

***A FURTHER LOOK***

# **BEHIND the LENS**

**MORE** DISPATCHES FROM THE CINEMATOGRAPHIC TRENCHES



**JAY HOLBEN**



**A FURTHER LOOK**

# **BEHIND THE LENS**

**MORE DISPATCHES FROM THE CINEMATOGRAPHIC TRENCHES**

**BY JAY HOLBEN**

Since completing *Behind the Lens: Dispatches from the Cinematographic Trenches*, I have continued to author a number of columns and give a number of lectures on the art and science of cinematography. As a bonus to reward individuals who participate in the promotion of *Behind the Lens* in social media networks, I decided to collect a handful of these additional pieces that were not included in the book. I hope that they, along with the 70+ articles compiled in the book, help to illuminate your path to telling fantastic stories in the greatest art form yet known to man: motion pictures.

Happy shooting!

Jay Holben  
Los Angeles, California  
September, 2015

The articles included here appeared in *TV Technology Magazine* in 2014 and 2015. My thanks to Tom Butts, editor-in-chief and Terry Hanley managing editor.

More on Jay Holben can be found at [www.jayholben.com](http://www.jayholben.com)  
Follow Jay on Instagram at [www.instagram.com/jayholben](http://www.instagram.com/jayholben)  
Twitter [www.twitter.com/jayholben](http://www.twitter.com/jayholben)  
and Facebook [www.facebook.com/booksbyjayholben](http://www.facebook.com/booksbyjayholben)

A Further Look Behind the Lens: More Dispatches  
from the Cinematographic Trenches  
© 2015 Jay Holben.  
Cover art © 2015 Jay Holben

All rights reserved. No part of this publication may be reproduced in any material form (including photocopying or storing in any medium by electronic means and whether or not transiently or incidentally to some other use of this publication) without the written permission of the copyright holder except in accordance with the provisions of the Copyright Designs and Patents Act 1988.

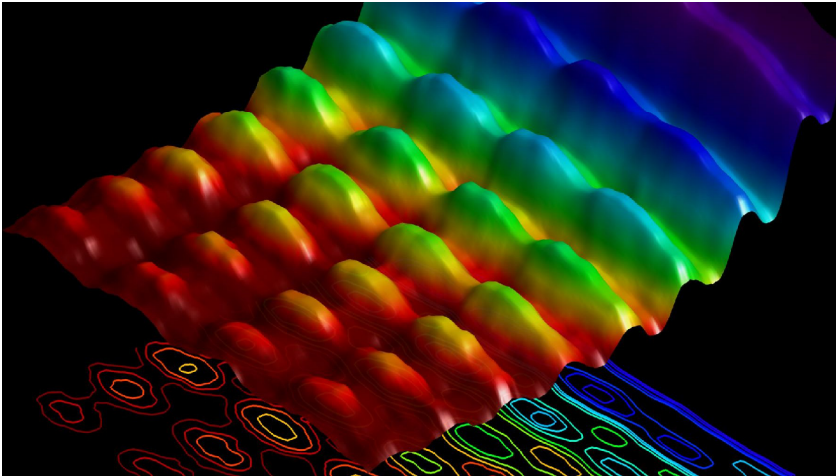


# Contents

- 1 Light Itself
- 2 Looney Lumens
- 3 Lighting Fixtures 101: Space Lights
- 4 Lighting 101: Changing Intensity
- 5 Adventures in Lighting: An Exercise in Hard Light
- 6 A Study in Blackness: Dark Lighting Inspired by *The X-Files*
- 7 Adventures in Lighting: Back to Front / Front to Back
- 8 Adventures in Lighting: Improvising Lighting
- 9 Developing a Lighting Toolkit
- 10 Understanding Photometrics
- 11 An Update on LED Technology

# 1 LIGHTING

## Light Itself



I hope you, Dear Reader, will allow me a little artistic license this month and permit me to wax a bit poetic. I found it mildly amusing that for nearly two decades I've been writing about cinematography and lighting, with over 1,000,000 words in print on the art and science and I've never just taken a few minutes to write about *light* itself.

Inspired quite a bit by an episode of *Cosmos* with the extraordinary Neil deGrasse Tyson and further prodded by an

Instagram post that I made last week with a photo from École polytechnique fédérale de Lausanne (EPFL), a European technical university. The photo is the result of a collaboration between the Laboratory for Ultrafast Microscopy and Electron Scattering of EPFL, the Department of Physics of Trinity College in the US and the Physical and Life Sciences Directorate of the Lawrence Livermore National Laboratory. It is the first time in history that a photograph was taken of light simultaneously behaving as a wave *and* as a particle.

In 1905 Albert Einstein was the first to propose that light had a duality to it, behaving both as a wave and as a particle, and countless scientific experiments have proven one or the other to be true – but never before has anyone captured the true duality of light simultaneously – until just this March. The picture generated by EPFL is so perfect in its pure scientific beauty. Yeah... I geeked out for quite a while when I first saw this picture, I'm not gonna lie.

Light, itself, is truly extraordinary. It is only a tiny sliver of the otherwise massive electromagnetic spectrum; about 400 to 700 nanometers (one billionth of a meter) is the spectrum we call "light."

I've spent the vast majority of my life centrally preoccupied with this beautiful phenomenon. It is light that brings out the beauty in our world: a stunning golden sunset over a turquoise tropical sea; the nearly iridescent blue of a lotus flower; the fiery green eyes of the one that you love... We can only experience these wonders through the phenomenon of light.

There is nothing else in our universe that behaves like light. A photon of light is born instantly traveling at 186,000 miles per second. There is no acceleration, just instantaneous speed. A speed that *nothing* in our known world can even come close to matching.



I'm certainly not the only one who spent a lifetime obsessing over light. It was the polymath Ibn al-Haytham (965-1040 CE) who shucked conventional wisdom and noted that light is emitted from light-producing sources (such as the sun and fire) and reflected off objects in our world before reaching our eyes. Up until that point, conventional wisdom stated that our eyes sent out rays that reflected off objects and returned to us. He also was the first to note that light travels in a straight line – somewhat ironic to our typical subjects here, he discovered this by creating a camera obscura. Sir Issac Newton (1642-1727) was the first to propose a particle nature to light, which he dubbed “corpuscular” and the first to identify that white light is actually composed of the entire spectrum of colors (principally red, orange, yellow, green, blue, indigo and violet). It is the light of the stars in the sky that has unlocked the secrets of the universe and the birth of existence as we know it.

Obviously, my love affair with light hasn't always been academic. It started long before I even understood the concept of photography. I fell in love with light before I even quite understood that it was light that awakened a passion in me as a very young child. This true romance started in the darkened cinema; watching light dance on the movie screen and bring pure imagination to life.

I wrote, in the intro to my first book *A Shot in the Dark*, about how I used to drive my wife nuts by getting lost in light on a constant basis. We'd be in a restaurant, having a casual conversation and suddenly she would stop and look at me and say, “you're looking at the lighting again, aren't you?” Yup! I sure was. Once I graduated from the simple idea of light as a utility into the world of light as an artistic expression (this transition was aided considerably by the brilliant lighting designer Ed Brown, whom I worked with for a number of years), I began to *see* light completely differently. I began to notice how the sun reflected off the windows of the buildings in the late afternoon. I would sit for hours in my first apartment in Los Angeles and watch as the light changed over the course of the day. For me, every one of these experiences went into a mental Rolodex of imagery that I would consult any time I had to create a moment with light. Every scene that I've ever lit has been inspired by some observation or memory from real life; from that mental Rolodex. I try to inspire my students and readers to venture forth and do the same. Learn to *see* light as it happens around you. Take the time to watch that glorious sunset. Take the time to watch as that sunbeam slowly inches across the room on a lazy winter afternoon. Take the time to see the rainbow created inside a dew drop on a blade of grass. As technicians, sometimes our trade can be relegated to a '2K here' or a '1x1' there or just another 'Leko' in the corner. Work to see beyond the mundane technical details of our vocation and revel in the true beauty of light – artificial just as much as natural. It's all truly awe inspiring.

Photos

(previous page top left) The duality of light. © École polytechnique fédérale de Lausanne (EPFL)

(previous page bottom right) sunset photo by the author.

## 2 LIGHTING

# Looney Lumens

In my day (excuse me while I stoke up my pipe) the principle measurement of photometrics was the footcandle. The humble footcandle is the measurement of the light of one candle on a one foot square area one foot away from the flame. Footcandles also had their counterpart, footlamberts, measuring light reflecting off of a subject. Light meters still operate in footcandles as do most photometrics reported by manufacturers to this date. The footcandle is the equivalent to 1 candela over 1 square foot.

