RECIPROCATION SESSION

Practical Meat Photography: Do's and Don'ts

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A friend of mine who 20 years ago was a staff photographer at *Look Magazine*, and who now shoots some of the biggest advertising campaigns in print media, once told me that red apples and red meat are the two most difficult food products to photograph in color.

"Why?" I asked. "Because everyone knows exactly how a red apple and a cut of beef are supposed to look," he answered. "Everyone knows the precise shade of red an apple is supposed to be, and the precise tint a piece of meat is supposed to be. When you're dealing with preconceived notions like that, the photographer must sometimes match those notions exactly, or else the viewer will think something's wrong with the photograph, not with the apples or meat. And the viewer doesn't want to know about, and doesn't care about, lighting problems or background difficulties or any of that; if they see a photograph of meat, then the meat had better look like meat, and not cardboard. It'll be the photographer's fault if it does."

My friend has photographed everything from jalapeños to Janis Joplin, yet he still finds meat and apples to be especially difficult subjects, especially when photographing in color. If a professional feels this way, then how can anyone in the meat business – whether scientist, executive or journalist – hope to produce meat photography that properly illustrates important research, in-plant processes, or for-publication articles?

Even with some basic photography training, it is doubtful that any of us will be submitting slides and prints to *Life* or *Time*. However, there are techniques and knowledge each of us can master with relative ease that will allow us to produce acceptable, professional-quality photographs, whether you're working in an academic laboratory, an R&D lab, or in a plant.

A good photograph, regardless of subject matter, is the result of the following:

a) an understanding of how a camera, film and light work together to product an image;

b) an understanding of subject matter;

c) a clear vision of the expected result – in other words, an understanding of the desired finished product, which in this case is a photograph illustrating research, a product, a process, or a situation.

The point of this reciprocation session is to present, in brief, information to provide you with a working knowledge of how to shoot better photographs for your research, lectures, presentations and articles.

How a Camera Works

The most important thing to understand about a camera, any camera, is that it does **not** work like a human eye. Though the result is similar – an image – a camera and eye differ remarkably in their processes to achieve that image. In a highly simplified explanation, the human brain picks up coded responses (impulses) to light from the eyes, and then transforms them into meaningful images. We are genetically coded to see certain wavelengths of light, and these are interpreted by the eye and brain as certain colors.

A camera lens also transmits light, in the form of an image, focusing it upon film. But the photographer has at his disposal a number of variables to control in order to determine the exact nature of the resultant photograph. A camera and lens have two basic controls of light, for instance: aperture (lens), and shutter speed (camera body). In color photography, different films respond to color in different ways. And color filters placed in front of a lens change the way film will react to the colors it is presented. Understanding and mastering these variables is the key to good photography – any photography.

Camera Types

Though there are several different types of cameras available today, this discussion will feature the most popular type for in-plant and in-lab photography: the single-lens reflex camera, "SLR" for short. An SLR has a body to hold film, an interchangeable lens, and through-the-lens viewfinding, which means that when the photographer looks into the viewfinder of an SLR, he is actually looking at the image through the camera's lens; he is seeing what the camera sees. This is accomplished by means of an interior mirror tilted at 45°, which reflects the image through the lens up into the viewfinder. While through-the-lens viewfinding offers great advantages – it is especially helpful in close-up photography – there are a couple of disadvantages to consider. Most importantly, when the shutter button is pushed on an SLR-type camera, the interior mirror must move out of the way so that the image, coming into the lens, passes onto the

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film. The mirror's movement creates vibration and sound, and the vibration can affect the sharpness of the photograph. Therefore, it is recommended that if an SLR camera is being used, a tripod and cable-release be used in conjunction with the camera whenever possible. This is almost always possible in a lab; it is usually impossible in a plant.

The noisiness of the mirror mechanism gives the SLR its other basic disadvantage: It is a difficult camera to use for candid photography. However, this is rarely a concern in meat photography.

