chiaroscuro

Here I was intentionally going after a highly stylized, theatrical look. More dramatic than usual. The backlight calls attention to itself and has a theatrical feel. The background light is a deep blue. It certainly draws attention to the subject, since the subject is in sharp relief. Some effort was made to control the exposure of the shirt by placing some ND gel on the bottom fourth of the Rifa light face. Flex fill as fill light works well when a high contrast ratio is acceptable. Note the shadows are not completely black, however, the fill is actually working to prevent the right hand side of the face to be in complete darkness.

31. Four examples: 4. Window Light as Key

If you're shooting indoors and don't have (or don't want to work with) lights, find a window. Instant Vermeer lighting. Windows that are all skylight make wonderful soft lights. If I had a small light or reflector (Flex-Fill) with me at the time of this interview, I would have used it, as it would be nice to have a little more fill, however, anything is better than underexposed interiors under harsh lighting, at least the window offered a key light worthy of this lively and dynamic interviewee.

32. Five Variations of three-point lighting

As you vary the position of the key relative to the subject, you get different classic variations of three-point lighting. As you progress from glamor to profile lighting the face appears slimmer and more texture is brought out in the face.

1. Glamor lighting (a.k.a. classic Hollywood lighting) is characterized by a subtle, symmetrical, butterfly-shaped shadow beneath the nose. It flatters people with high cheek bones, however, it tends to hollow out cheeks and eye sockets in others. This is how Hollywood starlets were lit during the golden age of Hollywood. You also see this style of lighting in fashion magazines.

2. Loop lighting is a variation of glamor lighting in which the key light is lowered and moved farther to the side of the subject so that the shadow under the nose forms a loop on the shadow side of the face.

3. Rembrandt lighting is characterized by a triangular shaped highlight on the shadowed cheek of the subject with the key coming practically from the side of the subject. This is the classic variation for drama and dimensionality in the frame.

4. Split lighting is when the key illuminates only half of the subject's face, with the effect of narrowing a wide nose and with a weak fill can hide facial imperfections.

5. Profile lighting (a.k.a. rim lighting) is used for dramatic effect. The back of the subject's head is in shadow, lighting comes from the side.

Assignment: Experiment with these five variations, how do they change the mood of the interview?

33. Popular professional instruments

Open face. Open face instruments include reflectors in their design and most models (like the Lowel Omni) can be focused in order to provide a choice between a concentrated spot of light or a more even, broad beam. Examples include the Lowel Omni (can be fitted with a 500W or 300W lamp), Lowel Tota (can be fitted with a 750W or 500W lamp), Arri 1K Arrilite, and the Mole-Richardson 1K Mickey Mole. The Tota is small with adjustable reflecting doors and it's good for illuminating large areas or used as a key or fill with optional umbrella attachment. Open faced lights are perfect for diffusing, using with a soft box (e.g. Chimera) or bouncing. But if you want the most

versatile kit, you'll want to throw some Fresnels in the mix (more on that later).

Fresnel. We discuss Fresnels in more detail on slide # 41. See notes under that slide for information on Fresnels.

PAR (Parabolic Aluminized Reflector). These instruments are made with a sealed-beam PAR lamps. The lamps themselves have an integral reflector inside the glass envelope (thus the name) designed to produce a very concentrated beam of light. The actual lamps are available different lens grids in the front of the lamp (with HMIs these are usually separate lenses you placed on the face of the PAR lamp) to provide different beam spreads (narrow, medium, wide). There are some PAR instrument designs with an aluminized glass reflector and interchangeable quartz-halogen lamps just like open faced units. These use glass lenses over the unit much like HMI PARs.

Soft light. Whether it's a halogen lamp in a soft box like a Rifa or a grid of LEDs or fluorescent tubes, soft lights are a key element in any lighting kit. Due to their size, they produce a softer light (recall: the larger the source, the softer the light). Thus, the softest lights have really large sources. Chimera video banks can be placed on open face, Fresnel, and PAR instruments to turn them into soft lights.

Fluorescent. Unlike incandescent lamps, fluorescent lamps require a ballast to regulate the flow of power through the lamp which makes them more bulky, however, fluorescent lamps are more energy efficient than incandescent lamps and run significantly cooler. These advantages more than outweigh their higher cost when used as soft key lights for interviews, keeping your subject cool and comfortable. Two popular models for use in interviews are the Kino Flo Diva-Light and the Lowel Caselite. Both are re available in 2-tube and 4-tube models, using 55W/tubes, either Daylight or Tungsten balanced. With the Caselite the light is also the case, which holds stand and offset arm too, so it's pretty good for traveling.

HMI (Hydrargyrum Medium arc length Iodide). A daylight-balanced lighting instrument using an enclosed AC mercury arc lamp (kind of like the love child of a quartz-halogen lighting instrument and an arc welder). Available in PAR or Fresnel configurations. Requires the use of a separate, usually heavy, ballast to control the voltage and a starter to ignite the arc (all in one outboard unit).

While expensive, they offer a very efficient and bright source of daylight balanced lighting. Excellent for use when working outdoors or when you need to match interior lighting to windows during the day, which avoids the need of gelling the windows with CTO.

Most HMI units are pretty large and unwieldy for documentary work, however, two exceptions that come to mind are the 400 Bron Kobold and the 200 EWB Kobold Reporter, both small HMIs that pack lots of daylight balanced light in a small unit.

HMIs are much more efficient than halogen lights, so a 400W HMI gives you more light than a 2,000W halogen with CTB gel attached. Not to mention the dramatically reduced electricity requirements. When you need a powerful daylight balanced source, HMIs are worth the expense of the rental. They do require more maintenance and care and feeding, and you should definitely learn how to use them properly before taking them out on shoot. The Bron Reporter is a 200W HMI portable lighting system designed for field production. It can be used with a 30 volt battery belt or an AC ballast. The Bron Kobold is a 400W HMI unit that is pretty compact and the lamp and ballast are designed to be rugged for all-weather use, and given this is a bright, daylight-balanced unit, it's ideal for fill light outdoors or matching exterior daylight when shooting an interview indoors.

LED. A lighting technology based on semiconductor devices. Very efficient, low energy usage and direct no heat towards your subject. Ideal for documentary work because they offer a bright light in a small form factor. There's a lot of innovation happening right now around LED lighting technology. Right now they are very expensive, but prices are dropping. The fact they are efficient enough to run off batteries, are available in a wide range of sizes, and are available in either daylight or tungsten (some designs can produce any color) make them very attractive for portable, run-and-gun production.

There's a wide range of offerings from Zylight, Lite Panels, Prompter People, Kino Flo, and others. Keep an eye out for the Blender soon to be sold by Lowel which allows controllable daylight and tungsten light in one unit. The Zylight Z90 is interesting in that it can display any color and has two user-controllable presets along with daylight and tungsten presets. Optional wireless controller.

Competition is vibrant right now in the LED marketplace.

34. Some low-budget alternatives to pro lighting

When you're on a tight budget or working in unusual locations, you have to be creative with your light sources. Work lights from your favorite home improvement store fitted with 3200K halogen lamps provide lots of light for low cost. Chinese lanterns cast beautiful soft light, but don't use with high wattage light bulbs (never exceed maximum wattage recommended). If you want high-wattage chinese lanterns, consider the professional Chimera lanterns which can handle 1,000W halogen lights. Window light and reflectors can make nice combinations for key and fill, indoors or out, use reflector card or Flex-Fill as fill light. Always carry a Flex-Fill with you. They come in matte or shiny; white or silver or gold; folds up for travel. I like Matte-Silver on one side and Matte-White on the other. They come in various flavors. Foam-core makes a good bounce source. Try using high CRI tubes like Chroma 50/daylight or Ultra 32/tungsten for excellent color rendition in ordinary fluorescent fixtures. In some cases flicker can be a problem. Professional fluorescent fixtures have ballasts that run at a high frequency to avoid flicker problems.

35. Camera-mounted lighting options

There are a number of options for camera mounted lights: **Anton/Bauer ElightZ**; **Anton/Bauer's Ultralight 2**; **Zylight Z90** LED light features microprocessor controlled, can produce any color, has presets: daylight, tungsten, two user selectable, and a wireless controller available. A larger, brighter Zylight will be introduced at NAB this year.

