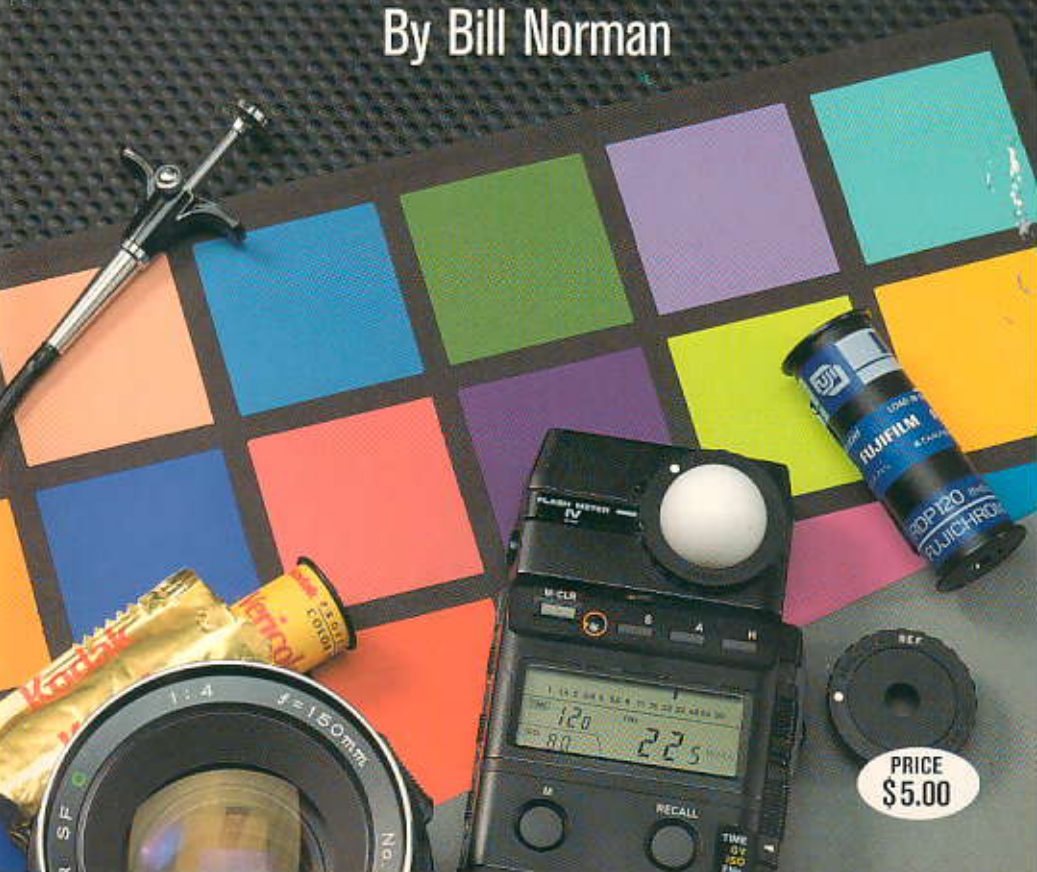


# TONAL RANGE

A REFERENCE GUIDE FOR  
COLOR FLASH PHOTOGRAPHY

By Bill Norman



PRICE  
\$5.00

We would like to thank Spectra American Photo Labs (Sun Valley, California), Delmar Studios (Charlotte, North Carolina) and Griffin Printing (Glendale, California) for their assistance toward making this booklet possible.

Photography, Design and Production by The Graphic Marketing Group, Inc. (Foster City, California).

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# PREFACE

Many of our customers have asked how to consistently produce “gutsy” or “punchy” photographs that display a full tonal range — where the shadow areas have predictable detail, highlights are not washed out, and the mid-tone colors are rich and full.

Of course, alterations can be done to your photographs through custom printing, retouching, airbrushing, or digital manipulation of images scanned onto a computer. However, it is obviously far more cost effective to make these corrections in the camera room rather than after-the-fact.