Nearly every SLR model on the market today features an on-board light meter, and usually this is a through-the-lens system, also. A light meter measures the amount of light coming into the lens. It is extremely useful in that the light meter takes into account the three basic light variables – aperture opening, shutter speed, and film light-absorption rate (the film's "speed" in photography parlance, expressed as an ASA or ISO number; the higher the number the "faster" the film) – and presents a measurement of each for the photographer.

Here's how it works. Film speed is pre-adjusted; you don't change film speed with each frame. In a shutter-priority system, the photographer also pre-sets what shutter speed will be used (this can be changed with each frame). The light meter will then indicate what aperture opening, or "f-stop", will be needed to give an adequately lighted image. In an aperture-priority system, the aperture opening is pre-set and the shutter speed becomes the light meter's variable. Some newer SLRs — so called "idiot-proof" cameras – feature light meters that make the decision of both aperture opening and shutter speed for you, once you've pre-set the film speed. With these cameras, the photographer simply points and shoots.

However, there are certain situations and reasons to prefer a less-automatic metering system. These will be discussed later, in the "Lenses" subsection.

A light meter does not "see" light in the same way a human eye does. Rather, a camera's light meter measures all the light coming through the lens, and establishes an average. This is perfectly adequate for photographs of scenes with fairly uniform light – a long view of mountain scenery, for instance – but creates problems when the scene to be photographed has both very light and very dark areas. A light meter's average reading of such a scene will produce a photograph with either the bright areas too bright, or the dark areas too dark.

When the photography is critical – and I would consider any photograph of a meat product to be a critical lighting situation, because the color and exposure must be right – it is best to forego the camera's built-in metering system and use a hand-held light meter. The hand-held meter allows you to measure, at very close range, the light reflected from the object in the scene with the most critical color. If you're photographing fresh meat cuts, for instance, a hand-held meter can be used to measure light from a particular cut. The resulting measurement will be precise for that particular cut – valuable information, if that's the critical center of the intended photograph.

Another helpful tool for gaining a better light meter reading is a "gray card." There is nothing fancy about a gray card – it's simply a gray-screened board that reflects 18% light, an ideal average. Metering off a gray card will give you the best average possible in a bright/dark situation. Simply hold the card near the center of the image you want, move close enough so that the card fills the viewfinder, and then get your meter reading. (Incidentally, almost anything gray that has an 18%, or close, reflection rate will serve as a "gray card." Another photographer friend of mine was once shooting a parade in extremely bright daylight, and was having difficulty getting good light meter readings from the passing floats. He simply pointed his camera down at the street and used the asphalt as a "gray card," and came home with near-perfect exposures.)

In order to ensure adequate exposures, I highly recommend "bracketing" photos. Once the meter reading has been established, the image focused in the lens, and all the settings set, I always take one frame at the settings the meter gives me, a second frame one f-stop down and a third frame one f-stop up. I do this in case there's something funny about the light I haven't noticed, or if it is an unusual light situation (in color photography, shooting under fluorescent lighting would be considered "unusual" and/or "difficult" lighting), or if the subject matter presents special lighting problems – lots of reflections, for instance (which is often the case when shooting stainless steel machinery). Out of the three frames, I always end up with one that is usable.

Different people have different preferences, but when it comes to electronics in cameras, and having little transistors make decisions for me – well, I back away. I much prefer a manual camera that lets me decide *both* the aperture opening and shutter speed, without any electronic override. At *MEAT&POULTRY Magazine*, I use an Olympus OM-1 manual camera body for all photographic work, including both color and black/white.

Others who don't want to bother with continually adjusting shutter speed and f-stops will want to use one of the newer electronic cameras – perhaps even one that features automatic focusing. There are several models of these point-and-shoot cameras currently available.

Besides containing the light metering system and holding the film, the camera body also controls shutter speed. This is adjustable on all SLR-type cameras, and the range is generally from one full second up to 1/250th or 1/500th of a second. The longer the shutter is open, the more light is exposed to the film; more light falls on the film at 1/30th of a second than at 1/125th.