Blender provides tungsten & daylight (two LED grids) with variable tungsten / daylight controls, Lowel will be selling these. **Lite Panels** are available in tungsten or daylight and are available in flood or spot models. They make a wide range of lights, including the larger, more powerful, 1x1 Lite Panels. They have announced a large Lite Panel with Tungsten/Daylight grids for variable color temperature control without gels. **Prompter People** has a very nice, inexpensive, daylight-balanced camera light that works with camcorder batteries. They also have a new line of very inexpensive LED lights. **Aesthetic warning:** your subjects will look better if the light source comes from the side (modeling, shape, chiaroscuro, etc.) These smaller

lights can be used with a range of battery options. With larger camcorders you can use the power-tap off the brick battery holder, or use a separate battery. Some sleds are available so you can use your same camcorder batteries to power these small lights. The Prompter People and Lite Panels lights have attachments so you connect the battery right onto the light. The Lite Panel thing is separate, the Promoter People light has the connector directly on the light.

36. Comparison of lighting technologies

Tungsten. Electricity passes through filament, giving off light and infra-red (heat). Quartz Halogen designs provides a color temperature of 3200°K. Available in both single ended and double ended variations. High energy usage, ubiquitous and inexpensive, yet inefficient energy-wise. No ballast or control electronics required, very simple instrument designs. Available in Open Face, Fresnel, PAR, and Soft Light designs.

HMI (Hydrargyrum Medium arc length Iodide) daylight-balanced lighting that uses an enclosed arc lamp. Requires use of a ballast that controls voltage starter to ignite the arc. HMIs are expensive, yet provide a very efficient source of 5500°K. Available in both single ended and double ended variations. Solid-state ballasts are flicker-free, older magnetic ballasts may exhibit flicker under certain shutter/frame rate settings (with both video and film cameras). Available in Fresnel, PAR, and Soft Light designs.

Fluorescent. Gas-discharge lamp, electricity excites mercury vapor which creates ultraviolet light that in turn causes a phosphor coating on inside of tube to fluoresce, producing light. Require ballast to regulate power. Very efficient. High CRI lamps available in either 3200°K or 5500°K in a single or double ended design. Due to the physical design of the tubes, only available in Soft Light designs.

LEDs are semiconductor devices that provide an extremely efficient source of power and ideal for use batteries. Available in two designs: arrays of single LEDs or high-density LED modules. Currently very expensive, prices are dropping slowly. Units are available with a color temperature of 3200°K or 5500°K. Units designed with High-density LED modules can display any color without gels (Zylight).

37. Comparison of lighting technologies

No notes are available for this slide.

38. A bare-bones, economical, starter lighting kit

Natural light is often the best choice for lighting, especially when doing documentary, but sometimes you need some help. If you like to travel light, here's a suggestion for a minimalist \$250 one light starter kit. The inventory includes: (1) Lowel Tota-Light w/ Protective Screen and 16' power cable, less lamp, street price \$115 (2) Two 500W, 120V 3200°K lamps (FDN), always carry a spare, street price \$15 ea (3) Lowel Umbrella for Tota, street price \$30, turns the Tota into a decent key light (4) Manfrotto Nano Light Stand (#001B) ideal for travel, closed length is only 19" fits in a carry-on bag for travel by air, yet opens up to height of 6.2', street price \$55 (4) Extension cord, 25' 14 gage, three-prong w/ three outlets, not pictured, street price \$20. Other items (not included in budget) would be a carrying case and a small padded box for storing spare lamps.

Once you master the use of this kit, you might want to add some small Fresnel instruments (e.g. 150W and 300W Arri Fresnels with spare lamps, barn-doors, and light stands). Many beginners miss the chance to work with Fresnels by buying kits like Lowel's DV Creator kit which in many respects is too much wattage and not enough light in the right places, unlike an open face Omni light, Fresnels have a focused beam that puts the light where you need it rather than all over the place, while open faced light are hard to control, Fresnels, by virtue of their optical design, are easy to control and their barn doors actually work by cutting the light sharply.

I own both Omni and Tota lights, and the reason I suggested the Tota with the Umbrella as the basis of a minimalist one light kit is that together they make for a nice soft light, with minimal weight and size. The Omni is slightly heavier and much bulkier. The barn doors on the Omni do not work all that well, since it's not a Fresnel, and the Omni in spot mode is not very flattering. As a background or area light its OK, but if had to pick a single light on a tight weight, bulk, and cash budget, I think the Tota with an umbrella is a good place to start. If you want a soft light all the time, a Rifa would be a good option, but it costs more. The Tota and umbrella, on the other hand, makes a nice soft light with the umbrella, or a good bounce or overall ambient area light bouncing off the ceiling. It's a versatile place to start.

39. A good kit typically starts with a soft key...

Soft key is the starting point for an interview lighting kit. Three good options are:

Lowel Rifa: a quartz-halogen unit that opens and closed quickly and easily, available in 4 models (250W, 500W, 750W & 1000W), can also be fitted with fluorescent lamps.

Kino Flo Diva-Lite: a fluorescent unit available in 2-tube and 4-tube models, 55W/tube, either Daylight or Tungsten

Lowel Caselite: a fluorescent unit available in 2-tube and 4-tube models, 55W/tube, either Daylight or Tungsten, the light is also the case, which holds stand and offset arm too!

40. ...and then is completed with some open-face and Fresnel units and other essentials.

Open Face Instruments e.g. Lowel Omni or Tota or Pro Lights, good for background lights and fill-lights, lighter and less expensive than Fresnels, but don't offer the same quality of light.

Fresnel Instruments e.g. Arri 300W Fresnel and/or 150W Fresnel, excellent for back lights, kickers, and accent lights, add diffusion and they make good soft fill lights and background lights too, very versatile!

Stands that are steady yet small stands are essential, .g. Lowel compact UNI-66 stand, Max. height of 7-ft. with folded length of 22.5-in. is easy to fit into medium equipment cases. Can handle up to a 650W Fresnel and a Caselite or Diva-Lite when used with offset arm.

Travel Cases with wheels and handles are essential, Lighting kits can get heavy fast, especially when you add plenty of extension cords!

41. What's so special about Fresnels?

The beam of light produced by a Fresnel has the quality of sunlight, casting crisp, distinct shadows. The mean is easy to "cut," with a crisp, sharp edge between the illuminated and non-illuminated areas. Compare the quality of light and the evenness of the beam of a Fresnel and a open faced light and you'll see what I'm talking about, the difference is striking in terms of "cut," evenness of the beam, and the quality of the wrap. In addition, you can make subtle changes in the quality of the Fresnel with diffusion, so you have the perfect hard to soft

lighting instrument. I would suggest adding one or two Fresnel instruments to your kit. For use as a back light or accent light as part of a small “one case” kit that’s easy to travel with, I’m very fond of the Arri 300W and 150W Fresnel units. They also feature an adjustable beam pattern (Flood to Spot) which is accomplished by moving the light source closer to or farther from the lens.

A Fresnel is more versatile than open faced instruments and gives you a hard, clean light that has the quality of sunlight. Fresnels get their name from a special scalloped glass lens that bends divergent beams of light into a controlled beam that is easy to control in Flood mode with clean, sharp shadows. Fresnels are more efficient than open face units in practical use. The circular rings of the Fresnel lens produces a pattern in the light. In order to eliminate this, the Fresnel lens in lighting instruments has a pebbled finish on the back side of the glass. While this provides a less tightly focused beam, it does end up producing a very clean, even beam of light that is in most applications is more desirable than an open faced design.

The Fresnel is named after Augustin Fresnel (1788-1827) who did important work on optics and was one of the founders of the wave theory of light. He became a member of the French Lighthouse Commission in 1819 and in 1822 developed a multi-prism lens that produced a beam five times more powerful than the reflector system used previously in lighthouses. We now use the term Fresnel to describe both the lens and light fixtures that use the lens in their design.