Unfortunately, most of the information published on this subject is presented in a reasonably complex manner that may take time to comprehend and apply to your type of work. Much of it is written in sensitometric terms that analyze the exposures after-the-fact, as opposed to illustrating how to make the corrections during a “shoot”.

Hence, the purpose of this booklet is to provide basic information on tonal range in a simplified manner to assist you in making quality photographs economically. It is our desire that this booklet will be of great benefit to you.

Your questions and suggestions are always appreciated at Norman Enterprises, for they enable us to improve our products and to meet your continually changing needs.

Sincerely,  
Norman Enterprises, Inc.



Bill Norman  
President



# 1ST THINGS 1ST

***Improperly exposed film is the single greatest cause of poor tonal quality in color photographs.***

We selected subject matter with an exaggerated tonal range and bracketed the exposures to illustrate the qualities that you might expect from under, correct and over exposed emulsions. The goal of the photo lab was to make the best prints possible, adjusting their printing times to maintain a uniform density in the center of interest (the highlight side of the Espresso can), letting the light and dark tones fall where they may. Hence, the images were not enhanced by "dodging" or "burning-in" during printing:

## TRANSPARENCY COLOR —

### Type-R Color Prints from Original Transparency Film



2-stops Under



1-stop Under



Correct Exposure



1-stop Over



2-stops Over

Notice that with transparency film, correct exposure is especially critical for maximizing tonal quality. Once highlight detail is lost it cannot be rebuilt, but dark transparencies can be improved to a certain degree by boosting the exposure time when making prints and/or by adjustments in making 4-color separations. Transparency film is the widely used emulsion for color lithography.

### NEGATIVE COLOR —

#### Type-C Color Prints from Original Color Negative Film



2-stops Under



1-stop Under



Correct Exposure



1-stop Over



2-stops Over

Notice that negative color film is more forgiving (has more latitude) than transparency color. Hence, it is widely used in portraiture and candid photography where your final products are photographic prints. Often times, especially in candid and when photographing large groups, inadequate lighting causes severely under exposed negatives. While the photo lab can salvage these images, correct exposure still generates the best tone quality.

# EXPOSURE TESTING

Regardless of the film, correct exposure is your primary key to good tonal quality. One way to insure a predictable tonal range is to base your lighting and exposures on the results obtained from previous photographic tests. Several objectives of these tests include:

- 1) **Determining the f-stop** that will locate the middle gray (18% gray) tone of the subject in the center of your film's contrast range.
- 2) **Analyzing your lighting** for tonal range and artistic effect.
- 3) **Calibrating your flash meter(s)** for greater accuracy. This gives you the ability to read the correct f-stop and to read the tonal levels of the subject in varied subject and lighting situations.

There may be different points of view on the best way to make such a test. But, here is one method that works well:



f/8

f/8<sup>1</sup>/<sub>2</sub>

f/11

f/11<sup>1</sup>/<sub>2</sub>

f/16

- 1) Create a representative subject and lighting situation for the type of work that you do.
- 2) Include an 18% Gray Test Card adjacent to the subject, and near to the main point of interest. Be sure that the card is large enough for your photo lab to read on a densitometer, and be sure the card is evenly illuminated and free of glare.

An 18% Gray Card is used because its density is the "standard" for establishing mid-range between white and black. It reflects 18% of the light falling upon it, and you can base your exposure on the reflected light reading off of the card.



- 3) Include a written note of the f-stop used for each exposure and include anything else that you wish for future reference. Post-it Notes™ are handy for this purpose. Place the note in the field of view, and be sure to write with a bold pen that can be seen easily on the test print.

From personal experience we can tell you that it is best not to rely on your memory as to how the test was run. Having a written record can avoid confusion and mistakes during your evaluation of the test results. Information that you may wish to include in this record could be lighting diagrams, lighting equipment (with serial numbers), camera and camera lens, film batch number (if you purchase your film in case lots), and so forth.

