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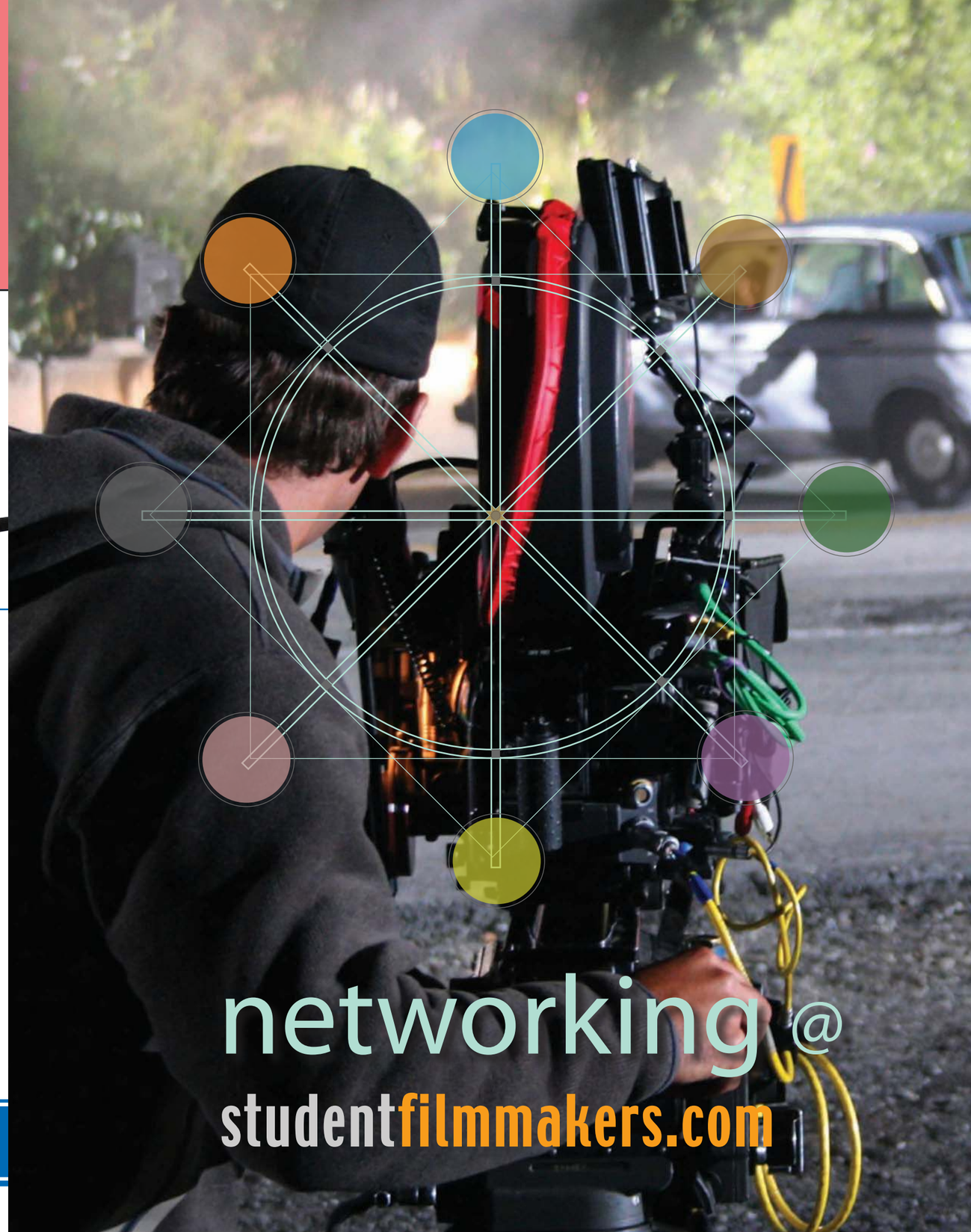
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I don't think I could tell you how insanely busy I am these days and how much I love it. When I was very young I had a little toy projector that would play little short cartoon clips on the wall. I would turn the lights out and sit in awe of the images and the story they could tell. And, I loved cartoons! Someone once said that if you find what you love doing and learn to make a living at it you will never work another day in your life. I feel I have found it. I just wonder when the part about …not working is supposed to kick in.