Because they offer more control and a narrower beam, Fresnels are especially good for accenting specific objects in the background and for use as a back light. What might require a 600W open face and lots of spill management can usually be done with a 300W Fresnel with a simple aim, flood/spot adjustment, and a tweak of the barn doors. No doubt about it, if you want soft fill off a bounce card, wall, or ceiling, a bank of open face work lights from your local hardware store is cheap and effective. But if you want finesse and control, Fresnels are the way to go. They are the perfect compliment to a soft key light in any kit. Really large Fresnels provide the equivalent quality of moonlight at night or sunlight streaming through a window, you’ve probably seen these at work if you’ve ever been on or near a big-budget movie set.

As far as my preference for the Arri Fresnels, I like them because they are well designed, quality instruments, and available from most rental houses when I want to expand my kit. Other quality Fresnel instruments are available from LTM and Mole-Richardson. Lighting instruments are a lot like musical instruments, there are lots of them because each one plays in a unique way in the hands of the individual artist.

42. Electricity and safety

Do you have enough power available? Try not to blow circuit breakers (or fuses), some household circuits are 15A, newer code requires 20A circuits in kitchens. Know where there breaker box is just in case. Small lighting kits have the advantage of working on a single circuit with plenty of cushion. Use the “paper power equation” to determine power needs:

- Watts (P) = Total Power Output (light & heat output)
- Amps (I) = Rate of Electrical Flow (volume or current)
- Volts (E) = Potential Difference (electromotive force)

Standard Voltage of US Electrical Systems is 120 Volts. Power Equation $P = I \times E$ (remember as “PIE”). Because the standard Voltage in the US is 120V. You can round off Volts to 100.

Example: If you are trying to determine how much power (in watts) you can draw on a 20 amp household circuit, you multiply 20 amps x 100 volts = 2000 watts. This builds in a 20% cushion so you are safe. Thus, for example, you can use a 1000W soft light, two 300W Fresnels, and two 150W Fresnels, and have 100W left over to cover your camera and monitor.

Important Safety Tips

- Read the manual and safety information provided with lighting instruments
- Always be cautious when dealing with electricity
- Never handle Quartz-Halogen lamps with bare hands (oil from your fingers getting on the lamp may cause them to shatter when they get hot)
- Never operate open-faced lights without safety scrim

- Make sure cables, lights & outlets are grounded and in good condition
- Tape down extension cords that cross traffic areas
- Avoid “clothes lines,” cables that are not lying along the floor
- Reroute power cables to another circuit if you blow a circuit breaker or fuse
- Keep hot lights away from people
- Don't handle hot lights without gloves
- Make sure extension cords are rated for the current you are using, otherwise they may heat up excessively, damaging their insulation
- If you're ever in doubt about anything, ask questions.

43. Diffusion

Diffusion material modifies the quality of light by spreading the beam, the result is a softer source and a more gentle wrap on faces and objects.

Tough Spun feathers beam edge and softens overall field, beam shape is maintained. Varieties: Tough Spun #3006, Light Tough Spun #3007, Quarter Tough Spun #3022

White Diffusion provides wide beam spread with an even field of soft light without shadows. Varieties: Tough White Diffusion #3026, Tough Half White #3027, Tough Quarter White #3028

Frost provides moderate beam spread, yet still maintains a discernible beam center. Varieties: Tough Frost #3008, Light Tough Frost #3009, Opal Tough Frost #3010, Powder Frost #3040, Light Opal Tough Frost #3020

Also available: Grid Cloth, Tough Silk, Soft Diffusion.

Numbers listed are for Rosco Cinegel from [Rosco Laboratories](http://www.rosco.com). Similar materials available from other manufacturers. Mention of Rosco products does not constitute an endorsement. Quality gels are also available from LEE and GAM (Great American Market).

43. Color correcting gels

Color correction gels are used to match the color temperature of difference sources, typically in the daylight / tungsten dimension. Also available are green / magenta correction gels.

Color Temperature Blue (CTB) gels include:

- Double CTB: converts 2800K to 10,000K (Mired shift = -260) Cinegel #3220
- Full CTB: converts 3200K to 5500K (Mired shift = -131) Cinegel #3202
- 3/4 CTB: converts 3200K to 4700K (Mired shift = -100) Cinegel #3203
- 1/2 CTB: converts 3200K to 4100K (Mired shift = -68) Cinegel #3204
- 1/4 CTB: converts 3200K to 3500K (Mired shift = -30) Cinegel #3208
- 1/8 CTB: converts 3200K to 3300K (Mired shift = -12). Cinegel #3216

Color Temperature Orange (CTO) gels include:

- Double CTO: converts 10,000K to 2400K (Mired shift = +320) Cinegel #3420
- Full CTO: converts 5500K to 2900K (Mired shift = +167) Cinegel #3407
- 3/4 CTO: converts 5500K to 3200K (Mired shift = +131). Cinegel #3411
- 1/2 CTO: converts 5500K to 3800K (Mired shift = +81) Cinegel #3408
- 1/4 CTO: converts 5500K to 4500K (Mired shift = +42) Cinegel #3409
- 1/8 CTO: converts 5500K to 4900K (Mired shift = +20) Cinegel #3410

Numbers listed are for Rosco Cinegel from [Rosco Laboratories](http://www.rosco.com). Similar materials available from other manufacturers. Mention of Rosco products does not constitute an endorsement. Quality gels are also available from LEE and GAM (Great American Market).

45. Theatrical gels

Theatricals is the term used to describe colored gels other than those used for color correction, listed here are just a few. Gel manufacturers offer "swatch books" with small samples of their gels.

Some useful tints include:

- Bastard Amber: provides warm tint, natural skin tones. (#02)
- Dark Bastard Amber: provides warm tint. (#03)
- No Color Pink: a very pale pink (#33)
- Surprise Pink: takes the edge off pure white light (#51)
- No Color Blue: very slight cooling (#60)

- Special Lavender: gives light a moonlight quality (#54)
- and many more!

Some useful colors include:

- Primary Red: for special effects (#27)
- Primary Green: enhance foliage and other special effects (#91)
- Primary Blue: good for an intense blue background wash (#80)
- Deep Amber: firelight effect or dramatic backlight (#22)
- Congo Blue: deep, purple-blue for non-realistic atmospheres (#59)
- Night Blue: good for moonlight backlight or side light (#74)
- Skelton Exotic Sangria: a good purple for special effects (#39)
- and many more!

Numbers listed are for Rosco Cinegel or Roscolux from [Rosco Laboratories](#). Similar materials available from other manufacturers. Mention of Rosco products does not constitute an endorsement. Quality gels are also available from LEE and GAM (Great American Market).

46. Tools of the trade (1 of 3)

Cube Taps (some are actually shaped as a cube) make it easy to run power to multiple lights, whenever you run an extension cord, get in the habit of putting one of these on the end of it, that way, when you need to tap in to power, you are never in a situation where you need to go hunting for one and disconnecting other things. Plan ahead. Extension cords that have three or four sockets on the end are quite handy too.

Gloves protect hands from hot lighting instruments, get yourself a pair of leather gloves and leave them in your lighting kit.

2-Prong to 3-Prong Adapters (a.k.a. ground lifters) are used when lighting in older buildings (avoid use whenever possible, keep your lights grounded, safety first).

Gaffer Tape is cloth tape with a special adhesive, avoid using duct tape, it's too sticky and leaves behind a mess. Pro grade gaffer tape recommended. For use around hot lights, use black paper tape instead.

Flags, Nets, and Silks come in a range of sizes and used to, cut, reduce, or diffuse light (respectively), usually held in place by a Gobo Arm on a C-Stand. Flags and nets can be used to sculpt light and create subtle effects.

Sand Bags (a.k.a. Beach) stabilize C-Stands and light stands, smaller "Shot Bags" are easier to use with small stands.

C-Stands are stands that can be used many ways, from holding flags to booming small lights and everything in-between, use with sand bags.

47. Tools of the trade (2 of 3)

C-47s (a.k.a. clothes pins) are used for attaching gels or diffusion to barn-doors and other things.

Grip clips can be used for attaching all sorts of things.

Dimmers can be used to dim tungsten units, however, solid-state dimmers cause problems with electro-magnetic interference and filament buzz, creating sound problems. ND Gel or scrim (metal mesh) offers a better alternative for reducing the intensity of a light.