If your subject is moving, you need to use a quick shutter speed, or else the object will appear blurred in the photograph. But the photographer has a problem if the fast-moving object is in a dimly-lit scene, since the shutter must remain open long enough to allow for an adequate exposure. In this kind of situation, film speed and aperture opening are important. Both are discussed in subsequent sections.

In a static situation – the objects to be photographed are not moving, which is the case in almost all in-lab meat photography – choice of shutter speed is not critical. However, whenever possible, always shoot at 1/60th or quicker. This will guarantee a sharp photo. If the photographer stands extremely still, and holds his breath when snapping the shutter, it is possible to use 1/30th shutter speed and still come out with a sharp photo. Slower than 1/30th, and a tripod is a must!

Lenses

The lens is the camera's equivalent to the human eye. But while the eye is uniquely adjustable to a variety of situations, camera lenses are most often designed to do a particular job. Thus, it is usually necessary to own a set of lenses, so that varying circumstances can be accommodated.

Lenses are categorized by their focal length – the distance between the optical center of the lens and its image when the camera is focused on infinity. The longer the focal length, the smaller the angle of view and the larger the image. For reference, a 50mm lens is about equivalent to what the human eye sees. Make sure that your set of lenses includes one 49mm or 50mm lens.

Shorter lenses – 45mm and less – have a wider angle of view (which is why they are popularly referred to as "wide-angle" lenses) but somewhat distort the image, especially at the edges of the frame. A good wide-angle lens is extremely useful, however. Only a wide angle can capture all the elements in a group scene, whether you're photographing a table-top collection of products or an overview of a plant's sausage kitchen. I recommend a 28mm wide-angle lens; it gives a nice wide angle, but doesn't distort terribly. Wider than 24mm, and you're approaching a fish-eye view. Personally, I find a 35mm wide-angle lens not sufficiently different from a 50mm lens to warrant the expense of owning one, but professional photographers, who must be prepared for every kind of situation, usually have a 24mm, 28mm and a 35mm.

Long lenses – those with focal lengths greater than 50mm – are available in two basic types: fixed and zoom. A fixed lens has one focal length – 105mm is a standard. A zoom lens adjusts its focal length – from 105mm to 400mm, for instance. While the zoom lens would seem to offer the most versatility, allowing the photographer to precisely choose the telephoto quality of the photograph, zoom lenses, because of their complex interior lens mechanisms, generally compromise photo quality for convenience. The photographs produced from a zoom lens are often not as sharp as a fixed-lens photograph, unless a very high quality lens is used, which are prohibitively expensive. Thus, I recommend owning one good fixed-length long lens, either a 105mm or 210mm. Longer lenses are available, of course, but in a lab or meat plant you won't need them.

The basic lens requirements of an adequately stocked camera bag are a 50mm (49mm will do), 28mm, and either a 105mm or 210mm. These three lenses should be appropriate for 99% of the situations you will run into in a lab or plant. They have served *MEAT&POULTRY Magazine* for thirty-three years.

The lens also contains the other key light-controlling element – the aperture, the butterfly-leaf mechanism with openings measured in terms of "f-stop," i.e. f2.4, f5.6, f16, etc. The higher the f-stop number, the smaller the aperture opening. The smaller the opening, the less light allowed to pass through to the film. Thus, in a bright-light situation, the photographer must nearly always use a small opening – f32, f64, etc.

There will be a certain amount of distortion at the edges of a negative's frame when a photo is shot at either of the extreme ends of a lens's aperture range – at f1.8 or at f64, for instance. Thus, if the photographer expects to be using a lens in a lot of dim-light situations, he will buy one with the widest aperture opening available, to give him the flexibility to use an extremely wide aperture opening – f.1.8, for instance – and not distort. However, in general, the wider-opening lenses are more expensive.

Aperture also controls depth of field. Depth of field is what establishes which part of an image will be in focus and which won't. Minimum depth of field, which is achieved when a lens's aperture is open to its widest setting, will give focus only to objects within a very narrow focal zone. Sometimes this is desirable: when the photographer wants to isolate a single element within a larger scene. Maximum depth of field, achieved with the aperture closed to its most narrow setting ("stopped down"), will give focus to everything in the viewfinder, from foreground to infinity.