Of course, this is an English system of measurement – one that only a small handful of countries in the world actually use. Hey kids, remember talking about the metric system in math class and being told that the US would be switching over to metrics *soon*? Perhaps *soon* is really relative to the existence of time as we know it, rather than our individual lifetimes... In any case, the metric measurement of footcandle is the lux – which is 1 lumen (let's call the lumen and the candela kissing cousins, if you will) over a 1 square meter area. Pretty much exactly the same thing, except that 1 square meter is 10.74 square feet. So 1 lux = 10.74 footcandles. You with me so far?

Ok, great. This is the professional way of discussing a luminaries' intensity of light over a given distance. What, however, if we just want to discuss the brightness of a source without regard to distance of light traveled?

For over a hundred years, this was commonly done by discussing the wattage of a given light source. As most incandescent light sources of similar wattage are *close* to each other in given output – this has become a standard. How bright of a source do you need? 100 watt? 200 watt? 1,000 watt? Professionals and laypersons alike had a frame of reference for these numbers. My mother understands how bright a 60 watt bulb will be when she needs to replace a burnt-out bulb in her living room. She knows that a 100 watt bulb will be too bright for her and a 40 watt bulb will be too dim.

We've utilized this same frame of reference for decades in the motion picture business – since the rise of the tungsten fixture (over carbon arcs). We order lighting based on wattage – six 1,000W fixtures, four 2,000W fixtures, ten 650W fixtures... Yet wattage has no direct bearing on brightness of a fixture, especially not in modern-day technology.

Wattage only describes the amount of power necessary (the product of amperage and voltage) to power a luminary. As the technology of lighting continues to evolve, new advancements in lighting: HMIs, fluorescent, LED and plasma lighting fixtures have substantially lower wattage ratings for substantially higher light outputs than the equivalent wattage in tungsten bulbs.

Generally speaking, lighting professionals simply, intuitively, know the difference. We understand that a 2,000W tungsten fixture would be substantially less bright than a 1,200W HMI fixture. Beyond newbies coming in on their first week of the job – this is common knowledge. However, how does 100W of LED compare to 100W of tungsten-halogen compare to 100W of HMI compare to 100W of fluorescent to 100W of plasma? Ask any gaffer, chief lighting technician or lighting designer and you're likely to get a shrug. Try to ask a *consumer* what the difference is between a 100W CFL, 100W tungsten light bulb and a 100W LED and you're likely to get the deer-in-headlights stare.

As the different luminaries have different electrical requirements and efficiencies, we're slowly doing away with the old frame of reference. This is starting in the consumer world where packaging requirements are moving away from wattage to denote *lumens*. How many lumens does a light source emit? In actuality, not just for typical consumers, but for *all* of us – this is a much more universal and accurate descriptor of a fixture's brightness value – and where we should also follow with our own manufacturers reporting.

The lumen is a consistent form of intensity measurement, regardless of the source or power consumption.

Below is a chart comparing various lumen outputs and the relative wattage equivalents of consumer incandescent bulbs, CFLs and LEDs

<b>Lumens</b>	<b>Incandescent</b>	<b>Compact Fluorescent</b>	<b>LED</b>
<b>450</b>	40W	9-13W	4-5W
<b>800</b>	60W	13-15W	6-8W
<b>1100</b>	75W	18-25W	9-13W
<b>1600</b>	100W	23-30W	16-20W
<b>2600</b>	150W	30-55W	25-28W

Obviously, when we can get roughly the same lighting intensity from a 25W LED as we can a 150W tungsten bulb, the wattage can no longer be considered a universal factor in determining a luminary's intensity.

I'd like to see a lot more manufacturers of professional lighting equipment start to list the lumen output on their fixtures along with the typical photometric information. Hopefully many will follow suit in the next few years.

### 3 LIGHTING

# Lighting Fixtures 101: Space Lights



This month's fixture introduction is the Space Light. Rarely (if ever) used as a single fixture, a Space Light is designed to be used in concert with multiple other Space Lights to provide an ambient top light soft source. Used, primarily on stage, often to create a base daylight ambiance or an overall soft base exposure.

The typical Space Light is six 1K "nook" lights, halogen bulbs in a simple reflector, configured pointing straight down in a "star" pattern, like the spokes of a wagon wheel, on a single circular base. Variations are 1 lamp, 2 lamp, 3 lamp and 4 lamp varieties. A skirt of diffusion (typically) encircles the cluster of lamps and hangs below them a few feet. A diffusion base can also be inserted into the bottom to close out the cylinder of light.

Because the individual fixtures can be addressed separately, or sometimes in clusters, and dimmed, Space Lights have considerable flexibility of exposure levels with a range of up to 2 and a half stops (in a six-light fixture).

The type of diffusion skirt is, generally, silk, but is interchangeable. To add some directionality with less spread, a duvetyne skirt can be employed instead of silk to black out the sides of the cylinder and only illuminate the bottom circle of diffusion. Color gel can be easily cut and inserted into or clipped onto the bottom disc and several companies offer dyed silk in CTB colors to make the fixture a "daylight" color balance. Many cinematographers and gaffers like to alternate "daylight" and "tungsten" Space Lights in a rig to give them flexibility of color temperature for day or night scenes. Typically, "night" Space Lights incorporate the duvetyne skirt and a CTB layer on the bottom diffusion disc to give the "moonlight" a little more top light directionality and keep it from spilling onto set walls.

Although the diameters of the Space Lights circle vary as do the lengths of the skirt, their true strength is in numbers. Clustering a number of Space Lights together can create a "directionless" ambient exposure that feels very much like natural skylight, or mimics ambient moonlight, over a large area.

Until recently, Space Lights were nearly exclusively tungsten fixtures and 6K of tungsten generates a lot of heat and requires a lot of power. Several companies (such as Mole Richardson and Nila, among others) are now manufacturing LED Space Lights which require significantly less power and generate significantly







less heat. These are much more suitable for a permanent installation in a news room, for example, and the reduction in electricity usage and reduction in air conditioning to cool the studio will more than offset the cost of the new fixtures. Although an LED array may not have the output power of a tungsten counterpart, the benefits of savings as well as ability to have daylight colored or bi-colored LED fixtures in a single Space Light is incredibly beneficial.

I have only ever turned to Space Lights when working on a sound stage with an existing perm structure. They're tedious to hang and power, but once they're in the air, they provide a powerful and efficient system for base exposure and ambient light - especially where green screen (or blue) is concerned. Their even field is great for lighting chroma floors.

Photos:

(previous page upper left) A shot of a single space light hanging on a sound stage. Photo by the author.

(previous page lower left) A shot of *The Event Premiere* shoot on the Universal Studios UVS-1 stage with many space lights in the perms. Photo by Otto Kitsinger.

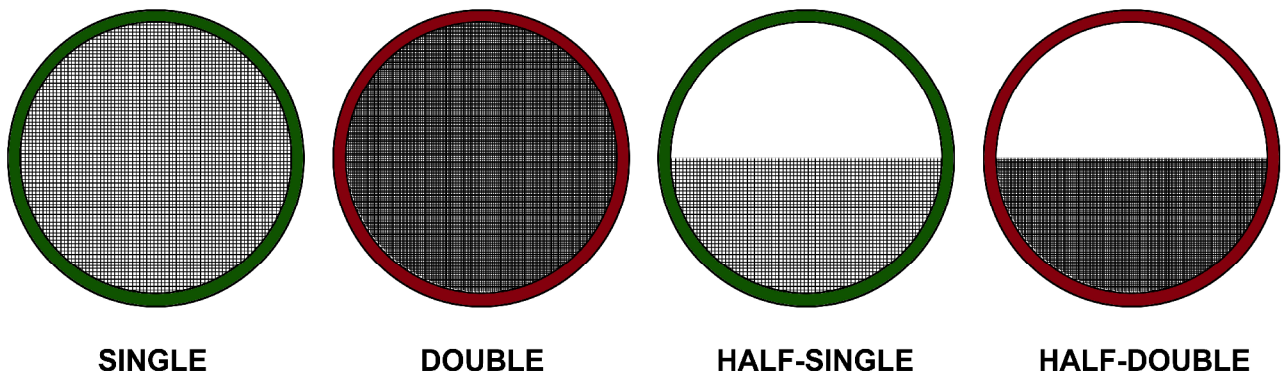
(this page) A look up the skirt of an LED space light. Photo by the author.

## 4 LIGHTING

# Lighting 101: Changing Intensity

At a recent lecture I gave in Northern California there was a great deal of confusion about how to adjust light intensity and when does light quality and/or color change when altering the intensity. Although this may seem very basic to some, I realized that many people aren't clear on this subject. So, let's shed some proverbial light on it, shall we?