Black wrap is heavy-duty foil painted black used most often for reducing spill from lights.

Gel Packs (a.k.a. "Gelly Rolls") provide a good way to store sheets of gel and diffusion. Expanding file folders are useful for keeping small pieces handy and sorted. The ones from Lindcraft are really nice and they have a new smaller design for smaller gel pieces.

48. Tools of the trade (3 of 3)

Scissor Clamps provide a way to hang lights with a 5/8-in. from a drop ceiling when shooting in an office environment

Mafer Clamp (a.k.a. Photo Clamp) w/ 5/8" Stud are handy for attaching lights in odd places

Light Meter with reading in foot candles comes in very handy for setting up lights without constantly looking at the monitor

18% Grey Card is used for exposure determination and testing, 18% is often placed around 50 IREs (0=Black, 100=White) but there's more to it ...

Other useful tools include:

- Scrim (used to reduce intensity of lights)

- Foam Core (reflective surface)
- Matte Silver and Matte Gold Show Card
- Edison light socket (for practical bulbs)
- Flex-Fill Reflector (Matte Silver / White)
- Duvetyne
- Trick Line
- Electrical Tape
- First-Aid Kit
- Flashlight
- Spare Lamps
- Circuit Tester
- Extension Cords
- Mic Stand (can double as reflector stand)
- Soft Box (for open-face and Fresnels)
- Leatherman Multi-Purpose Tool
- Tool Kit

49. Terms of enlightenment

Aesthetic Criteria: Parameters established for evaluating an artistic object.

Aesthetic Response: A viewer's cognitive and emotional response to an artistic object.

Aesthetics: Activity dealing with the appreciation of the form and style of an artistic object and the techniques used to realize the work.

Blocking: The grouping or arrangement of subjects; the patterns of movement in a shot or scene.

Chiaroscuro Lighting: Lighting that emphasizes light/dark contrast (fast falloff, with light coming from a specific direction). Has the effect of personalizing and emphasizing the subject. Commonly thought of as dramatic lighting.

Convention: A procedure, technique or device widely observed and accepted (break with it when it makes sense for your work)

Flat Lighting: Lighting that de-emphasizes light/dark contrast. Lack of shadows and little or no fall off (low contrast between the illuminated and shadow sides of a subject). Has the effect of depersonalizing or de-emphasizing the subject.

Lighting: The illumination of a shot or scene, described in terms of the source of light, quality of light, time of day, mood, as well as the specific requirements of what should be lit as well as not lit.

Motif: A recurrent thematic element in an artistic object.

Mood: Refers to the emotional tone pervading a shot or scene which fosters in the viewer expectations as to the course of events, whether happy, sad, disastrous, mysterious, etc.

Motivation: The reason behind a specific light source or effect.

Objective: The motivating goal of a light source or lighting effect.

Period: Representative of a particular time, i.e, turn of the century, the future, etc.

Sensory Awareness: The heightened employment of the senses, for example, lighting can heighten our visual involvement with a video.

Style: The characteristic way in which an artistic object is lit (or written, acted, directed, blocked, edited, shot, etc. for that matter).

Three Point Lighting: A lighting technique in which key and fill lights are typically on opposite sides of the camera and to the front and side of the subject and the back light is opposite camera behind the subject. Changing the position of the key light and varying the contrast ratio between key and fill has a significant effect on the look and feel of the lighting. Experiment with this.

51. Resources for further study

These slides, associated notes, more resources, and pointers to even more resources are available on the Documentary Video Boot Camp resource page at Kino-Eye.com/dvb/

52. More resources for further study

Good books include:

Matters of Light & Depth by Ross Lowell (a delightfully written introduction to lighting for video and photography)

The Digital Filmmaking Handbook by Ben Long and Sonja Schenk (a good introduction to video production)

The Set Lighting Technician's Handbook by Harry Box (the definitive technical handbook on professional lighting gear)

Light and Color by R. Daniel Overheim and David L. Wagner (good discussion of theory)

without complicated equations and advanced physics)

Online Resources:

DVinfo.net (discussions on a range of video production topics, an excellent real-info, real-people forum)

DVXuser.com (an especially good site for users of DVX100, HVX200, Red, and more)

Online Tutorials:

[Izzy Video](#)

[Acceptable.tv Tutorials](#)

52. Copyright and Licensing Notice

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Glossary of lighting terms

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A

Accent light. Any light source from any direction which is used to emphasize a particular object or area. For example, you light use an accent light to enhance a vase of flowers within a scene. An accent light can be a key light, kicker, or back light.

AC. Alternating Current. An electric current with periodically changing polarity (e.g. 60 Hz power in the United States).

Ambient light. The general lighting available in a shooting area prior to a lighting intervention, can serve the purpose of overall fill, however, sometimes undesirable and has to be overcome. Often provided by overhead fluorescent fixtures in an office. See also Natural Light, Artificial Light, Existing Light.

Amp (A). A measure of electrical power. Amps = Watts / Volts. Typical household circuits are 15A or 20A. Lighting units are typically rated in Watts. In the United States electrical voltage is about 110 Volts. To calculate how many lights you can put on one circuit, divide by 100 to add a safety margin, so use the formula: Amps = Watts / 100. For example, if you want to use 650W and 300W lighting units and want to know how many amps they will draw, add together the wattage (650 + 300 = 950) and then divide by 100, thus, you will need 9.5 Amps.

Angle of light. The horizontal and vertical relationships between camera / subject and light / subject affects

modeling (visual) and mood (emotion). For example, the key light can be anywhere from 0° (for flat lighting) to 90° (for side lighting) from the camera / subject axis in the horizontal plane. On the set the terminology is usually along the lines of Top, Side, Front, ¾-Back, etc.

Apple box. A sturdy rectangular box commonly used in media production made of wood. Used to support equipment, people, props, etc. Sometimes called a “man maker” when stood on by a person to help them appear taller. Available in various sizes: Full (12” x 8” x 20”), Half (12” x 4” x 20”), Quarter 12” x 2” x 20”), and Eight or Pancake (12” x 1” x 20”). Full apple boxes work well stood on their end as a temporary place to sit on the set.

Area lighting. Lighting that illuminates specific areas of a set rather than the entire set.

Artificial light. Light produced by lighting instruments rather than light from natural sources like the sun, moon (reflected sunlight), and fire.

Automatic white balance. A circuit in a video camera that attempts to adjust the white balance automatically. See White Balance.

Available light. See Existing Light.

B

Baby. 1. Nickname for a 1K fresnel lighting instrument. 2. Used to describe any light which is smaller than a standard size unit of comparable intensity (e.g. “Baby Baby,” “Baby Deuce,” etc.). 3. Refers to anything with a 5/8 inch stud (i.e. baby plate) or anything that mounts onto a 5/8 inch stud (baby receiver).

Baby pin. A 5/8” stud, the standard stud on light stands designed for smaller fixtures.

Baby plate. A steel plate with holes for screws with a 5/8” stud welded on to it. Used for mounting lights or grip heads on a wall, apple box, or other surface.

Back light. Light coming from behind the subject used to help create separation from the background. When it's strong in conjunction with weak or no key, results in a silhouette. Sometimes confused with Background light. A back light with the specific purpose of providing definition in the subject's hair is called a hair light.

Background. Anything that is behind your interview subject.

Background light. Lighting on the background behind the subject. Sometimes confused with Back Light.

Barn doors. Folding doors mounted on the front of lighting instruments in order to control illumination. They work best on Fresnel instruments.

Black wrap. Aluminum foil coated with a heat resistant black paint which is used for wrapping lights in order to control light spill. Can also be used for making small flags or an improvisational snoot.

Blonde. Slang for a 2K open face lighting unit, also known as a “Mighty.” Gets name from a particular brand

of open face lighting instrument that was color coded yellow for 2K (thus blonde). See Redhead.

Bobbinet. Black mesh cloth used primarily for making nets. It also is available in rolls for darkening windows.

Boom. An adjustable counterweighted arm usually positioned on a study stand in order to place a light over the subject.

Bottomer. A flag or cutter which is placed in the path of a light beam in order to cut the light from the bottom of the lighting unit.