Film

Though there are literally dozens of types of film on the market – even dozens of 35mm film, which is the size nearly all SLR cameras require – there are a few basic rules which help the photographer decide which film is appropriate for which job.

With color film, there is an immediate choice: print or slide? If you expect that your photographs will be published in color in a journal or magazine, **use slide film.** Nowadays, 95% of all color separations are made using an electronic scanner. While excellent separations can be made from either slides or paper prints, separators prefer slides (1st-generation positive transparencies) to 2nd-generation paper prints, made from a color negative, for several reasons. Slides are easier to wrap around the scanner drum; provide a sharper overall image and better edge definition; are usually less grainy than prints; and allow better contrast control in the separations. Also slides are more versatile: they are perfect for lectures, presentations and the like. At *MEAT&POULTRY*, we **always** use slide film for color work.

With black and white photography, there is no choice – it is all print film. However, the photographer has a range of film "speeds" to choose from, whether the film is black and white or color, or print or slide.

What is film speed? The term refers to the film's ability to absorb light. A so-called "fast" film (ASA/ISO 200 or higher) absorbs light faster than a "slow" film. But there is a price to pay: fast films generally produce grainier, less distinct photographs than slow films, and in color work there is always some color distortion with fast films.

What works best? My personal recommendations follow: For color work, I nearly always use Kodachrome 64 if I'm not going to be working under incandescent lighting (more on lighting follows). ASA/ISO 64 is a little slow, especially inside a meat plant, but the color reproduction from Kodachrome 64 slides is about the best available. Kodachrome 25 offers even better color reproduction, but it is simply too slow a film for general indoor photography. If I know I'm going to be in a dim-light situation I'll use Ektachrome 200, but never anything faster – the color and clarity just aren't true enough for for-publication photos. Bear in mind, though, that Ektachrome film tends to be sensitive to blue hues, while Kodachrome is more sensitive to reds, which is another reason I prefer Kodachrome for meat photography.

For black and white, I use Kodak's new T-Max 400. ASA/

ISO 400 is fairly fast, giving me a lot of versatility: I can easily move from a sausage kitchen into a dark cold-storage area without having to worry about film speed. In the better-lighted situations, I'll simply use faster shutter speeds or smaller aperture openings. T-Max will replace Kodak's standard Tri-X 400; Kodak says, and I agree, that the T-Max 400 has the clarity of a normal ASA/ISO 100 film. That's important in for-publication photography.

Film is perhaps the part of a camera's system least like the human eye. While our eyes generally interpret different kinds of light in a consistent pattern, different films interpret different kinds of light in unique ways. Natural sunlight is the best source; it will always provide the photographer with the truest colors. Fluorescent lights make meat look gray; incandescent lights give a yellowish cast to everything, and sodium vapor lights turn everything orange. Without compensating for these film/light characteristics, the result will be unusable photography.

Filters are the answer to the problem. These attach to the camera's lens, and basically re-interpret the light for better color reproduction. For instance, to compensate for the grayish cast fluorescent light gives subject matter, when I'm using Kodachrome 64, I use a #40 magenta filter. It artificially enhances the reds, so that the resulting photograph is close to natural color. I find the #40 magenta to be far more satisfactory than the FL-D filter more commonly sold to compensate for fluorescent lighting.

Sodium vapor and mercury vapor lights present special problems. One of my most horrid meat photography memories goes back to Hormel's Austin, Minn., headquarters plant just after it opened in 1982. I had been given special permission to do a major story on the plant, and was toured through the facility for two entire days. Other press people were only allowed a two-hour tour on the plant's opening day. Once inside the plant, I was stunned by two things: its size, and all the sodium vapor lights! I didn't have film or filters to compensate for the orange glow, and I knew that any photos I shot probably wouldn't be usable. Not only that, but sodium vapor lighting looks brighter to the human eye than to a camera, so my light readings were extremely low, putting me in slow-shutter speed, wide-aperture situations, which severely limits photography. I hurriedly called my old friend the *Look* photographer, who sympathized with my problem but said that without bringing in my own lights, there wasn't much to do. We wound up printing all the accompanying photos to the article in black and white.