- 4) Based on your lighting and the published ISO\* rating of your film, determine a normal exposure. When practical, it is convenient to be able to start with an exposure in the middle of your camera's f-stop range.
- 5) Once you have selected your normal exposure, continue to shoot "over" and "under" exposures using successively different f-stops in the smallest increments that your lens will permit. It is good to expose a series that extends 2 to 3 stops each side of your initial exposure.

Don't forget to slate (log) the f-stop for each exposure. Also, it is important to note that with some flash equipment today, shutter speed can affect exposure (see page 30).

- 6) Have your film processed just as you would for a normal assignment. Your photo lab will be happy to analyze the tests and read the Gray Card densities of the various exposures.

Using a transmission densitometer, your photo lab will probably select a Gray Card reading in the vicinity of .70 to .80 on a negative, or .90 to 1.20 on a transparency, to establish the proper exposure. Using these readings as a basis for your exposures can provide a quality finished product that is a win-win-win situation for you, your lab, and your customers.

*\*ISO — International Standards Organization. This organization establishes standards and calibration methods for numerous scientific measurements, including film speed.*

# FLASH METER CALIBRATION

You may wish to recalibrate your flash meter(s) to coincide with the test results, thereby making the meter readings more accurate for your future work. Some meters have a calibration potentiometer for this purpose. Others may require that you add or subtract a small amount of neutral density behind the photo-pickup device. Be sure to test the meter(s) in both the incident and reflective modes to confirm that the calibration is consistent on both (see pages 16-17).

Another method of calibrating your meter(s) is to rate the film at an ISO number that causes the meter to provide the correct f-stop reading. This method is especially handy when using a number of different film types because it prevents having to recalibrate the meter(s) for each emulsion.

For example, let's say that the published rating for a particular emulsion is ISO 160, and you find that the optimum exposure is achieved when rating the film at ISO 100. Simply program your meter for ISO 100, and the recalibration is accomplished.

A key for being able to do this accurately is whether the desired ISO number is included in the meter program. Your flash meter probably offers ISO speeds in  $1/3$ -stop increments whereas your camera lens is probably calibrated in  $1/2$ -stop increments. Hence, using this method may introduce a small error because of the unavailability of the correct ISO number on your meter. But, it can place you pretty close (to within  $1/6$ -stop).

The chart (below) illustrates how f-stop is affected by changes in ISO number. We have arbitrarily selected ISO 100 as the starting reference:

ISO Number	F-stop Change
25	- 2
32	- $1\frac{2}{3}$
40	- $1\frac{1}{3}$
50	- 1
64	- $\frac{2}{3}$
80	- $\frac{1}{3}$
<b>100</b>	<b>0 Starting reference</b>
120	+ $\frac{1}{3}$
160	+ $\frac{2}{3}$
200	+ 1
250	+ $1\frac{1}{3}$
320	+ $1\frac{2}{3}$
400	+ 2



Here are some interesting facts about ISO numbers that become obvious from looking at this chart:

- 1) Increasing film sensitivity (speed) by one *f*-stop causes its ISO number to double. Similarly, decreasing film speed by one *f*-stop causes the ISO number to be cut in half.

*Example:* ISO 40 is one stop slower than ISO 80, and ISO 160 is one stop faster than ISO 80.

- 2) Traditionally, ISO numbers are rounded.

*Example* – One stop faster than ISO 64 is termed ISO 120 (not ISO 128), and one stop faster than ISO 120 is termed ISO 250 (not ISO 240), and so forth. These small errors do not affect scientific accuracy because the calibration is correct, even if the actual number is not.

(This rounding is necessary in part because the mathematical formula for ISO is based on powers of two, which are not whole numbers.)

- 3) When ISO is charted in  $1/3$ -stop increments, as they are above, every third larger ISO number doubles, and every third ISO number smaller is cut in half. Hence, the scale can be expanded by simply doubling or halving numbers that are already on the chart.