This issue marks *StudentFilmmakers* magazine's 12th issue, coming full circle with our readers and with some of *StudentFilmmakers*' very wonderful and talented writers whose excellent works debuted in the magazine's premiere issue last April at NAB. I want to bring special attention to M. David Mullen, ASC's "Notes on Camera Movement" on page 10; Sheila Curran Bernhard's "Casting Your Documentary" on page 18; Mary Ann Skweres' "Anthony Hopkins Traverses Indie Filmmaking Frontiers" on page 24; Chris Cavallari's "Compressing Video for Mobile Devices" on page 38; and Kevin Zanit's "Advice on Working with Rental Houses" on page 48.

Additionally, make sure to read Myrl Schreibman's "Understanding Your Actors" on page 22; and Dana Dorrity's "Writing the Third Act" on page 30.

Drop by our writers' and online community members' forums and networking pages at networking.studentfilmmakers.com, where you can sign up for a free networking account. In fact, send me your comments and feedback by leaving me a comment on my page at networking.studentfilmmakers.com/kwelch2007. The network grows everyday and has a free "Call for Cast" classifieds section and is searchable by city, state, and zip code.

We want to welcome *StudentFilmmakers* magazine's new contributing writers, Melissa Ulto, with her article, "A Filmmaker's Checklist and 10 Important Questions," on page 50, and Brian Liloia, with "¡Sí, Se Puede! (Yes, We Can!)," page 52, about the student production of his short documentary.

StudentFilmmakers magazine invites you to come visit us at NAB, and if you want free VIP Exhibits Passes just use the code BR07 when you register online at www.nabshow.com.

Enjoy all of the great articles that are here to give you insight into techniques, technology, and to inspire you in your filmmaking project.

Truly,
Kim E. Welch
Publisher/Editor-in-Chief

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Al Gore and director Davis Guggenheim in an *An Inconvenient Truth*. Photo by Eric Lee; Courtesy of Paramount Classics, a division of Paramount Pictures.



Sunrise and the Pot of Gold

Defining 'What is Light?' and Controlling Color for the Most Effective Images

by Ira Tiffen

Look around you. What do you see? Perhaps, not quite what you are thinking. What you really see aren't the objects you would describe, but more accurately, the light reflecting from them, or that emanating from the light source itself. While you may know this intuitively to be true, you can prove it by eliminating the light. Can't see anything then, right?

So we routinely experience our world through the medium of reflected or emanated light.

Think more about this, and you'll realize that this is central to the reason why cinema and television images have the power they do to convey ideas and emotions, transporting the viewer into another space and time and mind.

We are used to knowing our surroundings in large part (visual stimuli make up the majority of environmental data input for most of us) by relaying the reflected light through our eyes into our brain, which sorts it all out. We *see* not so much by contacting the objects around us but by collecting the light coming from them.

> The camera is the eye of the viewer. And its power comes from its ability to capture and replay light – light that is most often reflecting from the objects it *sees*. Using the camera is ultimately like turning a light on in the mind of the viewer.