Incandescent lighting requires special film: tungsten-balanced. This film, available for both prints or slides, is chemically altered to give natural tones to photos shot under incandescent lights. It is a "must" when shooting color under this type of lighting.

Most professional photographers compensate for bad or poor lighting by bringing in their own lights and/or flash equipment. They'll use fill lights to wash out fluorescent effects, a strobe to brighten up a scene, etc. If you're setting up a permanent photography area inside your lab, consult with a professional photographer about proper lighting. Your resulting photography will be far better. In our situation at the magazine, we don't use extra lighting because we simply cannot carry the equipment from place to place or job to job. We are fortunate at our offices for studio-type photography in that we have an ideal skylight in our production room that gives natural light.

A word about strobe lights. Don't use them inside meat plants. You will get lots of reflection and light-bounce from any stainless steel machinery and equipment, ruining your photo. Just about every in-plant photograph published in *MEAT&POULTRY* was shot with available light.

How to Take Better Photographs of Meat

An understanding of how shutter speed, aperture, film speed, lighting and lenses work together allows the photographer to make decisions and choices for better photography in any given situation. Advance planning is the key. Here are some tips:

1) If you will be shooting color, know what kind of lighting you'll be working under. If it's artificial lighting of any kind, bring along the right kind of filter or film to compensate for the unnatural effects of that lighting. Whenever an editor from *MEAT&POULTRY* visits a meat plant, we call ahead to learn what kind of lights we'll be dealing with. Typically there are several types even in a single plant, but even knowing that is helpful. For color, whenever possible, work under natural daylight.

2) Choose the "slowest" film you can get away with. If all scenes are going to be fairly well lit, Kodachrome 64 is an ideal color film. In dim light use a faster film, but don't exceed ASA/ISO 400; your results from extra-fast films will be just too grainy. Same rules apply for black and white film.

3) Picture the desired photograph in your head; this will help you choose the proper lens. Are you photographing a group of objects? Will you need a wide-angle lens? Is it a close-up? Will a 50mm do the job? Are you shooting from a distance? Is a telephoto appropriate?

4) Whenever possible, use a tripod and cable release mechanism. This will guarantee you vibration-free photography. Obviously, a tripod is easier to set up in a lab than it is to carry around in a plant, but there are small tripods now available no larger than a collapsible umbrella that are fairly convenient for in-plant work – I use one most of the time. However, the bigger and heavier the tripod, the better the photos will be. My friend the *Look* photographer has used for year a huge wooden beast of a tripod. He says he hates to carry it, but has never been dissatisfied with its use.

5) In a studio or lab, in a controlled situation, use a black background. This will give you better light readings, and will show off meat, especially, better. If you have the time, use a gray card to establish your light meter setting.

6) Bracket your photos. Remember that the cheapest part of photography is film. The most expensive part is a roll of unusable photos. So shoot everything in triplicate to ensure a proper exposure.

7) For color:

Fluorescent lights – use a #40 magenta filter with Kodachrome 64 film;

Incandescent lights – use tungsten film;

Mercury-sodium vapor lights – ask a professional.

8) Remember how the camera's light-controlling variables – shutter speed, aperture opening, and film speed – work together. If you're shooting a scene that requires maximum depth of field, you must use a narrow aperture opening,

Practical Meat Photography: Do's and Don'ts

compiled by:

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DO'S

General:

1) For versatility and convenience, use a single-lens reflex (SLR) type camera that requires 35mm film. Electronic light metering, automatic focus, and other options not necessary but may be desirable.

2) Have 3 good lenses: a standard length (49-50mm), wide angle (28mm), and telephoto (105mm or 210mm).

3) Buy the best equipment you can possibly afford.

4) Whenever possible, use a tripod and cable-release mechanism. This reduces camera shake and will produce sharper photographs.

5) If you must hold the camera by hand, do not shoot at a slower shutter speed than 1/30th of a second. Slower speeds produce less-than-sharp photographs.