There are three primary tools for changing the intensity of a light source without changing the color or quality of the light: scrims, nets and ND gel.



### To Scrim or Not to Scrim

The first tool is the most ubiquitous - the metal scrim. As a young electrician I was taught (beaten to a pulp when I didn't comply, actually) that when I went to get a light I also got a stand, barn doors and a bag (or box) of scrims. No light was complete without those accompanying items.

Scrims are a woven wire mesh in various densities that can be dropped into the accessory frame of most film lights to change the intensity of the light. This starts with tungsten fixtures and extends to HMIs. You don't commonly find scrims with fluorescent or LED fixtures. They're made of metal so that they can withstand the heat intensity of sitting near the lens of a tungsten or HMI fixture.

Scrims come in two standard densities: single and double. The single scrim, which generally has a green metal rim, reduces the light output by 25% (1/2 stop) and the double, which generally has a red metal rim, reduces the light output by 50% (1 stops). Both of these tools reduce light without altering the color or quality of the light.

Scrims also come in half-scrim variety where half of the circle is scrim and half is open air. These are used to affect only 1/2 of the light source at a time and are handy if a subject has to walk close to a light. If you place a 1/2 scrim with the scrim side down in a light fixture, then the subject - at a distance - can be lit with full-strength light, but as they walk towards the fixture, they start to walk into the area of the light altered by the scrim and therefore the intensity change as they get closer to the light is negated by the 1/2 scrim. Although they are rare, there are also quarter scrims and some graduated scrims.

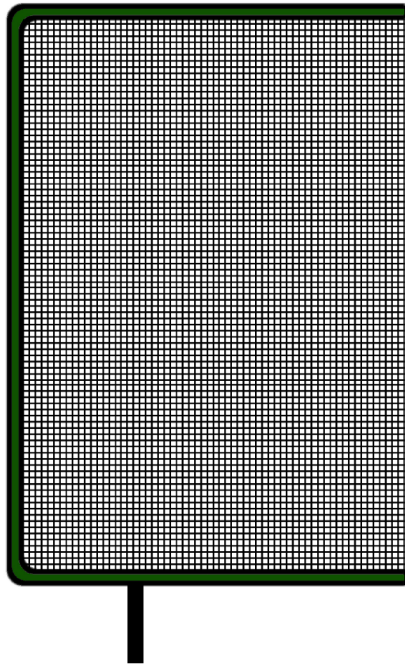
In Los Angeles, a typical scrim bag (or box) has two doubles, one single, one half double, one half single and one open frame (intended to put a gel inside). In New York a typical scrim bag/box has only one



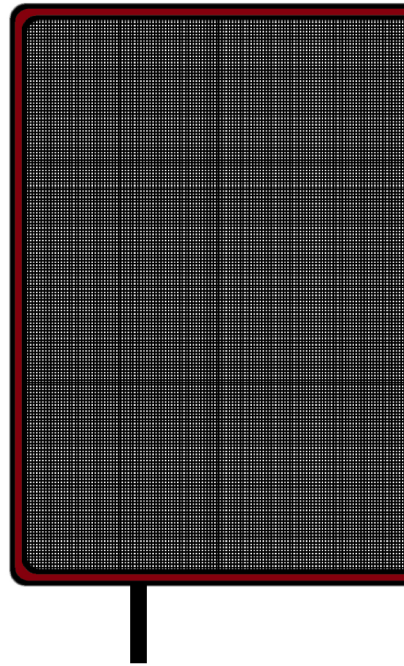
of each. I'm not sure why Hollywood adopted the second double scrim, but I sincerely appreciate the versatility of having it in every bag!

Baseball aficionados will appreciate the slang terms for "dropping" of scrims. A single is a single scrim only. A double is a double scrim only. A triple is a single and a double and a home-run is two doubles in one fixture.

Some people refer to scrims as "diffusion," but I find this term to be confusing as the scrim's purpose is *not* to diffuse the light (although, in actuality, it is to some degree as light reflects off the metal surface of the weave and scatters).



**OPEN-ENDED SINGLE**



**OPEN-ENDED DOUBLE**

### **But Soft, What Gentle Net Arises**

Nets act the same way as scrims, they are a mesh material that reduce light intensity without altering color or quality. Nets, which is short for bobbinet, the woven fabric that they're most often made from, are fabric and are used away from the fixture, not inside it. They typically come in 18" x 24", 2' x 3' and 4' x 4' (although there are other sizes available). Nets follow the same color coding as scrims with green being 1/2 of a stop (25% reduction in light) and red being 1 full stop (50% reduction in lighting). There are also purple/blue nets which are a reduction of 1/4 stop (12.5% of light intensity) and are generally a lighter, closer to white net, as opposed to the typical black. Black nets absorb about 90% of the light that strikes the woven fabric. A blue net absorbs about 50% of the light and can, slightly, change the color of the light output. A white net absorbs about 30% of the light and also acts as a slight diffuser by spreading some of the light that reflects off the white threads.

Nets can come in very large sizes, typically called 'butterflies' 6' x 6', 8' x 8', 12' x 12' and 20' x 20'. These can be used outdoors to reduce the intensity of natural sunlight.

Some of the smaller nets are "open-ended" meaning that they have a standard metal frame on three of the four sides, and only a thin piece of wire connecting the fourth side. This way, you can use the net over only a portion of a light's beam without putting a hard shadow into your scene from the frame of the net. This works the same way that a half metal scrim works, but you have much more control and flexibility about what portion of the light you're reducing intensity.

## **Oh for a Muse of ND**

The final tool for altering intensity is neutral density (ND) gel. This is, typically, only used when the other two tools are unavailable or for fixtures that don't have scrims or dimming capability - such as many fluorescent fixtures.

Neutral density gel reduces light output while still allowing full color spectrum to pass through the gel. It is available in densities of 0.3, 0.6, 0.9, 1.2, 1.5 and 1.8 - each density represents a stop of light loss, so 1, 2, 3, 4, 5 and 6 stops, respectively.

There are two additional methods of changing intensity without changing color and only slightly affecting quality - shutters and spot/flood.

Shutters are a mechanical device, like window blinds, that you slip into the barn doors of a fixture and you can adjust them to various degrees of open or close. They can introduce shadows, depending on the harness of the light source you're using them on. They're, typically, used for larger Fresnel fixtures such as 5Ks and 10Ks.

Spotting or flooding a fixture changes the relationship of the reflector/bulb to the fixture's lens to create a more focused, intense beam of light or a more spread and diffuse beam. There is a slight change in the quality of light, but it's subtle - depending on the fixture.

## **Lord, What Changes These Methods Bring!**

Some of the lecture attendees were confused about dimming. Dimming a fixture adjusts the intensity of a light source, but it can also change the color of the light - especially with tungsten lights. As you dim a tungsten bulb, the color temperature drops and gets substantially redder, which can be undesirable for your scene.

Most fluorescent and HMI fixtures cannot be dimmed. Specialty fixtures have built-in dimmers on their ballasts, but their range is often limited. When they're present, you can safely dim a fluorescent or HMI without altering the color output significantly. Most LED fixtures have built-in dimmers and dimming does not affect the color of the light from LEDs.

Barn doors are present on many light fixtures, but they serve to cut stray light off unwanted areas not reduce intensity. Although a secondary effect of cutting of light is a possible reduction in intensity, that is not the door's primary purpose and adjusting barn doors almost always introduces shadow whereas scrims and nets do not.

Diffusion placed in front of a light definitely reduces the intensity of the light, but it also affects the quality of the light. Even the lightest diffusion will change the light quality to some degree.

Any gel that you place in front of a light will reduce a certain amount of light (with the sole exception of heat shield, which should not reduce any intensity, only infrared radiation) by the very nature of filters (gels) acting as subtractive color mixing devices - meaning they stop some wavelengths of light from passing through the gel. Most gels, however, with the exception of diffusion and ND, will alter the color of the light to some degree. In a pinch, when I haven't had ND on hand, I've used a combination of equal strengths of CTO and CTB to create my own ND. It's not perfect - but it works when no other solution is present.

Finally, altering the distance of a light to a subject will change the intensity, but it will also, significantly, affect the quality of the light. Moving a fixture further away creates a harder light on the subject.

There are myriad ways to change the intensity of a light source on your subject, but only a handful will *only* change intensity and not affect color or quality. Knowing when and how to use each technique will help to improve your overall lighting arsenal.

"A wonderful and well-thought out resource for those who want to bring high production values to 'limited budget' projects. It's a treasury of techniques that anyone can use."