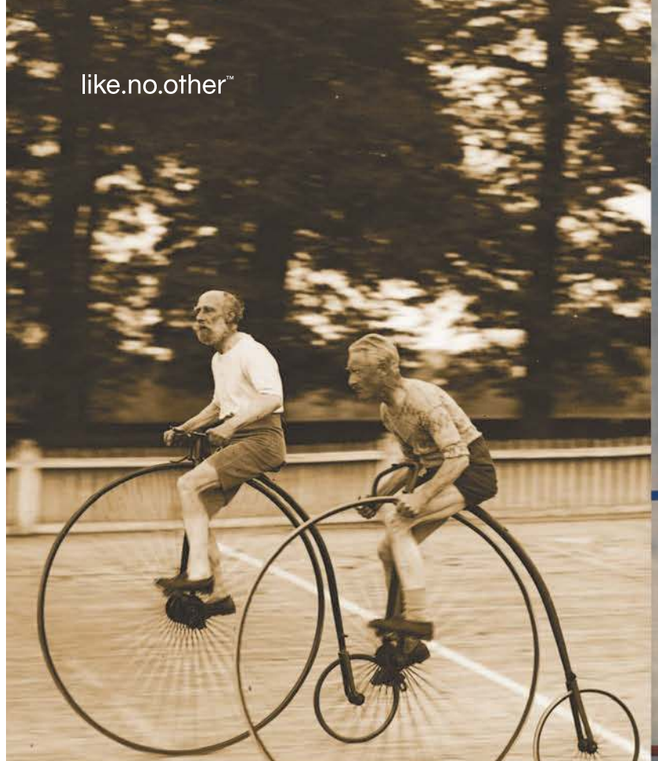
But what is light? We certainly take it for granted when it comes to making movies. That hungry dinosaur, lumbering after us and frightening the little ones; the euphoric vision of liftoff as the astronauts head for the stars; the poignant intimacy of a couple after they struggled past obstacles to be together; all are, after all, just light emanating from the screen, large or small. And with that light, when artfully crafted, comes the ability to let us experience the shock, the horror, the joy, the humor, and the myriad other emotions we encounter in films.

The relationship between light and our mind goes beyond color and contrast. The patterns formed tell us many things about our environment, even if it is the two-dimensional one onscreen. The relationship between the light coming from the screen and the light we are used to experiencing our environment through is therefore of great importance to the filmmaker. So let's consider: *What is light?* And what is important to know about it to help us communicate most effectively?

Technically, light is part of what we call the electromagnetic spectrum. This embodies that wide range of energy around us that we measure by frequency and wavelength. Only a narrow portion of the overall, having wavelengths from about 400 nanometers (1 nm = 1 billionth of a meter) to about 700 nm, the *visible spectrum*, is visible to us as *light*. Shorter wavelengths run into the ultraviolet (UV), x-rays, and gamma rays; longer wavelengths into infra-red (IR), microwaves, radio and television and beyond.

We work within the visible spectrum as that is what our eyes are sensitive to. Our recording media are therefore designed to work in that region as well, although there are some extensions into the UV and the IR that will be good to know about.

The array of colors we see are all defined by wavelengths: blue centers







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around 450 nm; green around 550 nm; and red around 650 nm.

This leads us to some interesting and useful concepts. White light, that which we see as white, is essentially light having roughly equal distribution of light energy throughout the visible spectrum. Thus, similar amounts of light, centering on the 450, 550, and 650 nm regions, when added together, cover very nicely the full range from 400 to 700nm. This leads us to the concept that adding red light to green light to blue light creates white light. That's the additive concept of color, and you see this in live theater when lights of various colors overlap onstage and mix to form other colors including white.

Film and digital video function in a similar manner, mixing red, green and blue light in different ways but to the same end: to make white, black (the absence of light), and all the shades and colors between (by changing the relative proportions of the red/green/blue mix).

Let's move to a practical example. The sun is shining. Its light is generally considered to be *white*, including light at all wavelengths, effectively of all colors. A red object in the scene appears as red because it has the property of absorbing green and blue and reflecting only red. This is true as long as there is red in the light to start with. Same is so of all the other colors we see – they are generally a product of the quality of the light plus the characteristics of the object it reflects from.

If the light is missing certain parts of the spectrum, such as with metal halide lighting, then objects reflecting light in that missing spectrum will appear colorless, or gray, in comparison. Turn on a white light, and they regain their color again. So, again, it is important to remember that what we see is a function of BOTH the quality of the light PLUS the reflection characteristics of the scene.

With camera filters, we are introducing yet another variable, one that allows us an additional level of image control. Once the light reflects from the various scenic elements, we can fashion it further to our liking with filters.