6) Make sure you get a light-meter reading for the object you most want to have in proper exposure. Use a hand-held meter if necessary.

7) For the best light-meter readings, use a standard photographic gray card.

8) When photographing meat on a table or counter, use a dark background. The resulting exposure will be more uniform.

9) Always "bracket" your photos. Shoot one at the settings your light meter indicates, another at one f-stop wider and another at one f-stop narrower.

10) Don't use electronic strobe flash inside a meat plant. You will get too much reflection and light-bounce from stainless steel machinery.

11) Use the "slowest" film you can get away with. Remember: The slower the film, the sharper the photo. "Slow" film = films with ASA/ISO 100 or less.

12) Before you shoot, visualize the photo in your head. What kind of depth of field do you want? What's the primary object of the photo? Where's the center? The answers will determine your choice of lens, shutter speed and f-stop.

Color:

1) Always use slide film. If you must have a set of prints, shoot a second roll of slides. Magazines and journals *always* prefer to use slides.

2) Whenever possible, shoot in natural daylight (sunlight).

3) Color films have different color sensitivities. Kodachrome tends to be sensitive to red; Ektachrome tends to be sensitive to blue. For meat photography, Kodachrome is best.

4) Know and be prepared for the kinds of indoor lighting you'll be working under. Different kinds of lights affect films in different ways. To come away from a shoot with usable photos, you must be prepared for the lighting.

5) Under fluorescent lights, use a #40 magenta filter with Kodachrome 64. The filter will negate the graying effects on meat of the lights.

6) Under incandescent lighting, always use tungsten film, which will negate the orange/yellow cast these lights produce in color photography. Tungsten film and 3200 Kelvin lights are especially useful in most laboratory settings for research protocol and samples.

7) For mercury vapor, sodium vapor and halogen lights, consult a professional for the proper film/filter combination.

DON'TS

1) Don't assume a camera works like a human eye. It does not! Lenses, films and filters all respond to visible light in different ways than our eyes do. If you assume a camera is like an eye, you will shoot photographs that are unusable because you didn't take into account varying light sources, exposure to light, etc.

2) Don't use a simple camera designed for at-home family photography for professional-quality work. A Canon "SureShot" is an ideal family camera, for instance, but will not produce acceptable for-publication or for-presentation meat photography.

3) Don't stand far away from your subject. Get as close as possible. This is especially critical when photographing single objects.

4) Don't use white or bright backgrounds. They will confuse your light meter readings and wash out photographs.

5) Don't assume your on-board camera light meter is always right. Use a hand-held light meter, too.

6) Remember: Whenever you make a choice in photography for convenience – a faster film, for instance, or cheaper equipment, or always letting a camera's electronics make decisions for you – you compromise quality. Good photography is the result of knowledge and work.

7) Don't use a zoom lens, unless you happen to own one of the best. Generally, their convenience is outweighed by the lack of quality of photos taken with them, which tend not to be sharp and clear.

8) Don't experiment with different types of film, especially color, when shooting for-publication photos. Experiment on your own time (experimenting is an excellent thing to do, by the way). Your goals when shooting for publication or presentation are quality and consistency.

which will require, in dim light, a slow shutter speed. Thus, you'll have to have a tripod, or very fast film. If you're shooting a quick-moving object, you'll have to shoot at a fast shutter speed, which will require a wider aperture opening for an adequate exposure, thus reducing your options for depth of field. If you will be working mostly in a dim-light situation, choose a fast enough film so that you still have some range in available shutter speeds and f-stops. A slow film in dim light means that you'll be shooting everything at f2.4 or wider and at ¼ second shutter speed or slower. In a lab with stationary subjects and using a tripod, you can get away with these limits. Inside a plant – forget it.

9) Buy the best photographic equipment you can afford. Most low-end SLR cameras are not good enough for professional-quality photography. Spend a few hundred dollars on a good body and a basic lens; spend a few hundred more on wide-angle and telephoto lenses.

10) For color, use slide film.