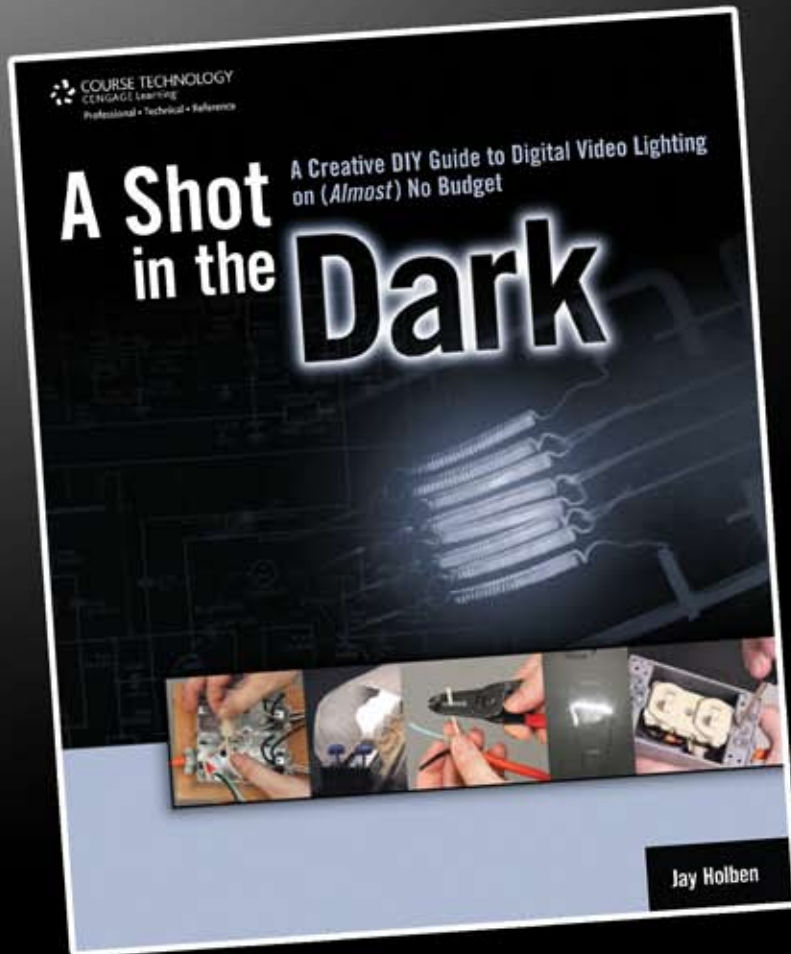
— Russell Carpenter, ASC (Academy Award Winner, Best Cinematography for *Titanic*)

"Jay has such an easy way of explaining the difficult. His descriptions and his demonstrations are not only informative, but fun as well."

— Steven Poster, ASC, National President International Cinematographers Guild (*Donnie Darko*, *Stuart Little 2*, *The Box*)

"A concisely presented handbook that details the way lighting works and why. Detailed examples that let the reader learn, practically, the magic of lighting design and principles. I highly recommend this to anyone, from pro to student."

— David Devlin, Chief Lighting Technician (*Saving Private Ryan*, *Jerry Maguire*, *Minority Report*)



The first book by Jay Holben, often lovingly referred to as "Lighting from the Hardware Store," ***A Shot in the Dark*** covers the fundamentals of cinematography from the nature of light to how to control it and then it teaches you how to build your own lighting fixtures and tools to inexpensively light your next project (and more!). More than 25 years of experience in low- and no-budget productions informs every page of this easy-to-follow book offering step-by-step instructions on how to better harness light on (*almost*) no budget!

- What you Need
- The Fundamentals
- Understanding Exposure
- Understanding Electricity
- Light Quality
- Lighting Techniques
- Soft Lights
- Tungsten Fixtures
- Fluorescent Fixtures
- LEDs and More
- Accessories and Misc. Tools

Available @    

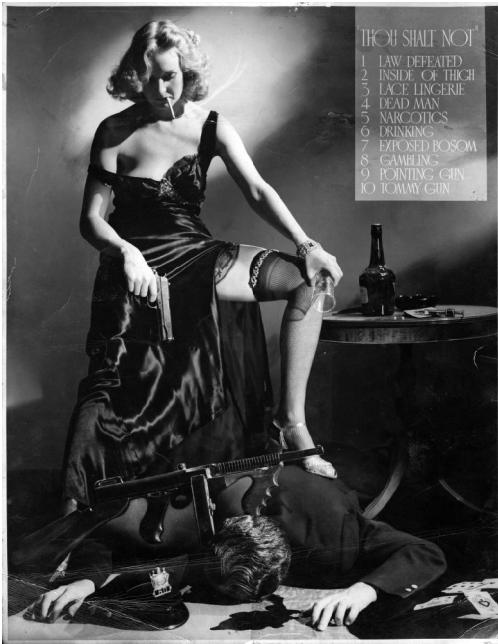
[www.jayholben.com/a-shot-in-the-dark](http://www.jayholben.com/a-shot-in-the-dark)

## 5 LIGHTING

# Adventures in Lighting: An Exercise in Vintage Hard Light



I was reminded of this particular project this past week while posting some tips on Instagram. In the not-too-distant past, I was the second unit director and director of photography on an HBO/Cinemax series called *Femme Fatales*. I was also employed to produce, direct and photograph the opening title sequence for the series. Mark Altman, the show's co-creator, had some specific concepts for the titles, one of them was a recreation of a photograph, shot for Life Magazine in the 1940s. The photograph was a parody of all the things you can't show in a film because of the Hays Code - the precursor to the current Ratings System. Altman wanted this classic image to be part of the introduction to the show and it was my job to re-envision the photograph with the show's host, Tanit Phoenix.



Looking at the original photograph, I quickly noted that it was going to be an exercise in hard lighting. The things that stood out to me, first, was the hard sidelight and the bright spot on the wall behind the model that provided some beautiful separation.

Having come from a theatrical lighting background, first, before working in film, I'm no freshman when it comes to working with hard light. In fact, in spite of modern photographic trends, I find that hard light can be truly beautiful, when used correctly - and I often like to use hard light with women and fashion photography, which would also seem to buck modern trends.



Shooting alongside first unit, I ended up choosing a dark corner of the location that had exposed brick. There was, unfortunately, an exposed power panel on the wall, so I brought in a folding privacy screen to cover that eye-sore.

I was working closely with co-executive producer David Williams on the title sequence and he volunteered to play the ill-fated police officer under Tanit's foot in the shot.

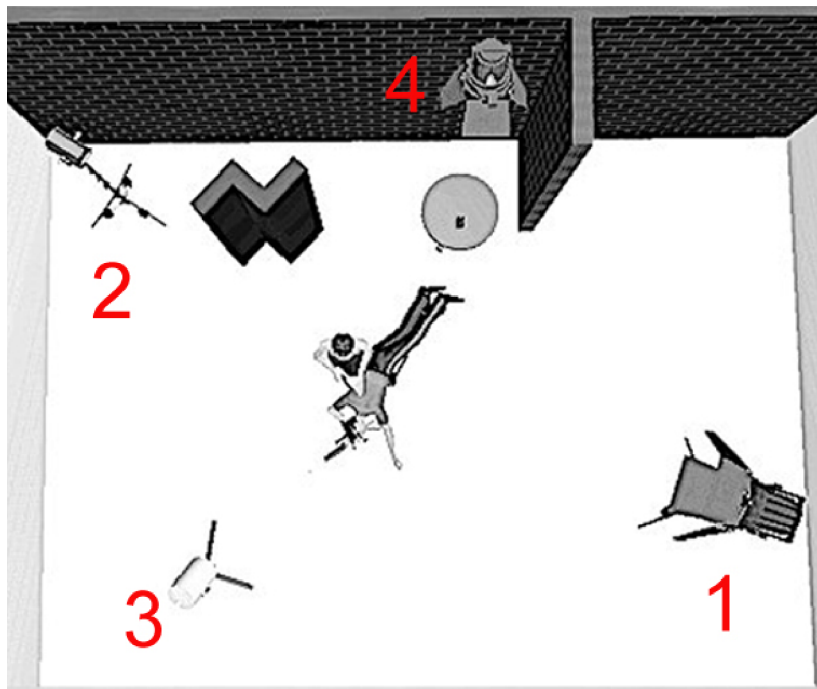
I started with a 2K Fresnel (1), set at full flood, and backed off to give me the hot sidelight that would cover all of Tanit and David on the ground. I decided to keep this very contrasty and not employ any fill, letting the shadow side fall to deep black.

Next up was a 575W Source Four Leko (3) that I brought in to put the separation light behind Tanit's head. The original photograph had a somewhat more amorphous shape to the separation light, but that didn't really play very well on the exposed brick. I preferred to have a solid, tight circle.