Bottom chop. A flag used to keep light off of the floor or the lower part of a scene.

Bounce board. A white reflecting panel (often foam core is used) used as a soft key, fill light, or soft kicker.

Bounce card. See bounce board.

Bounce light. A soft light source created by reflecting light off of a white surface (a wall, ceiling, foam core, etc.).

Branch holder. A pipe-like unit with a locking nut which is used to hold branches, wooden poles, or other items.

Branchaloris. Nickname for branches which are placed in front of a light acting like a cucoloris to provide a shadow pattern.

Brightness ratio. See contrast ratio.

Broad light. A rectangular open-faced light used for general fill or for illuminating a cyc.

Bulb. The glass portion of a lamp, sometimes called a globe.

Burning up. A subject or a portion of a scene that is over-exposed (as in "Mike's burning up when he walks close to the window").

Butterfly lighting. See Glamor lighting.

Butterfly (Overhead Butterfly). A large frame with translucent fabric held up with four stands for providing gorgeous soft light on bright sunny days. Requires a crew to set up and a challenge on windy days, but the results are delicious.

C

C-47. Wooden clothespins used to secure gels to barn doors along with other tasks on the set. Also known as a #1 wood clamp. The origin of the name is tied to several colorful stories.

C-Clamp. A film production version of what you find in a hardware store except film C-clamps have one or more 5/8" pins for attaching lighting or a grip head.

C-Stand. A versatile stand used to support equipment on the set. Usually outfitted with a grip head and a gobo arm. Can be used for hanging sound blankets, backgrounds, or holding flags, or hanging chimera lanterns or small lights off the gobo arm. See Grip head, Gobo arm. The name is a derivation of Century stand, after the name of their first manufacturer).

California scrim set. A set of nets (scrims) with two doubles.

Candela. A unit of light intensity, a standard candle.

Celo. A type of cookie which is made from wire mesh coated with plastic.

Cheating. To move a subject, prop, or lighting instrument to a new position (usually between two shots of the same subject) for better results. The cinematic equivalent of poetic license.

Chiaroscuro. The treatment of light and dark to produce the illusion of depth and a dramatic effect. By simply turning the subject or moving the key light, you create more or less chiaroscuro, which can be flattering and offers visual impact and a sense of depth. You can work with soft or hard light. In contrast, standard television lighting is the exact opposite of chiaroscuro: flat with minimal shadows, everything is visible. See Rembrandt lighting.

Chimera. The brand name of a popular soft boxes (a.k.a. light banks). Chimera makes a wide range of units design to fit most popular lighting fixtures. Excellent for turing a hard Fresnel or open face light into a gorgeous soft light.

Chimera lantern. A professional lighting version of classic chinese paper lanterns capable of accommodating high wattage lighting fixtures. Works well hanging from a C-stand with a gobo arm.

China ball. Synonym of chinese lantern.

Chinese lantern. A paper-covered wire frame inside which a socket and light bulb may be placed. Not designed to handle high wattage lamps. See Chimera lantern.

Cinematographer. The person responsible for the camera work and lighting in a film. Sometimes the term is used even though the medium in use is video. Also called a lighting cameraman or director of photography.

Circuit breaker. An electrical switch that automatically shuts off an electrical circuit when an excessive current load occurs. Most household circuits are designed to support a 15 or 20A load. Tip: new electrical codes require 20A circuits in kitchens, so kitchens are a good place to draw power from. If you plug too many lights into a single circuit, you will "pop" a breaker. Whenever you're using lighting instruments on a shoot, it's a good idea to do your calculations ahead of time (see Amps), find out if other high-current draw devices are on the circuits you are using, and always know where the circuit breaker box is located just in case.

Clothes light. A light shining directly on the subjects clothing. Sometimes when interview subjects wear black they will need a clothes light so the texture of their clothes don't get lost.

Clouds. Collections of water vapor that mother nature is always moving across the sun in order to make it difficult for you to shoot outdoors without changes in the light.

When nature is cooperative, provides nice even soft light on cloudy days.

Color Rendering Index (CRI). A numeric value that indicates the color accuracy (compared to daylight at 100) of a light source. HMI lights typically have a CRI of 90 and some high quality fluorescent lights also have a CRI around 90 (anything 90 or over is pretty good, anything 85 or over is acceptable for videography).

Color temperature. Color temperature is a characteristic of visible light. The color temperature (measured in degrees Kelvin (K)) of a light source is determined by comparing its chromaticity with that of a theoretical black-body radiator. As the black body is heated it emits different colors. At lower color temperatures (2700–3000 K) it emits “warm” (yellow–red) colors. At higher temperatures (5000K or more) it emits “cool” (green–blue) colors. Daylight has a spectrum similar to that of a black body. A practical application: if there are multiple light sources with different color temperatures in a scene (e.g. outdoor daylight which is bluish and indoor tungsten which is yellowish) one way to balance the color temperature of the two light sources would be to place color-correcting gels over one or the other light source, see CTB, CTO; 2. Color temperature is sometimes used loosely to mean “white balance” on a video camera.

Complimentary colors. The three complimentary colors in the additive light system are: Magenta (a red-purple color, complement of Green), Cyan (a blue-green color, complement of Red), and Yellow (complement of Blue). See Primary colors.

Contrast. The difference between one tone and another or between the darkest and lightest regions within the image. High contrast images exhibit an extreme brightness ratio with very few grey tones in between pure black and pure white. On the other hand, low contrast has an expanded range of grey tones with limited amounts of pure black or pure white.

Contrast ratio. The range between the brightest and darkest tones in a scene that an imaging system can reproduce. With a typical video camera, you can reproduce a contrast ratio in the range of 64:1 (5 stops), while film can reproduce a contrast ratio in the range of 128:1 (7 stops) or greater. Not to be confused with the lighting ratio.

Contrasty. A shot with high contrast. See Contrast.

Cookie. See cucoloris.

Cool. Light sources or gels in the blue-green region of the color spectrum.

Cool card. A yellowish, orangish, or slight-magenta “white card” used for setting white balance with the effect of cooling the scene by fooling the white balance circuitry in the camera to think the scene is a little warmer than it really is. The same effect can be achieved using a normal white card and gels.

Cove. 1. The curved edge of a cyc where the back wall blends into the floor, see Cyc; 2. Making a focused soft

light by shining a light into a piece of white or silver show card that has been curved into a parabolic shape.

Crop out. Adjusting the frame with a camera move, focal length change, or both to eliminate some undesirable element in the frame.

CRI. See Color Rendering Index.

Cross light. Illuminating a person from both sides with lights of equal intensity (if one was brighter than the other then you’d have a key / fill arrangement).

CTB (Color Temperature Blue). A blue gel that when placed on a tungsten lighting instrument will boost the color temperature from 3200°K to 5500°K for a better match with daylight. Available in various densities of blue called ½ CTB, ¼ CTB and ⅓ CTB. A nice trick for giving scenes a touch of warmth is to hold a ¼ or ⅓ CTB gel over then lens while you’re setting the white balance. This fools the camera into thinking there’s more blue in the scene and thus the overall color balance will be warmer.

CTO (Color Temperature Orange). An orange gel that when placed on a daylight balanced lighting instrument or to cover a window during the day will reduce the color temperature of daylight from 5500°K to 3200°K for a better match with tungsten lighting. Available in various densities of orange called ½ CTO, ¼ CTO and ⅓ CTO. Also available with ND, which is useful for gelling windows in order to match the daylight outdoors to tungsten lighting indoors.

Cucoloris. Perforated material which is used to break up light or create a shadow pattern, most often to make a plain background more interesting. Also known as a cookie. Some flag and net kits include a standard cucoloris, however, you might prefer to make your own pattern for a unique look, for example, simulating a window pane, tree branches, etc. Sometimes custom cookies are called gobos instead of cookies. Standard cucolorises come in 18” x 24”, 24” x 36”, and 4’ x 4’.

Cutter. A cutter is pretty much the same thing as a flag, however, while flags are square or rectangular, cutters are usually longer in shape. See Flag.

Cutout. See matte.