Discussion

M. Hunt: Steve, you said that your camera was a manual. Might you just comment on what a lot of us other amateurs have, one that is either semi- or full automatic?

S. Bjerklie: In fact, it is hard to buy a manual camera these days. They are almost all electronic in some way. In an electronic camera, the light meter will automatically adjust shutter speed and/or aperture for you and all you have to do is press the shutter button, it is truly a kind of point-and-shoot type of situation. Some cameras feature what is called aperture priority which allows you to choose the f-stop and the camera will automatically adjust what shutter speed you ought to have. Other cameras have shutter priority which allows you to choose the shutter speed and it will automatically adjust the f-stop. I think all of that is fine; and a lot of professional photographers, especially ones who work in candid situations, use these cameras because they don't have to fuss with making any adjustments, they can just point and shoot. My complaint with them is that no electronics are as good as the human mind and you're just going to get *average* readings and photographs. They don't allow you to play around as much with a slow shutter speed, depth of field, or a certain blurring effect, like an emulsion coming out of the emulsifier. A manual camera allows you to make all those decisions. I happen to prefer a manual camera; almost no one else I know does. But electronics are electronics. If you happen to own a camera that has a lot of electronic gizmos on it, make sure you have an adequate supply of batteries because your battery will always go dead when you are 200 miles from home or in a cold cooler.

L. Johnson: I was just wondering if you could give us any pointers on taking plate pictures and pictures of dinners, etc. It seems to me that you need to use a light-colored plate because the meat shows up. I was wondering what suggestions you might have.

Bjerklie: That is a difficult photographic situation because cooked meats tend to be dark and that is what would be on a dinner plate. Probably you will have the plate decorated with bright colors, vegetables or what-have-you, and you want those colors to come out real bright. And you are right, you want a light-colored plate, if not white. if I were to shoot a lot of photographs of a meal like that, I would probably talk to a professional and ask what kind of lighting I should have over the object to give a steady, constant lighting to achieve what I wanted to do. There are all kinds of tricks and gimmicks to getting the right kind of photographs. John (Huston, Meat Board) I think your photography of dinners is fabulous and I know you spend a lot of money getting those things. So I would talk to a professional in that kind of situation because it is a difficult subject to get the right color reproduction.

M. Stevens: I agree, I use the Pentax K 1000, and if I make a mistake I know what it is.

Bjerklie: That's right; with a manual camera, if you blow it, you know who blew it and why.

Stevens: How do you make the fat as white as possible, what kind of filter did you use?

Bjerklie: That 40 magenta under fluorescent lighting produces adequate whites.

Stevens: What particular color did you use in that deli shot with fluorescent?

Bjerklie: That again was the 40 magenta.

Stevens: If you don't have daylight available to you, what is your ideal light source?

Bjerklie: I guess it would depend on the situation. If I was on the road and didn't have a bunch of equipment with me, I would want the Kodachrome 64 film and a 40 magenta filter for under cool-white fluorescent lights. That is what I would hope for because I know I would get good color out of that kind of photography. For me that has always been about the best. Incandescent lighting, however, actually is the easiest to control because all you need is tungsten film and you will get excellent color reproductions using tungsten under 3200 Kelvin light bulbs. Unfortunately, most plants don't have incandescent lights in their processing areas, usually only in coolers.

Stevens: Do you use any other filters to make the whites whiter, if you're not really looking at meat but just in terms of carcass white?

Bjerklie: I guess if I was overly concerned about the whiteness of the fat, I have never really experimented much with blue filters but definitely that is what I would try if that is the effect I needed to show and I wasn't concerned with the color of the lean. Blue filters will bring out the whiteness.

C. Carpenter: I just had a comment that sometimes it is useful to use print film. A couple of suggestions that I have got from professionals is to always take prints and take slides, because almost always with print film, when you get your prints back they were printed balanced for blues and greens so they'll virtually always come back with a bluish tint to them. They can correct that, but they need a correct slide as a guide to work from. So if you also have a slide, professionals can very easily correct it to get the correct balance. And, as you said, the easiest way is to take two slides to supply the printer with one so he can correct the print for you very easily.