Next up, the privacy screen was dropping too deep in the shadow and I wasn't really happy with this lifeless dark corner, so I bright in a 1K Fresnel (2) and backlit the screen to put some light through the holes and give me some life and texture in that back corner.

Finally, to spotlight the whiskey bottle on the table, I bright in a 150W Arri Fresnel (4) and spotted it in over the table to give me a little round hotspot that didn't spill off too much on to the floor.

There was no diffusion, no bouncing, all very hard light used to create this moment.



Most of the time, shooting additional photography and second unit, you're pressed for time, equipment, resources and crew. Over the years, I've become very comfortable with these limitations and this shoot was no exception. It was by design, both creatively and artistically, kept to a minimum of lighting fixtures and hardware that I could handle on my own and be ready to shoot at a moments notice when Tanit was free from main unit photography. The final shot used in the titles, was a tip-up and the editors cut off Williams as the dead officer. Several stills that I shot that night were used in marketing for the series. All in all, an eventual and memorable night and a great exercise in the beauty of hard light!

Photos:

(previous page top center) Screen capture from the opening sequence of *Femme Fatales* photographed by the author. © Four Amigos / True Crime Entertainment

(previous page bottom left) The original Hayes Code image printed in *Time* magazine.

(this page top right) A photograph of the full setup mimicing the *Time* parody

(this page bottom left) The setup

## 6 LIGHTING

# A Study in Blackness: Dark Lighting Inspired by *The X-Files*

When I first made the move to Los Angeles to pursue my career in film, my two LA roommates were huge fans of *The X-Files*. It was early spring of 1995 and the Chris Carter series was just getting into its second season. My roommates had recorded each episode onto VHS tapes and insisted that I catch up before starting to watch the new shows with them. I, too, became enamored with the series – not just the adventures of Fox Mulder and Dana Scully as they searched for truth of the paranormal – but in the work of Canadian cinematographer John S. Bartley, CSC and his gaffer, David Tickell.



*The X-Files* was one of the first shows I had ever seen to take a truly cinematic approach to prime-time television and Bartley (and, indeed, Fox networks, as well) wasn't afraid of *dark*. Real dark. Blacks like I had never seen on television. That was a part of the appeal of the show – a courageous approach to the photography and lighting that really drew you in.

Christopher Probst, now a fantastically successful cinematographer, was one of my roommates and my good friend. He and I dissected Bartley's work on *The X-Files* ad nauseam. We, too, wanted to learn the tricks of the trade to making night look so beautiful, so enticing, so terrifying.

As much as I hate to discuss 3-point lighting (what I often call 'lighting by numbers'), we discovered a true three-step approach to Bartley's night that has proved successful throughout my entire photographic career.



It starts with edge light. For some reason, moonlight, or dim light or even "no light" is always backlight. It always seems to play best as a hot 3/4 edge on characters. Perhaps is convention that's been born over years of imagery, or perhaps it's because our eyes will open to let in more light on the faces of the people we're relating to – that background lighting goes hotter naturally. It is a real phenomenon that you can observe very simply. Life is full of hot edges – don't take my word for it, keep your eye open (literally) and you'll see. So that was part 1: Edge light your talent.

It then moves to backlight, or rather

*background* light. It helps considerably if elements of the background are hotter than the foreground. Bright details in the darkness that help stop the eye down and perceive blackness better. Bartley's dark world of *The X-Files* was filled with bright, moon-lit walls behind near-silhouette characters; piercing blue moonlight peaking through the leaves of the trees.

Finally, a little soft, heavily under-exposed front fill to just bring out the details in your actor's shadow sides a little bit. This is generally accomplished with a large bounce – at least a 4' x 4', but I often try to go more for an 8' x 8'. This should be, at least, two stops under key to just barely bring out details. Further, while the backlight and edge light can be cool, the soft front fill should be neutral in color. This color contrast goes a long way toward selling the feeling.

The combination of these three techniques creates such a convincing nighttime look that I've turned to it again and again in the intervening years. It's not anything that is truly extraordinary – really, it's a pretty basic approach, but I can credit cinematographer John Bartley and *The X-Files* for opening my eyes to the beauty of darkness and how to light for dark.

My first big project after this revelation was a feature film called *Mothman* that we shot on-location in Point Pleasant, West Virginia. Much of the story takes place out in the forest area outside of the small town (dubbed the 'TNT Area' for the hidden munitions depots that were formerly used by the US Military scattered about the forest). Armed with my knowledge of what Bartley had (inadvertently) taught me, I approached my night sequences with the same three-stage process.

Backlight – generally with an 18K HMI on a parallel off in the distance, spread wide to cover most of the background with a swath of bright blue “moonlight”.

Edge light – with a closer HMI, generally a 200W Joker or a 575W PAR, I'd add the 3/4 edge to my characters, making this a hot edge – about a stop and a half to two stops over key.

Finally, the soft front fill. Out in the forest, this was often a 4' x 4' beadboard bounce with a 650W Tweenie bounced into it. I also tried to keep this low, below actor's eye lines. It is dim enough and soft enough to be almost “sourceless.”

Therein lies my approach to dark. Thanks to some cutting-edge prime-time television, it's a technique I've used again and again throughout my career.



Photos:

(previous page top right) A screen capture from *The X-Files*, photographed by John Bartley, CSC. © Fox Television.

(previous page bottom left) A shot of actress Debbie Diesel peeking around a corner in a day-for-night shot by the author.

(this page) A frame capture from *Mothman* shot in the West Virginia forest utilizing techniques learned from Bartley. © Mr. Black Productions



## 7 LIGHTING

# Adventures in Lighting: Back to Front / Front to Back

During a recent class at Global Cinematography Institute, I had a student bring up an experience that he had working for a cinematographer who lit the background first, ignoring the actors until the last minute. For that class, on independent cinematography, I was co-teaching with Suki Mendencevic, ASC (*Poison Ivy II, I Hope They Serve Beer in Hell*). Both he and I confirmed that this was, indeed, a very common technique and each of us elaborated a bit on how and why.

For myself, I first encountered this idea working as a gaffer for my good friend Christopher Probst (*Detention, Fire With Fire, Beyond Skyline*) in our very early days in Hollywood. Chris and I rose up the ranks together and I would gaff when he was shooting and he would pull focus for me when I was shooting.

It used to irritate the hell out of me that Chris would always start lighting from the smallest detail in the room. Some bookshelf in the far back corner is where he'd start, with some nook light or a puck light or skipping a Fresnel across the face of the shelves.

"What do you want to do about the actors?" I'd ask.

"I dunno..." he'd send back and continue to run around the room setting small fixtures and moving practicals.

I used to think – what a waste of time! We're here to light the actors! It's about the actors! We need to figure out what we're going to do for them!

However, over time I began to see the wisdom in this technique. Setting the background helped to build an overall ambiance and helped to establish motivation for where light might come for the actors. Moving a practical to light up a corner of the room gave a motivation for an edge light or lighting up that bookshelf allowed for the perfect separation for the actor in a moment where they could step out of their key into silhouette against that background. It was about building the world around the actors and then allowing them to exist within that world and augmenting to light them when everything else was firmly in place.

After working with Chris and getting to know this style of his, I actually started to adopt it a bit myself in my own lighting. There was great wisdom in first lighting the environment. Not only did it allow you to set motivation or sources, but it built up the base exposure and "room tone" and made lighting the actors a lot easier and more logical. Starting from the actor's key light and going to the background was often light painting yourself into a corner. It became more of a task of trying to flag light off of areas and fighting spill rather than already having that world lit and putting in key lights that augmented the background.

Suki brought up a very interesting point. As much of his career has been spent, like mine, in the independent and low-budget world, he looked at lighting from the background forward as a defensive move. The ASC cinematographer opined that the AD and production department will always rush you. If you have the actor's lit then they can easily say "Ok, we're ready, you don't have time to do the rest, let's shoot!"

However, if you are lighting the background and haven't lit the actor's yet – they can't just start shooting, they have to wait. It allows you more time to make sure you're taking care of the image. "You have to have a plan in place," he asserts. "But, for me, it's easier to work in that way. It's almost like painting. Many painters start with the furthest point first: the sky, then the sea, then the beach, then get to the details up close. I do the same with lighting, starting with the furthest point first and ending – and



spending most of my time – on the details of the actors and the close up. Working from the background forward establishes a foundation for the lighting setup and often the background can stay the same as you're moving from setup to setup where you're just finessing the closeup lighting, so it's also an efficient way of working.

"There is no set formula or recipe, we do what is natural to us," Mendenicevic continues. "No matter how big or small your budget is, you'll never be given all the time in the world, so you have to do what is most efficient to get the look you need."