Cyc (Cyclorama). A background built in a studio which has a curved surface at the floor line in order to facilitate the creation of a shadowless backdrop. Often used for blue or green screen work.

Cyc light. Special row lights with a reflector designed to provide even illumination of a cyc or other background.

Cyc strip. A row of connected cyc lights.

D

Depth. The illusion of a third dimension. Effective lighting that emphasizes planes in the frame and takes advantage of chiaroscuro enhances the illusion of depth. One trick (which you see in many classical paintings) is to make the background darker and cooler than the foreground. Using depth of field to your advantage

(having the background slightly out of focus) also enhances the sense of depth. See Chiaroscuro.

Detail level. An image processing function in a video camera that controls edge enhancement and this has an effect on the overall sharpness of the picture. Be careful not to overdo the use of this.

Deuce. Nickname for a 2K fresnel lighting instrument. Probably larger than any light you would ever need on a documentary production. Usually 1K fresnels and smaller are used on interview shoots.

Dichroic (dichroic filter). A color filter (usually made by depositing metal vapors on a plate of glass) that is heat resistant and used for placing color filtration close to lamps in a lighting instrument. Most often used for converting tungsten units to daylight.

Diffusion. 1. A translucent material used to soften lights when attached to barn doors or placed in a frame in front of the light (it spreads the light creating a larger light source and thus softer light); 2. A filter placed in front of the camera lens to soften the image, typically results in specular highlights having some flare.

Dimmer. A device for varying the intensity of tungsten lighting instruments. As the light is dimmed the color temperature goes down (they get more yellow). Solid state dimmers (SCR dimmers) are notorious for causing interference with sound equipment and the filaments in tungsten lamps sometimes buzz when they are dimmed. See Variac.

Directional light. Hard lights (Fresnels and open face instruments) are directional, they produce a discernible beam with little or no spill, on the other hand, soft lights are not very directional, with a much broader beam.

Dots. Small round nets and flags used to control light. See Fingers.

Double. 1. A metal scrim placed in an open face or fresnel lighting instrument in order to reduce the light intensity by 1 stop, see Scrim; 2. A net used to reduce light intensity by 1 stop, see net.

Duvetyne. A heavy black cloth treated with fire resistant material used for blacking out windows, making teasers, hiding cables, turning flags into floppies, draping over the camera operator so they don't show up in a glass reflection, and many other uses.

Dynamic range. The difference between the brightest and darkest portions of video that a system is capable of processing.

E

Edison. Slang for extension cords with Edison connectors on both ends.

Edison plug. An ordinary household plug with two flat blades and a ground pin.

Edison socket. An ordinary household socket that accepts a plug with two flat blades and a ground pin.

Existing light. Light which exists in nature or in a room, etc. which has not been introduced into the environment

by an intervention on the part of the filmmaker. If you study lighting technique, you will be in a better position to make the best of existing light, which can be beautiful. Often changing the angle or position of the subject relative to existing light sources can make the difference between ugly light and beautiful light. Windows make for wonderful soft lights, albeit unreliable due to the movement of the sun and clouds). When we talk of existing light photography or videography, we're talking about shooting without the introduction of artificial lights. Also known as Available Light photography (or videography).

Exposure index (E.I.). A film's sensitivity denoted as a number, for example, EI 100 is relatively slow film, EI 800 is relatively fast film.

F

FAY. A 650 watt PAR light with a daylight balance dichroic filter.

Feather. The process of moving a flag closer to or further away from a light source will feather (move it closer to the light to soften; move it farther from the light to harden) the shadow on the surface that the light is falling on.

Filament. The component of a light bulb that glows producing lots of heat and some light. Quartz halogen (a.k.a. halogen) lamps contain filaments made out of tungsten (thus the use of the terms "tungsten units" and "tungsten lighting").

Fill light. Illumination which opposes and softens shadows thrown by the key light. Typically fill light is soft. If you don't have a soft lighting instrument, and need soft fill, consider bounding the light off the ceiling or foam core or some other surface.

Fingers. Small rectangular nets and flags used to control light. See Dots.

Filter. 1. A piece of glass fitted in front of a camera lens to control the color or quality of light entering the camera. 2. An effect applied to a clip in a non-linear editing system.

Flag (a.k.a. solid). Objects used for blocking light consisting of black duvetyne stretched over a steel frame with a mounting pin. Flags are made in a variety of sizes and shapes and are placed in the beam of a light source in order to create shadows.

Flag kit. A kit that typically include two flags, a double net, a single net, a silk, and an open frame (which you can use to make custom flags, hold gels, make your own cookie, etc. For formal documentary interviews in which you're doing nice lighting, a couple of C-Stands and a 24" x 36" flag kit is small enough to transport in a car and very versatile when it comes time to light.

Flicker. The alternation of light and dark which can be visually perceived. Depending on the shooting conditions and electronic shutter speed and frame rate settings of the

video camera, fluorescent and HMI lighting units can appear as flickering on video.

Flood. 1. The widest beam spread setting on a Fresnel lighting instrument. 2. A lighting instrument with a broad beam.

Floodlight. A studio lamp that illuminates a relatively wide area by “flooding” it with light. Also called a flood. See spotlight.

Fluorescent lighting. A gas-discharge lamp typically in the shape of a long tube that uses electricity to excite mercury vapor which in turn creates ultraviolet light that causes a phosphor coating on the inside of the tube to fluoresce, producing visible light. Unlike incandescent lamps, fluorescent lamps require a ballast to regulate the flow of power through the lamp which makes them more bulky, however, fluorescent lamps are more energy efficient than incandescent lamps and run significantly cooler. These advantages more than outweigh their higher cost when used as soft key lights for interviews, keeping your subject cool and comfortable.

Flux. A quantity of light present as measured in lumens.

Foamcore. Polystyrene which is sandwiched between heavy paper. Usually white, or white on one side and black on the other. It is used as a reflector and can be used to make soft boxes and other items because it is rigid and easily cut.

Footcandle (fc). A measure of incident illumination. See lux. Also spelled as Foot Candle.

Fresnel. A scalloped convex lens used in the design of HMI and tungsten lighting instruments that provides better efficiency and the crisp quality of direct sunlight. Fresnel instruments can be focused and have a knob that you can adjust for flood or spot. Fresnels offer clean, crisp shadows and even, smooth cuts when set to flood.

Frequency. The number of times a signal vibrates per second. Expressed in Hertz (Hz), which is the number of cycles per second.

G

Gain. 1. In video, an adjustment in the voltage of the video signal expressed in decibels (dB). When it's increased, the image is brighter, along with more visible noise; 2. In audio, how much the input signal level is increased, expressed in decibels (dB); 3. In audio post-production, how much the audio signal of a clip or audio track is adjusted, expressed in decibels (dB).

Gaffer. The chief lighting technician on a production in charge of the electrical department. Works closely with the Cinematographer and the Key Grip.

Gaffer's tape. A strong cloth-based tape with a special adhesive that does not leave behind any residue when carefully “peeled” off surfaces. It's also easy to rip. Not to be confused with duct tape which leaves a sticky mess behind.

Gel. A transparent or translucent sheet of plastic used to add color or correct the color balance of light. Available

in a wide range of colors. Manufacturers include Lee, Rosco, and GAM. Swatch books are available from manufacturers so you can see a sample of their range of colors.

Glamor lighting (a.k.a. Hollywood lighting). A three-point lighting setup characterized by a subtle, symmetrical, butterfly-shaped shadow beneath the subject's nose. It flatters subjects with high cheek bones, however, it tends to hollow out cheeks and eye sockets in some people. See Loop lighting, Rembrandt lighting, Split Lighting, Profile Lighting, Three point lighting.

Gobo. 1. Anything that is placed between a lighting instrument and the subject with the goal of creating some kind of shadow or visual texture. 2. A derivation of “Goes Before Optics,” an older term for a what is more often called a “flag.” See Flag, Cutter, Grip arm, Gobo arm, Grip head, C-Stand.

Grip arm. See Gobo arm.

Gobo arm. A grip head mounted on the end of a 5/8” diameter, 30” long arm used as a device for holding flags and other equipment. See Grip head, C-Stand, Flag.

Gobo head. See Grip head.