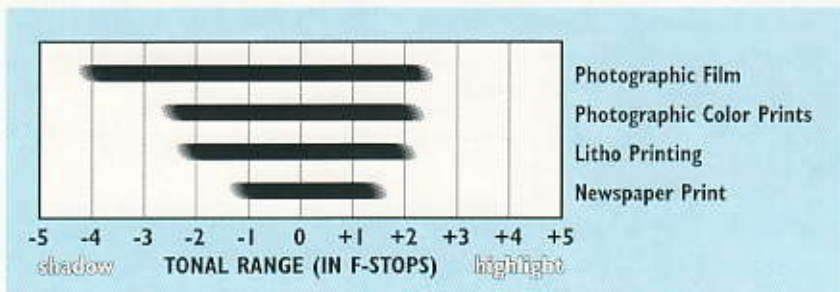
*Example:* The number after ISO 400 would be 500 (250 doubled), and the number ahead of 25 would be 20 (half of 40), and so forth.

- 4) For  $1/2$ -stop changes, the multiplier is 1.4 in the positive direction and .7 in the negative direction.

*Example:* ISO 40 plus  $1/2$ -stop =  $40 \times 1.4 = \underline{\text{ISO 56}}$ , and ISO 40 minus  $1/2$ -stop =  $40 \times 0.7 = \underline{\text{ISO 28}}$ .

# WHAT YOU SEE IS NOT WHAT YOU GET!

Remember, our eyes have a greater tonal range than is recorded on film. Color film has a greater tonal range than will be produced on the photographic print. Transparency color prints may tend to build contrast more than negative color prints. Reproducing these images on a printing press introduces other variables that affect tonal range. The bar graph (below) generalizes this dilemma in a simplified manner:



The tonal range of the film might be over 6-stops. The print condenses it to about  $4\frac{1}{2}$ -stops, and litho printing takes it down to perhaps  $4\frac{1}{2}$  to  $2\frac{1}{2}$ -stops, depending on the color separations, the paper, the line screen, and other factors.

Notice from the graph that film can capture more detail in the shadow areas than in the “hot” highlight areas (about  $4\frac{1}{4}$ -stops toward shadow and only about  $2\frac{1}{4}$ -stops toward the highlight). However, the print loses much of this shadow detail.

Also, notice that the shadow areas suffer even more on the printing press. This is because the high concentration of dots lay down a heavy layer of ink that spreads and tends to “block up” and eliminate detail in the shadows. This effect is called “dot gain” and it can restrict image detail in the shadows to about 2-stops below middle gray—and that is on high quality, gloss paper stock. Uncoated sheets and newsprint absorb more ink and can make shadow detail disappear even faster. But, correct exposure and the proper use of lighting techniques can minimize this problem.

Communication is the secret in getting the desired results in offset lithography, because alterations can be made when making the color separations. Therefore, it is important that all parties involved (client, art director, photographer and printer) understand the objectives and the critical characteristics of the photograph that must be maintained in the final printed reproduction. The images below simulate what normally happens to your photographs in these various circumstances.



Original Transparency



Print from Color Negative



133 Line Screen  
on Gloss Coated Paper



80 Line Screen  
on Newsprint

As the photographer, you have the responsibility and the controls to manipulate the tonal range of the subject to produce the desired effect in the final reproduced image.