I can certainly relate with Suki's experience and his strategy. The only real danger is spending too much time on details and not leaving yourself enough time to take care of the actors – who, after all, are who the audience wants to see. I used to tease Probst that it was not a movie about a bookshelf! But I came to see the brilliance of his ways and have adopted the back-to-front technique for most of my cinematographic career.

## 8 LIGHTING

# Adventures in Lighting: Improvising Lighting

Recently on Instagram I posed a question to my followers: What would you like to learn? What new topics should I cover here?

There were a lot of great responses, but one in particular stood out to me: "I would love to know how you guys improvise your lighting."

Now *there* is an intriguing question.

A big part of my career as a cinematographer was spent improvising lighting. Sure, in a perfect world you get a tech scout of a location or a set. You have discussions with a director about a look, and you go in with a specific plan. So many times, however, in low budget production, you don't get *any* of that. You end up showing up at a new location in the morning and have to come up with a plan on the spot.

So, how do I do it?

Step by step.

For the sake of argument, let's assume this is a scripted narrative project and we're shooting an interior on-location.

Everything starts with the script. The script dictates the genre: comedy, thriller, drama, mystery, horror, action, etc. Each genre has its own tricks and techniques and certain looks. Then the scene itself dictates a lot – are the characters happy? Sad? Mad? Afraid? Lost? Passionate? Each one of these moods will necessitate a different look and feel to the image. In the most simplistic terms (and clichés, but all workable) Sad = cold, blue, soft, but underexposed. Mad = warm, high-contrast, strong maybe hard lighting, sharp edges. Afraid = dark, heavy contrast, lots of shadows and underexposure, etc.

So the script gives me the genre and the mood.

From there I look at the biggest lighting tell-tale – is this day or night? Obviously each will have its own look and each will give me a place to start. If it's day – where are the windows? What natural light is coming into the location now? Do I like the look and feel of that natural light? Does it coincide with the genre and mood of the scene? If it doesn't, then how do I alter the natural light (cut/bounce/diffuse/recreate) to suit my needs? Daytime interiors will almost always be motivated from windows. I'll do my best to augment that natural light as much as I can and talk with the director about blocking the scene to make the best use of it.



Years ago I was shooting a no-budget film and one scene took place in a long, one-room apartment. The bed was near a floor-to-ceiling window and it was a very dramatic scene that took place on the bed. The director initially wanted to shoot the scene looking into the depth of the room, but I talked

him into starting that way and then flipping the action to the other side of the bed. The reason for this was looking into the depth of the room put a large floor-to-ceiling window behind camera and front-lit the whole scene. It was very flat and un-dramatic. Adjusting the blocking so that one character shifts to the other side of the bed allowed us to move the camera to the opposite side to *back light* the characters and create a lot of drama and contrast from that. Without turning on a single light, I improved the overall look and feel of the scene merely by adjusting the camera to take best advantage of the space for the narrative emotion of the scene.

So, finding the best use of existing light is a key to getting the best look you can.

Let's say that the windows are perfect. The natural light coming through the windows is great for the scene. How long will it take you to shoot the scene and how much will that natural light change during that time? That's where things can get tricky. Sometimes we love the natural light, but if it's going to take 8 hours to shoot a scene that elapses 1 minute of screen time, it's likely that our natural light will change during that time.

That's a topic for another time, however. What I'm getting at here is *motivation*. The key to starting to figure out your lighting is where is the light coming from.

If it's not a day scene and we're looking at a night interior – then where are the lights in the room, naturally? Start with those! Turn on the lights in the room and see how it looks. Does it work for your genre and mood? If this is a frighteningly dramatic scene and all the lighting is overhead fluorescent – that probably isn't going to work. Then it's time to turn off those lights and bring in practical lights.

Start with the practicals. A great table lamp next to the couch. Ok – that becomes your key source and that's where you start. There's a sconce on the wall in the background – great, that brings up some natural detail back there and gives you a little motivation for an edge light. There's a fireplace – perfect. Light that baby up (real or simulated) and you've got a nice flickering warm fill.

Now look at it. How does that work for you? Does it cover all the blocking? Are you lit the way you want for all of the important moments in the scene?

You might look at the actual practical and decide it's too hard on your actresses' face – so you adjust the practical so that the light from it is not actually hitting the actress and you bring in your own fixture – *motivated* as if it were coming from that practical, but a nicer, softer, more controlled source.

Now you're ready to roll.

The short answer to the question is: you start with existing light and figure out where your light is motivated from. If that doesn't work for your scene, then change where the light is coming from to generate a motivated source that does work for the genre and mood. From that main key motivated light, you can start to work in your details and fill. Really, I start with: if this was my room, in real life, how would I light it? And build from there.

Photos:

Shots from *Mindgame*, Stirling Gardner and April Adams. The first shot (previous page left) shows the dramatic scene with the window behind the camera; flat lit. The second shot (previous page right) shows the camera on the opposite side of the bed with the window back-lighting the actors creating a much more dramatic look.

## 9 LIGHTING

# Developing a Lighting Toolkit

A couple months ago I tried to answer a young cinematographer's question about how cinematographers improvise lighting. This month, somewhat continuing on a theme, I decided to delve a little deeper into how cinematographers and gaffers choose their lighting instruments.

The short answer is: experience and personal taste.

Thanks very much for reading this month, we'll see you next month! Don't forget to tip your waitress...

Ok, all kidding aside, there's an incredible amount of truth to that statement.

In the very early years of my career, my second film as a cinematographer I lit with a Lowel "DP" kit, a handful of 500W Altman Fresnels, Lekos, and various practical lights. Inside the Lowel kit were two "DP" 1K open face fixtures, one "Omni" 500W open face fixture, and one Tota 500W broad source. That was my full lighting package.

Why did I choose to shoot that film with that small lighting kit?

*Because that's what I could get my hands on.*

The Lowel kit belonged to the camera operator and the Altman fixtures I borrowed from the high school I taught at.

There was no deep artistic choice that went into choosing these fixtures. No photometric measurements calculated during prep based on scrutinizing location scout notes... No, that was what I used because that was what I had access to.

I've written several times before about an Arri kit that I've used on a number of occasions with four Fresnels: 650W, 300W and two 150W. That in addition to a KinoFlo "Gaffer" Kit with two 4' x 4-bank fixtures have worked with me time and time again. Why? Because I own them. They're handy, they don't cost me anything to rent from anyone else and – they emit light!

A good portion of my career was spent utilizing only the tools and resources that I had access to, which were typically limited by budgets.

Beyond that – when the sky is the limit – how do you decide what fixtures to use?

So much of that starts with how most of us begin our careers, like I did. Then, when you get to choose your lighting fixtures, you start with what you know and build from there. It's the same for first year cinematographers and 20-year veterans: we work with what we know.

As the budgets improve, access to more fixtures grants us the ability to play and learn.

I had the fortune of "coming up" through the electrical department and I worked with some great gaffers as an electrician before I started gaffing myself. This gave me the time to learn the fixtures and their abilities. To learn an instinctual difference between a 2K and a 1K Fresnel and when to reach for one or the other. To learn the benefits of HMI fixtures and how to utilize them.

Even as budgets grew and access to more toys at my fingertips, how did I decide if i'm going to use an 12K HMI PAR or an 12K HMI Fresnel, a Tenner or a 9-Light MaxiBrute in a condor for a nighttime exterior sequence?

How did I decide if I'm lighting my green screen with KinoFlo Super Green tubes or tungsten tubes? Maybe Sky Pans and Space lights?

There's no shortcut to gaining this knowledge.

Sure, you can read about what other cinematographers and gaffers do in publications like this or you can talk to your peers and find out their personal choices (and why! Always ask Why!), but nothing

beats just trying something new on your own. That, however, can be very scary when you're most often dealing with a client or a production that isn't your own.

The next best way is to study photometrics for new fixtures. You can't always completely trust the manufacturer's published photometrics, which are often measured in "laboratory" not "real-world" settings, but they'll give you a rough approximation of how a fixture will behave. Next month, we'll delve deeper into photometrics and how to read, interpret them and to plan ahead.

If you're in a major production metropolis like Los Angeles or New York, look up the local lighting dealers and ask for a demo. They'll be more than happy to introduce you to their fixtures and to what makes them special.

If you're not in a major production center, take the time to journey out to the major trade shows: NAB, Cine-gear, DV Expo, Government Video Expo, etc. There you'll get a chance to go hands-on with new fixtures, learn their features and start to become more comfortable with their uses.