In managing color, filters work differently from the theatrical lighting example earlier. Rather than adding color, they subtract, by either absorbing or reflecting, certain spectrum bits, thus creating a new bias that enhances other spectrum bits.

So camera (and lighting) filters don't inherently add light (unless you're using an ARRI Varicon, but that's for another time); they remove light and leave us with a better mix in some way.

Looking through a red filter will not be adding red light, but will remove, through absorption, blue and green and transmit only red. You can see the similarity in concept between what the red filter is doing and what the red object is doing – both are absorbing blue and green and either transmitting or reflecting red.

We will return to this concept many times in our efforts to make the most effective images. From producing the warm glow of firelight, to the cold blue of arctic ice, what we know about controlling color and its effect on our mind will help us to tell our stories most powerfully.

Before we go, let's look at some everyday examples of *natural filters* that our understanding of light and color allows us to more fully appreciate.

Ever been asked, *why is the sky blue*? Or wondered that yourself? Well, the answer is tied to the reason that sunrise and sunset are red. Here's what's happening. Light from the sun comes from a distance so far away that, for practical purposes, all the light striking the earth arrives in parallel, traveling at the same angle. However, as the earth turns, the part we are on will alter the direction that the light actually strikes us at as we go from day into night and back again.

When we are in daylight, the sun's light is striking us most directly, and travels through the smallest thickness of atmosphere. It happens that atmospheric thickness and characteristics are such that it scatters the shorter wavelengths first, starting at the blue end of the spectrum. This scattering of bluish light, reflecting from the water and other materials in the air, creates the familiar blue sky we know and love.

As the world turns, our sunlight arrives at an increasingly oblique angle until the sun sets over the horizon and we enter nighttime. As that happens, the light travels through an ever-greater thickness of atmosphere, along the edge of the earth's perimeter, until it is so thick that it has absorbed or scattered all the bluish light, on through the yellow and the rest of the spectrum until only orange and red are left. Causing, of course, the blazing colors of sunset.

One more thing. When looking for the gold at the end of the rainbow, remember that rainbows are themselves a form of natural filter – sunlight split into its component colors by the prismatic effect of atmospheric water droplets. By understanding these properties of the light you use to tell your stories, you will also become more adept at helping your viewers find that pot of intellectual gold, as well. Let alone any other forms of gold that may come your way…

In over 30 years of making optical filters, Ira Tiffen created the Pro-Mist, Soft/FX, Ultra Contrast, GlimmerGlass, and others, netting him both a Technical Achievement Award from the Academy of Motion Picture Arts and Sciences and a Prime-Time Emmy Award. Elected a Fellow of the SMPTE in 2002, he is also an Associate member of the ASC, and the author of the filter section of the "American Cinematographer Manual."

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Notes on Camera Movement

When to Move the Camera and Why

by M. David Mullen, ASC

Motivation is not just something actors need – it's something cinematographers and other cinema artists deal with every day when making a movie. This not only applies to how a set is lit, but also to elements like camera movement. When to move the camera, why to move the camera, ultimately matters more than how you move the camera.

As a cinematographer, I have to incorporate the tastes of the particular director I'm working for when designing how a sequence will be shot. Some like to find as many opportunities as possible to move the camera; others would prefer to only move the camera at very key, specific moments. My own personal taste is somewhere in between. I dislike unmotivated, excessive movement, yet many of my favorite moments in cinematic history involve some sort of camera move, from the fast telephoto panning in Kurosawa's movies to the endless traveling shots in Kubrick's films.

There is a basic truth that camera movement tends to weaken composition and lighting, yet what it can add is energy, often justifying the loss of control over the first two elements. Of course, there are moments when an inappropriate movement can deflate a shot's visual tension and become a distraction to the screen action.

Often on independent feature productions, there is an attempt to find ways of moving the camera because it is generally felt that camera moves – particularly slick ones on Steadicam, dollies, or cranes – add production value. This is an understandable desire to want to make one's movie look bigger-budgeted than it really is. However, it doesn't get around the fact that the movement must be there for some dramatic or logical reason; also, the movement shouldn't cause a loss of production value by making the elements in the frame less controllable.