Bjerklie: All right, I forgot about needing prints for the poster sessions. Certainly you'd need prints; for that, the slides are useless.

M. Hunt: Our photographers tell us that even though you're making prints, go ahead and use slide film because they have more flexibility with balancing the slide film. Also they suggest taking a picture of an 18% gray card, then supply them a slide with a gray card and then one of your own subject. They can color balance off the gray card and you have a much greater chance of getting a good print.

Carpenter: It's important to remember that film is the cheapest part of photography.

Bjerklie: I was at a wedding yesterday and the guy who was getting married was the son of a professional photographer. This fellow's father took a lot of photographs and also his father invited a lot of his friends to take photographs of this big Italian wedding and I couldn't believe it, when they came to the marriage vows, about 9 guys stood up and it sounded like a presidential press conference with all these motor drives going. There must have been about 2,000 rolls of film shot at the wedding and reception. These pros, I just couldn't believe how fast they went through film, but that's what they do. They've got to have the perfect photograph and they are willing to shoot 9 rolls of film to get 1 acceptable frame.

D. Loveday: Most of you have been exposed to the video camera. Will the same principles you talked about today apply to video cameras? The experience I've had is the harshness of auxiliary lights and shadows, as well as problems with color renditions.

Bjerklie: Excellent question, but I'm going to have to back off because I've never used a video camera inside a plant or a lab. I'm sure that's a whole other set of lighting requirements, lighting differences, and the way video tape responds to light, etc. Again, a video camera doesn't work like a human eye. So with video there's probably a whole extra set of stuff you have to learn and become familiar with.

K. Jones: I've been taking quite a few pictures over the last year of vacuum-packaged sausage products and have had a lot of glare problems. I have tried the anti-glare glossy sprays and they leave the packages cloudy and not transparent like the packages would look. Do you have any suggestions?

Bjerklie: If you are shooting a lot of photographs of packaged or vacuum-packed products, the film is so shiny it is really hard to know what to do. In that kind of situation, you're going to have to go up a notch, almost to a semi-professional set-up, and buy some studio lights to use with a tent over them to give you diffuse lighting. That way, you won't get the glare and the bright spots. It is about the only way to deal with things like that. Packaging film is really difficult to work with.

Hunt: Kevin, did you use artificial lighting there?

Jones: Yes it was.

Hunt: Do you know at what angle the light was coming at the product? It's been our experience that if you can see the glare with your eye, the camera will really see it. Generally, if the light is coming in at a 45% angle, and that's fairly critical, we have found that the reflections do not come directly at the camera quite as much.

Jones: We generally take these pictures using a copy stand; and for these products, we've been using incandescent lights where we want to get more of an orange effect on black background. We've had some very nice looking pictures when we were able to get around the glossiness of the packaging film.

Bjerklie: Try some kind of filtering over those lights that just diffuses the light more, some kind of silk mesh or something like that might help out.

G. Dolezal: I have been experimenting with computer slides and we have been using high speed film with much less than one-second exposure, tripod, shutter release, etc.; but with the brightness controls you have on the computer plus contrast, etc., we are looking through the lens and seeing one color and then getting something else. Any suggestions?

Bjerklie: You are actually shooting something like a video display. That is a really complex lighting situation. You've all seen what happens when a TV camera takes a picture of a television, with all those waves and weirdness. I have never made photographs in that kind of situation, but I would just try a variety of combinations of film and maybe some filters. You've been using 100 ASA – I would try a little bit slower speed film, maybe a little bit faster. I would definitely experiment between Extachrome and Kodachrome because of their different sensitivities to different colors. Video is a situation that you're just going to have to experiment with.

T. Shumaker: When you're using a 40 magenta filter, don't you have problems with stopping down?

Bjerklie: Yes, a 40 magenta filter is a fairly dark filter and you can get some distortion with light meter readings through that kind of filter, so I always extra bracket whenever I use the filter. I go one stop down, two stops down, one stop up and two stops up, and that almost always gives me something that is workable. You're right, the light meter readings through a darker filter can be a little troublesome.