I've seen the world's greatest cinematographers reach for a trick they learned in their first years or a tool as common as the humble batten strip. My first book, *A Shot in the Dark: A Creative DIY Guide to Digital Video Lighting on (Almost) No Budget* is aimed at making your own tools at home with supplies you can find at the local hardware store.

Read. Experiment. Reach out to manufacturers for information and demos and consult your peers.  
Happy lighting!

## 10 LIGHTING

# Understanding Photometrics

Last month I discussed the aesthetic side of how cinematographers and lighting directors go about choosing specific fixtures for the job. This month we're going to take a look at the technical side and how to interpret manufacturer photometrics.

The basic unit of measurement of light is the footcandle (fc). A footcandle is the theoretical light emitted from one candle, one foot away from a one-foot square "target." In many other countries, they refer to the basic unit of light measurement as the lux, which could also be thought of as the "meter-candle." 1fc is equal to 10.764lux.

Footcandles are merely a method of measuring intensity, or brightness, of light. Many lighting manufacturers present photometrics in their literature, which are charts listing the various intensities (most often in footcandles) of light that will be output from a specific fixture at a given distance. With an understanding of how footcandles relate to exposure, you can evaluate how well a particular lighting fixture will serve your needs by simply reading the literature before you buy or rent that fixture.

There's a great rule of thumb for being able to calculate how many footcandles of illumination you'll need for any given exposure assuming you're shooting at 24fps with a 180 shutter:

100 fc at 100 ISO is an  $f/2.8$

From there, you can calculate pretty much anything, always remembering that each doubling or halving of light is equal to one stop. Each doubling or halving of ISO is also equal to one stop. The following table may also be handy for determination of how many footcandles are necessary at a given ISO to achieve a specific  $f$ stop.

### 24fps 180° shutter or 1/48 sec shutter speed:

	1.4	2	2.8	4	5.6	8	11	16	22
25	100	200	400	800	1600	3200	6400	12800	25600
50	50	100	200	400	800	1600	3200	6400	12800
100	25	50	100	200	400	800	1600	3200	6400
200	13	25	50	100	200	400	800	1600	3200
400	6	13	25	50	100	200	400	800	1600
800	3	6	13	25	50	100	200	400	800
1600	2	3	6	13	25	50	100	200	400
3200	1	2	3	6	13	25	50	100	200
6400	0.5	1	2	3	6	13	25	50	100

Now we can look at photometrics for a fixture and get an idea how that fixture will perform. Randomly I elected to look at a Mole-Richardson Studio Junior LED fixture. Most of us have a pretty solid idea what we'll get from a traditional incandescent bulb Studio Junior, but you may not have had a chance

to work with the LED version yet.

On Mole-Richardson's website ([www.mole.com](http://www.mole.com)) you can find the following photometric information. As the fixture comes in two different colors ("Daylite" and Tungsten), they provide data for each color temperature.

Feet	Flood (Daylite)	Flood (Tungsten)	Spot (Daylite)	Spot (Tungsten)
5	1300	1200	3100	3000
10	397	380	990	900
15	155	145	450	420

Looking at this simple chart we can learn quite a bit. We see, first off, that the Tungsten fixtures are slightly dimmer than the Daylite fixtures – this tracks through to all LED fixtures, the phosphors necessary to achieve the lower color temperature limit the output of the LED.

Looking at the numbers and remembering the footcandle/exposure axiom (100fc at 100 ISO is a 2.8) we can see that at 10 feet, at full-flood, the Daylite fixture outputs 397 footcandles and the Tungsten outputs a slightly less 380 footcandles. This is about an  $f/8$  and  $2/3$  at 400 ISO. That's quite a bit of light at 10 feet! Plenty to put this fixture through some diffusion and soften it up and still get a healthy stop out of it.

Let's take a look at a the KinoFlo 401 Celeb LED fixture.

FC	858	279	134	77	41	36	27	20	17	14
Feet	2	4	6	8	10	12	14	16	18	20

So, at four feet, the Celeb gives us 279 footcandles of light. That's about an  $8 \frac{1}{3}$  at 400 ISO. The Celeb is giving us nearly as much output at four feet as the Mole Junior LED at ten feet.

Now, if you need that kind of stop – which fixture is right for you?

The Mole has more output at a greater distance, which gives you room to put large diffusion in front of it. Also, you can spot in the Mole Junior a bit to get some more intensity out of it if you're only using a 4x4 diffusion frame. If you imagine the actor will be four feet from the light source – you can use the KinoFlo Celeb bare, or you can use the Mole LED through larger diffusion to get a softer source. That isn't to say that either one of these is better or worse than the other – just two different choices. It might be that you're working in a confined space and you need less of a lighting footprint. Then the KinoFlo Celeb is going to win over the Mole. If you're looking for a larger, softer source and you have the room, the Mole will win out over the Kino.

Being able to understand photometrics will help you considerably in planning your lighting, placing your equipment order and choosing the right fixtures. Happy shooting!

## 11 LIGHTING

# An Update on LED Technology

I was asked to give a short talk at this year's National Association of Broadcasters convention in Las Vegas on new technology for studio lighting. The talk was on the very first day of the conference as part of the Broadcast Engineering Conference panels. I teased the audience first up by noting that they were probably all expecting me to discuss LED technology, but, instead, I was going to discuss Nobel Peace Prize winners! I wasn't kidding! Shuji Nakamura, Isamu Akasaki and Hiroshi Amano were the three winners of the Nobel Peace Prize for Physics in 2014. Their work, completed in the early 1990s, was the foundation for my whole talk and for the most exciting technology in studio lighting!



Of course, their prize was awarded for the invention of the blue LED. Yes, just as everyone expected, LEDs were the topic of my talk. After the Blue LED came into being, LEDs suddenly graduated from the thankless and oft-dismissed world of indicator lights into a whole new world as a legitimate luminary. Although our first years with LEDs were filled with 1x1 panels and small on-board lighting fixtures, the past couple years have seen a rise in legitimate studio lighting fixtures.

The LED, of course, has many advantages over traditional incandescent sources: they generate almost no heat, are nearly 20 times more efficient in their usage of wattage per lumen output, last substantially longer, are easily dimmed without color change and can be clustered together for alteration of color output from a single fixture.

None of this is really news, however. The news comes from recent advancements in LED fixtures: more Fresnels, Space Lights, larger flat-panel soft sources and a 6K LED that blew my mind.





Some of the earliest in the Fresnel category were Litepanels with their Inca and Sola fixtures. They were *very* large – about the size of a baby 10K – but they created some very beautiful light quality. Mole-Richardson came on the scene with LED conversion kits for their existing fixtures. Do you have an arsenal of Baby Juniors? Convert those Baby's to LED! Now Mole offers LED Fresnels to compliment nearly their full line of incandescent fixtures: Tweenies, Babies, Juniors and even a Senior! Yes, a 5K LED Fresnel that only uses 900 watts of power. That's the equivalent lumen output of a 5K tungsten that you can plug into a standard wall outlet and it comes in tungsten or daylight color balance. All of the Mole fixtures are dimmable and DMX addressable.



Arri offers several high-end LED Fresnel options: the L-5, L-7 and brand new L-10. All of the fixtures are available in "C" (color changing), D (daylight color balance) or T (tungsten color balance). Just like Mole, all of their fixtures are dimmable and DMX addressable.

On the subject of DMX, that's another extraordinary benefit to LED fixtures: the dimmers are built in to the fixtures eliminating the need for dimmer room or dimmer packs at all! If you've got an existing facility – the dimmer packs will make nice eBay sales for people looking for cool paperweights! For a new facility, this is a significant cost and space savings.

Fiilex introduced a new Q1000 Fresnel, a bi-color fixture with color variation from 2800K to 6500K and CRI's of 96-98 along with built-in green/magenta shift control. The fixture looks compact and well-designed.

Lupolux offers two LED Fresnel options, a 650W equivalent (50W consumption) and a 1000W equivalent (90W consumption), the larger fixture with an impressive 9-inch diameter lens.