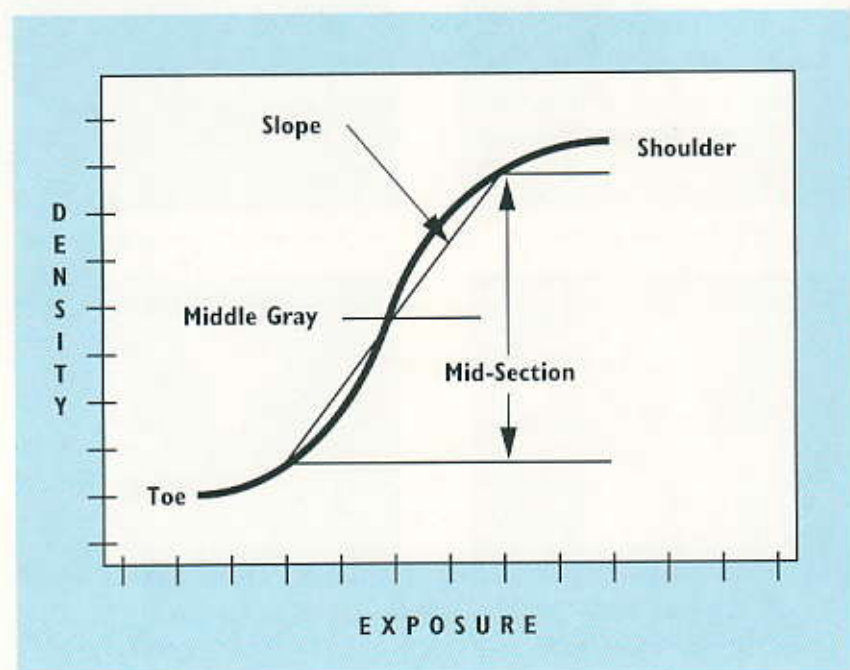


# A WORD ABOUT GAMMA

We mention Gamma by way of reference, as most information on tonal range seems to focus on it, which may tend to become overly technical for most photographic applications.

In photo sensitometry, Gamma (Greek letter "G") is a number given to describe the slope of the straight line ("mid-section") portion of a "Gamma Curve" or "Characteristic Curve". These curves plot the gamut (entire range) of various aspects of photo sensitive materials (film or paper). A "Characteristic Curve" is simulated below.

The greater the slope, the greater the contrast of the material. The higher the "mid-section", the greater the tonal range.



Curve illustrating how changes in exposure effect film density.

Notice on the graph that changes in exposure produce fairly equal changes in density over the "mid-section" area. For most emulsions, this generally covers an exposure range of about  $6\frac{1}{2}$ -stops. For most photographic papers, the "mid-section" is reduced to perhaps  $4\frac{1}{2}$ -stops. Exposing into the "toe" or "shoulder" does not cause a corresponding change in density and detail is lost.

Good exposure is created when the mid-tone of the subject is at the correct point on the curve. This causes middle gray (18% gray) to look like middle gray, and generally the goal is for all the other tones of the photo to reproduce accurately, where white appears as its true value and black appears as its true value, and so forth.

An exposure with a tonal range that does not fill the mid-section of the curve may appear too flat. An exposure that extends into the "toe" and/or "shoulder" may suffer a loss of highlight or shadow detail, depending on the direction of the error. There may be times when artistic considerations require your exposures to use the toe and shoulder points to create a particular mood. Hence, the key objective is to know where these points are so that you are able to obtain predictable results.

Variables affecting characteristic curves are technical and numerous and go beyond the scope of this booklet. If you would like to become more knowledgeable about photo sensitometry, your photo lab can be a valuable resource.

# TWO TONAL ELEMENTS – Subject *and* Lighting

In the preceding pages we have seen that the final reproduction of our photographs has specific limits to the range of tones that can maintain detail. Much of this range is caused by characteristics of the film, paper, and processing techniques controlled by the photo lab.

However, the tonal elements that you control at the camera are basically the *subject* and the *lighting*:

- 1) **SUBJECT** – The subject can be a single tone, such as an egg, as shown at right. Or, it may be comprised of numerous tones, such as the white and black Espresso makers (below). In this latter case, the tonal range happens to exceed the range of the photographic paper, as shown below:



Black and white Espresso makers creating an excessive tonal range.



Printed for shadow detail, causes the highlights to wash out.



Printed for highlight detail, causes the shadows to block up.