I'll relate some personal experiences dealing with moving the camera.

I photographed two small studio features recently, *Akeelah and the Bee* (Lionsgate) and *The Astronaut Farmer* (Warner Bros.) Though the second one had twice the budget of the first, the first had twice as much camera movement.

On *Akeelah and the Bee*, the subject matter revolved around spelling bees. Doug Atchison, the director, had assured the studio he would make spelling bees look exciting by shooting them as if they were sporting events. In theory, this was a sound idea, but in practice, it was quite a challenge. The truth is the fast camera movements and editing during a sporting event is naturally motivated by the fast action going on in front of the cameras. In our case, we had someone standing still in front of a microphone spelling a word.



Javier (JR Villareal) and Akeelah (Keke Palmer) in *AKEELAH AND THE BEE*. Photo credit: Saeed Adyani

To crank up the tension and energy of these events, we tried every trick in the book on our limited budget and schedule: crane shots, fast dolly ins and outs, 360 degree dolly moves with zooming as well, whip pans, Steadicam moves, snap zooms, etc. All centered on this person standing still at a microphone. Therefore the movement wasn't naturally motivated, but it was emotionally motivated to underscore the pressure these contestants were under. But it was a very risky approach in that it could become a bit like the forced humor that comes through the use of "funny" wide-angle lenses on close-ups. The energetic style probably worked the best when we were doing montage sequences because it created a musical quality that was well-suited for editing to music.

Because we were on a tight schedule, we storyboarded these spelling scenes very carefully so as to shoot only what we needed to make the editing work. Luckily, I could do much of the coverage under the stage lighting used for these events, allowing me on some days to do as many as 75 set-ups in under 12 hours of shooting.

Our work was complicated by the fact that our lead actress, who is in 90% of the movie, was a minor, and the child labor laws are strictly enforced by set teachers here in Los Angeles. There was no such thing as "grace" when it came to needing the actress for a second take if her time was up, so there are a number of ambitious shots in the movie which were the first (and only) take. The most memorable was probably the biggest shot in the movie. We had to establish the audience and TV cameras that faced Akeelah at the National Spelling Bee. The shot started on her eyes, zoomed out to a close-up, and then dollied 360 degrees around her as it zoomed out to show the 1000 audience extras plus 200 kids on stage behind her. When we got around to this shot, I was informed that our actress had to be gone for the day within fifteen minutes. Luckily, most of the stage and audience area (at the Hollywood Palladium) had been pre-lit to some extent, but we had to quickly build a camera platform that extended from the stage in order to place the circular track that surrounded the Akeelah standing at the microphone on the edge of the stage. The grips got that built in ten minutes, the lighting was finished, we put the camera up, and I zoomed in and got a quick eye focus, and then we shot the rehearsal, with all 1200 extras in the shot. And I believe that's the shot in the movie, in the trailer, etc.

But the purpose of the shot was not just to be fancy. We had to establish first her apprehension by being tight on her eyes, then establish what she was up against by showing the crowds surrounding her, and then end back on her face.

The Astronaut Farmer was made with a very different aesthetic approach. Set on a ranch in Texas (though shot in New Mexico) it has an Americana feeling of the Old West meets the Space Race. Our visual inspirations were Norman Rockwell paintings, western landscape paintings, and 1950's NASA steel and chrome futurism. Our framing and lighting was designed to look "painterly," and camera movements were designed to not interfere with that look. Therefore, the moves were very elegiac and lyrical when they occurred – slow, graceful, sometimes with a slight rise or fall. It was the minimalist aesthetic of a John Ford film.

One common mistake directors make when designing a camera move is beginning the scene on some unimportant but lyrical object, slowing moving past it and through the space, and finally landing on the beginning of the dramatic scene itself. The trouble with this sort of opening to a scene is the moment the movie runs long in the first cut, a shot like this will be the first thing to be eliminated. The editor will "cut to