Grip head. A fully rotatable, adjustable clamp usually mounted on the top of a C-Stand and used to support a Gobo arm, flag, or other equipment. Its core component is a gobo head, which accepts the pin on a flag or a 5/8” gobo arm. See Gobo arm, C-Stand, Flag.

H

Hard light. Illumination which creates stark contrast between light and shadow. Usually a small, direct, and focusable source (e.g. Fresnel). See high-contrast lighting.

Hertz (Hz). A unit for specifying the frequency of a signal, formerly called cycles per second (cps).

High-contrast lighting. A style of film lighting which creates a stark contrast between bright light and heavy shadows. See also high-key lighting and low-key lighting.

High-key lighting. A style of film lighting which creates bright, even illumination and relatively few shadows. See also high-contrast lighting and low-key lighting.

HMI (Hydrargyrum Medium arc length Iodide). A daylight-balanced lighting instrument using an enclosed AC mercury arc lamp. Available in PAR or Fresnel configurations. Requires the use of a separate, usually heavy, ballast to control the voltage and a starter to ignite the arc (all in one outboard unit). While expensive, they offer a very efficient and bright source of daylight balanced lighting. Excellent for use when working outdoors or when you need to match interior lighting to windows during the day, which avoids the need of gelling the windows with CTO.

Hollywood. 1. A term used to describe the mainstream film industry of the United States. 2. The act of holding a gobo with your hands instead of using a C-Stand.

Hollywood lighting. See Glamor lighting.

I

Incandescent lighting. Electric lights bulbs that works by a process of heat-driven light emissions called incandescence. An electric current passes through a thin filament, heating it until it produces light. The enclosing glass bulb prevents the oxygen in the air from reaching the hot filament, which otherwise would be destroyed by rapid oxidation. The lamps used in professional lighting instruments are designed to reduce uneven evaporation of the filament (and the resulting darkening of the envelope) by filling the lamp with a halogen gas at low pressure, rather than an inert gas. These lamps, made with quartz glass, can operate at a higher filament temperature (providing higher luminous efficiency and a whiter 3200°K light) with a trade off in terms of loss of life (thus the shorter lifespan of professional lamps).

Incandescent bulbs have a low manufacturing cost and require no ballast and thus are widely used in portable lighting kits. Lighting fixtures using incandescent bulbs, however, are gradually being replaced by fluorescent, HMI, and LED technology which provide more visible light for the same amount of electrical energy input.

Intensity. The quantity of light. You can increase the intensity of a light by moving the unit closer to the subject, removing scrims, or swapping it out with a larger unit. You can reduce the intensity of light by moving it farther away from the subject, adding a scrim, using a net, or using ND gel on the barn doors. Dimmers are sometimes used to adjust the intensity of a light. See Dimmer, Net, Scrim.

Inkie. Nickname for a small (250 watt) Fresnel lighting instrument.

Inverse square law. Light from a point source falls off inversely to the square of the distance. If you double the light to subject distance, you end up with only a 1/4th of the light intensity. Diffusion increases the rate of fall-off, while lenses and reflectors reduce fall-off, thus Fresnel instruments operate more efficiently than lighting instruments without a lens. If you ever wondered why big-budget productions use large numbers of huge lights far away from the talent when they could simply get the same illumination with smaller units close up, it's because they want to simulate natural light and the farther a light source is from the subject, the less the fall-off effect.

J

Juicer. Slang for a set electrician.

Junior. 1. A 2K fresnel lighting instrument. 2. Any 1-1/8 inch stud or mounting pin or any 1-1/8 inch female receiver.

K

K. See Kelvin.

Kelvin (K). Unit of measure used for absolute temperatures and color temperatures.

Key grip. On a feature set, the chief grip who works directly with the gaffer creating shadow effects for set lighting and supervises camera cranes, dollies, supporting structures, etc. according to the requirements of the director of photography.

Key light. The primary source of illumination in a shot.

Kick. An object with a shine or reflection on it from another object.

Kicker. A low-angle light coming from the back or side of the subject that adds interesting highlights. Often can be created using a small piece of reflector material on a stand catching spill from the key light rather than adding another light to the set.

Kill. To turn off a light.

Kiss. A light that gently brushes a subject.

L

LCD. A solid state technology used for image display. See CRT.

LED. A lighting technology based on semiconductor devices, which are very efficient in converting electrical energy into light energy, LED lights also have very long lifespans, in comparison to other lighting technologies.

Lighting cameraman (sic). See cinematographer.

Limbo lighting. A style of film lighting which eliminates background light and isolates the subject against a completely dark (or neutral) field. For example, George Lucas' *THX-1138* was shot with limbo lighting.

Loop lighting. A three-point lighting setup and a variation of glamor lighting in which the key light is lowered and moved farther to the side of the subject so that the shadow under the nose forms a loop on the shadow side of the face. See Glamor lighting, Rembrandt lighting, Split Lighting, Profile Lighting, Three point lighting.

Low-key lighting. A style of lighting with less illumination compared to high-key lighting, and therefore a darker atmosphere and tone. See also high-contrast lighting.

Lumen. A unit of incident light measurement. Typically used to describe how bright lamps are.

Luminance. The black and white, or brightness, component of a component video signal. See Chrominance.

Lux. A unit of incident light measurement. The video version of foot candles (fc x 10.8 = lux). Typically used to describe the minimum lighting required by a video camera. The specifications you see in manuals and sales literature are misleading, for they often are stated with lots of gain in effect.

M

Magic hour. The time of day when outdoor lighting is exquisitely beautiful and soft (dawn or dusk). Many of

the scenes in *Days of Heaven* were shot during magic hour.

Mafer. A small adjustable clamp with a 5/8" (baby) stud which can be interchanged with a variety of accessories. Also known as a photo clamp.

Masking. Blocking out part of an image, usually at the edges of the frame, thus altering the size or the shape of the frame projected on the screen, see Curtains, Letterbox.

Master pedestal. An image processing function in a video camera that controls how the camera handles darker sections of the image. The lower the master pedestal, the more darker images blend into black. The higher the master pedestal, the softer the contrast of the image and more details can be seen in the shadows, but the blacks will be milky.

Mickey. A term for an open faced 1K lighting unit. See Redhead.

Mighty. A term for an open faced 2K lighting unit. See Blonde.

Mired (from the term micro reciprocal degree). A unit of measurement used to express color temperature. Mireds are used to indicate the color temperature shift provided by a filter or gel for a given film and light source.

Monopod. An alternative to a tripod consisting of a single leg that extends and locks. They are easier to carry and faster to set up and take down compared to a tripod. They can also be used as a way of lowering the camera's center of gravity for smoother hand-held shots. Also handy for holding small lighting units, especially LED lighting units for on the run style shooting.

Motivated lighting. A lighting style in which the light sources imitate natural sources such as lamps or windows.

ND. See Neutral density.

Neutral density (ND). 1. Grey gels (no color) that are used to reduce the intensity of lights. Available in ND.3 (one stop), ND.6 (two stops) and ND.9 (three stops); 2. filters for use in a matte box or on a camera lens for performing pretty much the same thing as definition 1 except with the goal of reducing exposure.

N

Net. Bobbinet stretched on a metal frame used to reduce the intensity of light. A single net (typically color coded green) reduces the intensity by 30% (about 1/2 stop) while a double net (typically color coded red) reduces the intensity by 50% (about 1 stop). Nets typically have one edge "open" so the edge of the shadow they cast has a feathered edge.

Noise. Random variation in the color and intensity of video pixels which are usually the result of cranking the gain setting.

O

Obie. Slang for an eye light mounted on the camera.

On location. Also called shooting on location, see location shooting.

P

PAR (PARabolic Reflector). A lamp that has an integral parabolic reflector, making it very efficient.

Phono plug. See RCA connector.

Photo clamp. See Mafer.

Practical (also practical light). Lights that appear on camera, e.g. a table lamp. Practical lights may or may not provide useful illumination in the scene.

Primary colors. The three primary colors in the additive color system are: Red (complement of cyan), Green (complement of magenta), and Blue (complement of yellow). See Complimentary colors, RGB.