- 2) **LIGHTING** – The tonal range and contrast of any image is altered dramatically by the lighting used to record it as illustrated at right. The extreme contrast was created by the use of strong side lighting.





## Combining

# SUBJECT TONAL RANGE

with

# LIGHTING TECHNIQUES

Whether tones reproduce as intended depends on whether the exposure is accurate and whether the lighting, from highlights to shadows, is appropriate to recreate the tones that you desire in the finished product.

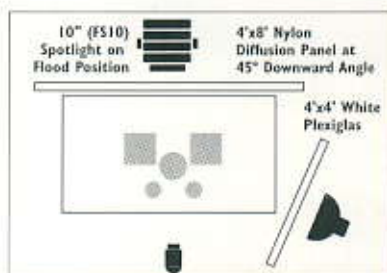
Your artistic creativity will dictate the lighting required to create the desired effect. When practical, you may wish to consider selecting clothing, props and background tones that minimize the conflict associated with the tonal range of the subject vs. the tonal range creating by the lighting.



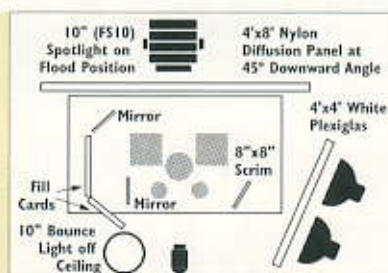
Corrections to the Espresso maker scene were made by adding an additional light behind a 4' square Plexiglas™ diffusion panel\* to provide a softer, broad light source.

Also, a 10" (5E) reflector fill light was bounced off of the ceiling to add general illumination. White reflector cards, made of poster board, were added to the left side along with several mirrors to fill shadows and add highlights. A scrim, made of a 8" square piece of window screen, was used to tone the light down on the white cup in the foreground.

The screen was sprayed with flat black paint to reduce this bright tone further.



Lighting diagram  
before making correction



Lighting diagram  
with corrections

The balance of this booklet pertains to practical methods of metering and controlling tonal range on photographic assignments.

\*Plexiglass™ comes in "Light Box White" (#2447), which is a commonly used light modifier.

# MEASURING TONAL RANGE

*Your best tool for measuring tonal range during a "shoot" is a flash meter.*

It bears mentioning that Polaroid™ instant prints are an excellent and widely used way to preview photographic results. However, it is good to realize that the tonal range of these prints may be condensed (contain more contrast) than in your final work. Hence, an amount of visual interpretation is generally required.

Let's say that you desire to measure (meter) tonal range and create a 4-stop swing from deep shadows to the hottest highlights, whereby an  $f/8$  exposure is the mid-tone between the two, as recorded on the gray card.



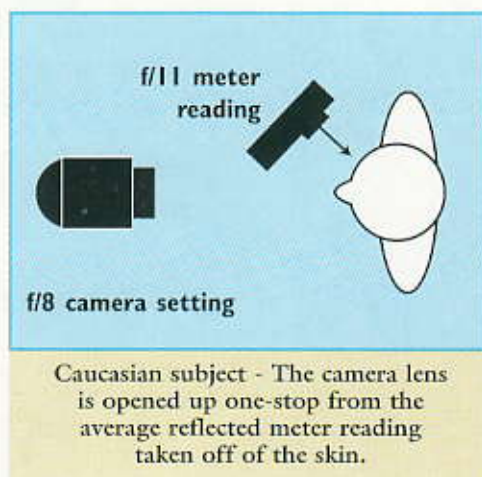
## 4-STOP TONAL RANGE ( $\pm 2$ f-stops)

-2	f/4	Deepest Shadow reading
-1	f/5.6	Shadow Skin reading
0	f/8	Camera exposure (Gray Card reading)
+1	f/11	Average Skin Tone
+2	f/16	Hottest Highlight reading

- 1) Set the camera lens to the desired  $f/8$  aperture. Adjust the output or distance of the main light until the *reflected* flash meter reading from the gray card is  $f/8$ . The card should be fully illuminated by the main light, using caution not to have any glare or shadows on the card that would cause a false meter reading (see pages 16-17).
- 2) Check your 4-stop range by taking flash meter readings of the lightest and darkest areas of the subject that you wish to maintain detail. Adjust your lighting as necessary to make sure that the selected shadow areas do not fall below  $f/4$  and the highlight areas do not read more than  $f/16$ . Notice that the teeth are hotter than  $f/16$ , but that makes them appear all the whiter.