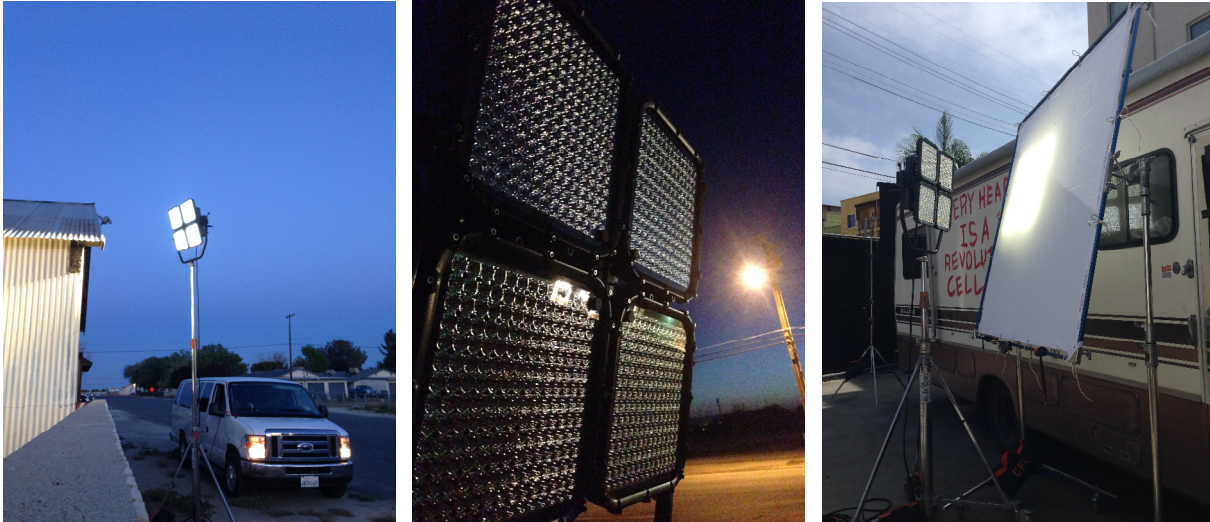
Moving away from Fresnel fixtures, Cinemills has their Cinesoft fixtures in 50W, 100W and 200W options – each getting progressively physically larger to offer even softer sources. They're a flat panel with a thick milked front to eliminate the individual harsh lamps from many LEDs. KinoFlo has had their Celeb fixture for some time, also a very soft and compact fixture with color change between tungsten and daylight.

Getting larger, Fill-Lite offers the Studio fixture – a 51-inch x 59-inch soft source with color change that can easily replace a large softbox in a significantly smaller footprint! It separates into two pieces for easier storage and transporting.

Very little heats up a stage faster than a large collection of 5K or 6K tungsten space lights. Although they provide wonderfully soft and natural top light, they require heavy cabling and generate a great deal of heat. LED space lights from Mole-Richardson, Olesen and Nila, among others, offer a fantastic nearly heatless

alternative that simplifies cabling, are controlled via DMX and available in daylight or tungsten.

Perhaps the most outstanding fixture I've seen recently is Cinemills new Sufa 6K LED. It looks like four 1x1 fixtures linked together in a single fixture. Each individual daylight LED features a highly efficient reflector that allows the fixture to pack a significant wallop!



I was producing additional photography for an independent feature called *Of Fortune and Gold*, written and directed by Jared Marshall. The cinematographer on the film was my former Global Cinematography Institute student, Idan Menin. His gaffer, Jacob Abrams, had arranged with Cinemills to be a test project for their prototype fixture. I was excited to check out this new toy, but was a little underwhelmed when they pulled it off the truck. Just another collection of 1x1 panels? My initial thoughts were immediately rebuked when we fired up the fixture. From about 300 yards away – it lit up the width of a city block! From an LED fixture! Even crazier, we were powering it off of a DC inverter connected to the battery of our passenger van! The light gave us the output and quality of roughly a 9-light Maxibruite. Although I didn't have a chance to do any thorough tests or take any photometrics – the overall performance was truly stunning and led me to realize that LEDs had truly come of age as a legitimate – and formidable – production lighting tool.

#### Photos:

(First page center left to right) Isamu Akasaki, Hiroshi Amano and Shuji Nakamura, winners of the 2014 Nobel Physics Prize for inventing the blue light-emitting diode (LED). (Photo by AFP)

(second page top) Litepanels Sola Fresnel

(second page middle) Mole-Richardson Junior LED Fresnel

(second page bottom) Arri L-10 LED Fresnel

(this page left) The Cinemills 6K LED running off an inverter in the passenger van.

(this page middle) Closeup on the 6K LED face.

(this page right) The 6K LED overpowering daylight



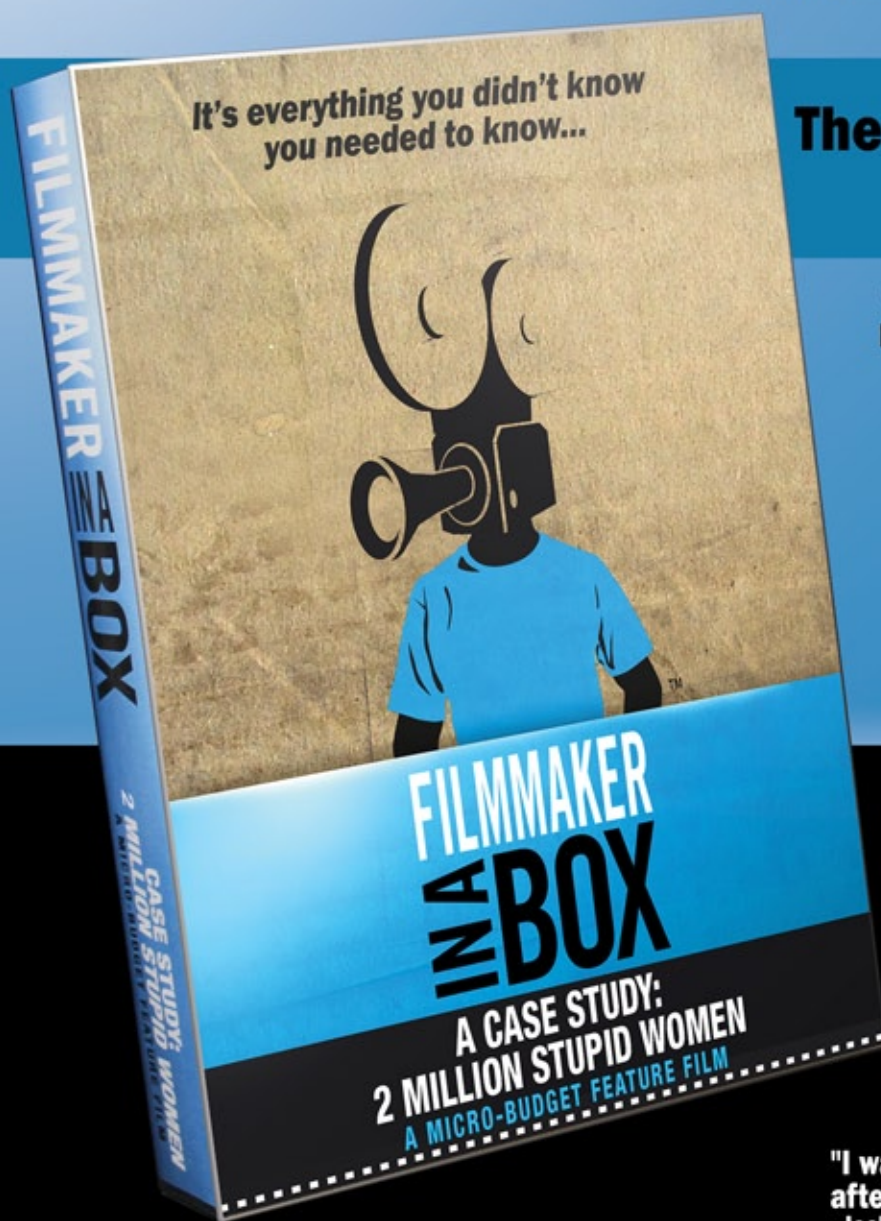
# "This is the stuff they don't teach you in film school!"

— Jonas Thorjborn, Writer/Director, Copenhagen Denmark

"I wish something like this existed when I was starting out! No bulls\*\*t, it's the next best thing to actually being there with the filmmakers while they were making it!"

— Mark Bell, FilmThreat

Check us out on  
YouTube  
for **FREE** videos!  
/filmmakerinabox



## The Ultimate Film Production Case Study

Ten Discs, Over 17 hours of *in-depth, uncensored, behind-the-scenes* coverage on every detail of the making of a micro-budget film:

fundraising  
locations

casting  
lighting

scheduling  
sound

and much more.

Including actual documents used for the film:

budget  
contracts

script  
sides

schedule  
call sheets

and much, *much* more.

Never has a more comprehensive and candid examination of the production experience been publicly offered.

"I was amazed how much I learned from FIB, even after 16 years in the industry! Invaluable!"  
— Josh R. Jaggars, VFX Producer on 2012, *Hancock*

"Filmmaker in a Box is the most comprehensive case study I've ever seen... I strongly recommend you pick up a copy of this incredibly thorough resource"  
— Stacey Parks, *The Insider's Guide to Independent Film Distribution*



[www.filmmakerinabox.com](http://www.filmmakerinabox.com)