Profile lighting (a.k.a. rim lighting). A three-point lighting setup used for dramatic effect. The back of the subject's head is in shadow, lighting comes from the side. See Glamor lighting, Loop lighting, Rembrandt lighting, Split Lighting, Three point lighting.

Put the money on the screen. Allocating resources on a production as to maximize production values. See Production value.

R

Raccoon eyes. The effect you get when the subject's eye sockets are in shadow. Often happens when you're shooting outdoors at high-noon or in a situation with harsh overhead lighting. Fill from a flex-fill or sun gun can help reduce the effect.

Redhead. Slang for a 1K open face lighting unit, also known as a "Mickey." Gets name from a particular brand of open face lighting instrument that was color coded red for 1K (thus redhead), see Blonde.

Rembrandt lighting. Rembrandt lighting is a three-point lighting setup characterized by a triangular shaped highlight on the shadowed cheek of the subject with the key coming practically from the side of the subject, creating the illusion of three dimensions by depicting light and shade and contrasting them boldly. See Glamor lighting, Loop lighting, Split lighting, Profile lighting, Chiaroscuro.

RGB. Red, Green, Blue. The primary colors of light. Computers, video cameras, scanners, and similar devices typically process images using separate red, green, and blue color channels. For example, a three CCD cameras has a CCD sensors for each primary. See Primary colors.

Rim lighting. See Profile lighting.

Run and gun. A style of shooting that is fast, unpredictable, and often involves covering action in multiple locations in a short amount of time. A great deal of documentary and broadcast journalism is done in this manner.

Sandbag. A bag, typically full of sand, used to stabilize C-Stands and light stands on the set (small sandbags full of metal pellets are called shot bags).

Scrim. 1. A metal screen that can be dropped into a fresnel or open face instrument in order to reduce the intensity of the instrument. Available in four configurations (color refers to color coding of rim): single (½ stop, green), double (1 stop, red), half single (½ stop, green, ½ circle), and half double (1 stop, red, ½ circle). The half single and half double are useful when the light is falling on a area at a diagonal and you want to even out the coverage of the light, reducing the intensity of the bottom of the beam but not the top. 2. Another name for a net, see Net. 3. A cloth mesh material often used in theatre as a back drop that can be either lit from the front to hide the background or not lit to reveal lit background elements.



S

Scissor clamp. A clamp with a 5/8" pin and a scissor shaped clamp that attaches to T-bar drop ceiling rails. Handy for hanging small lights in a office. The clamps usually include a cable holder that makes it easy to manage cables running along the ceiling.



Shiny boards. A large reflector used for re-aiming sunlight for use as key or fill light when shooting outdoors.

Shot. A single, continuous run of the camera. The images recorded by the camera from the time the camera starts until the time it stops.

Showcard. Artists' cardboard which is easily cut and formed and used as a reflector or for making special rigs. Available in various surfaces including white, black, matte silver, matte gold, shiny silver, and shiny gold.

Sider. A flag or cutter placed in the path of a light beam in order to cut the light from the side of the lighting unit.

Single. 1. A metal scrim placed in an open face or fresnel lighting instrument in order to reduce the light intensity by ½ stop, see Scrim; 2. A net used to reduce light intensity by ½ stop, see net.

Signal to noise ratio (S/N). The ratio of the desired signal to unwanted noise in an audio or video recording system.

Silk. A material used to diffuse light. Available in various configurations including large silks (as part of an overhead kit) or small silks stretch in a metal frame (available as part of a Flag kit). Once upon a time these items were actually made of silk (thus the name), but

today they are made out of synthetic fabrics. See Flag kit, Butterfly kit.

Snoot. A cylindrical attachment used with Fresnel lighting instruments in order to reduce the width of the beam.

Soft light. A light that produced a wide, diffused beam of light. Interviews are often lit using a large, soft key light. The larger the light source, the softer the light, and the more gentle the wrap around faces. See Chimera, Rifa, Diva Lite.

Solid. Another name for a flag. See Flag.

Specular. A highly directional, focused light, often in the form of reflection off a hard, reflective surface. Specular light appears as a very hard light.

Spill. Light emanating from the sides of a lighting instrument, or any light that is falling where it is not wanted. Barn doors, black wrap, snoots, flags, dots, and fingers are used to reduce or eliminate spill.

Split lighting. A three-point lighting setup in which the key illuminates only half of the actor's face, with the effect of narrowing a wide nose and with a weak fill can hide facial imperfections. See Glamor lighting, Loop lighting, Rembrandt lighting, Profile Lighting, Three point lighting.

Spot. 1. On a fresnel light, adjusting the knob for the most intense beam with the least spread. See Flood. 2. An alternative term for spotlight.

Spotlight. A studio lighting instrument that illuminates a relatively small, specific area, or "spot." Also called a spot. See floodlight.

Stinger. A single extension cord with Edison connectors. Most often on a feature set the term refers to a single "hot" extension cord that is left around for occasional use.

Striking. 1. The process of breaking down a camera position, set, or location, for example, "strike the camera and let's move on to lunch" 2. The process of turning on an HMI lighting instrument, typically, since they can be very bright, you often will say, "striking" while turning them on to let people know, things are going to get bright. With tungsten and fluorescent lighting instruments, as a courtesy, you will often say, "light coming on" instead of "striking."

Sun gun. Term used to describe a small, battery powered daylight balanced HMI lighting instrument.

T

Take down. Reducing the light on an object by means of using dimmers, nets, dropping scrims into an instrument, placing ND gel on a light, or "wasting" the light (moving a light away from the subject slightly).

Teenie. A term for an open faced 650W lighting unit.

Three point lighting. A traditional lighting set up used in portraiture and interviews using three lights: a key light (the primary light source), fill light (fills in some of the shadow areas), and a back light (providing definition

and preventing the subject from blending in with the background). Often a fourth light is used to light the background itself, but essentially it's still three point lighting, since there are three lights on the subject. See also:

Tie in. A power feed obtained by temporarily clamping on to the main power service within the main circuit breaker box on location. This method is dangerous and illegal in many areas. Always work with an experienced gaffer if you need sophisticated lighting that requires serious amperage.

Topper. A flag or cutter which is placed in the path of a light beam in order to cut the light from the top of the lighting unit.

Tungsten. 1. Generic term for lighting instruments that incorporate 3200°K (tungsten balanced) halogen (a.k.a. quartz or quartz halogen) lamps in their design; 2. The material used to make the filament in standard incandescent and quartz-halogen lamps.

Tweenie. A term for a 650W Fresnel lighting unit.

U V W X Y Z

Umbrella. 1. An attachment that opens up like an umbrella and has a reflective material on the inside. An umbrella can transform a hard open-face lighting instrument (e.g. the Lowel Omni or Lowel Tota, which both sport a built-in socket to accept an umbrella) into a delightful soft key or fill; 2. An essential device to have on a shoot in order to providing your crew and subjects with shade when shooting outdoors in bright locations or protection from water when it rains.

Variac. A lighting dimmer that reduces the voltage. It stands for VARiable AC.

Warm card. A bluish or greenish “white card” used for setting white balance with the effect of warming up the scene by fooling the white balance circuitry in the camera to think the scene is a little cooler than it really is. The same effect can be achieved using a normal white card and gels.

Wasting light. See Take down.

White balance. A circuit in a video camera that establishes the relative balance of red, green, and blue light that comprises the white reference. Video cameras are pretty “dumb” when it comes to color reproduction, therefore, setting white balance is required in order to have white objects appear white in video. Cameras typically have two present white balance settings (tungsten 3200°K and daylight 5500°K) and one or two additional user presets which you can set by pointing the camera to a white card and pressing the “set white balance” button.

Wrap. 1. The shoot is over (as in “that’s a wrap”); 2. The process of packing up all of the equipment and cleaning up after yourself at the end of a shoot.

Colophon

This document was produced on a MacBook Pro using Pages (part of Apple’s iWork suite) and set in Adobe Garamond and Interstate. Music listened to while writing included the oeuvres of The Talking Heads, Brian Eno, Philip Glass, The Neville Brothers, Tangerine Dream, Kraftwerk, Blonde Redhead, Pylon, R.E.M., Erik Satie, The B-52s, The Pretenders, and Spoon.

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