If excessive highlights become a problem that you are unable to solve completely with lighting techniques, you can try using makeup on shiny skin or dulling spray on products. Or, in extreme cases, placing a polarizing filter over the camera lens and/or over the light source can control or eliminate direct glare and problem highlights.

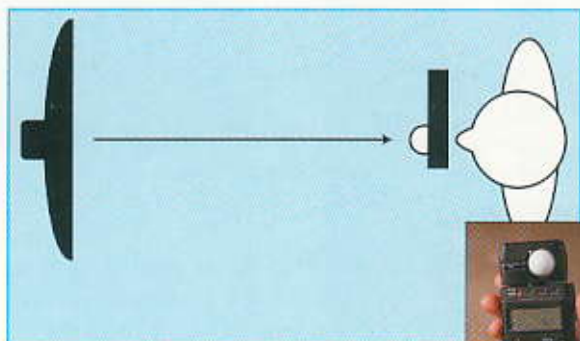
A rule of thumb is that Caucasian skin reflects about 36% of the light (one stop more than the gray card). This being the case, correct exposure would be achieved by opening the camera lens one stop from the average meter reading taken off of the skin, as illustrated below.





# USING THE FLASH METER

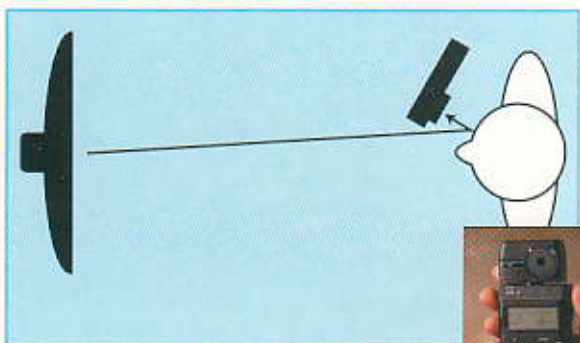
To measure the light output of an electronic flash unit, the flash meter is generally used in the *incident* mode. In this mode the meter utilizes a *hemispherical translucent white dome* in front of the photo pickup device that gathers light from numerous directions. These readings are taken with the meter at the subject position and pointed toward the light source, as illustrated below. When using several lights simultaneously, you may wish to take an individual reading of each light. To do this, it may be necessary to switch off lights or otherwise shield the meter from all lights except the one under test. Once these individual tests are concluded, your camera f-stop can be determined by taking one final reading by pointing the meter toward the main light with all lights in operation.



Incident Reading



However, to read a specific tonal value of the subject, the meter is used in the *reflective* mode. In this mode the meter utilizes a *calibrated flat disk or narrow angle spot attachment* in front of the photo pickup device. These readings are taken with the meter at the subject position, pointed toward the subject, and placed as close to the subject as necessary to read the areas of interest.



Reflective Reading



**Here are several precautions  
when taking *reflective* meter readings:**

- 1) Be sure to place the flash meter close to the subject without casting a shadow.
- 2) Shield the meter from stray light that could enter into the photo-pick-up device and cause a false reading.
- 3) Be careful that light does not glare off of the subject or the gray card and provide a false reading.



The meter position is too close and in the light path, casting a shadow on the reading area.



The meter is too far from the subject, causing stray light to spill on the meter.



The meter is reading light glare off of the gray card. Either reposition the meter or the card.



The meter and the card are positioned correctly to obtain an accurate reading.

# LIGHTING TECHNIQUES - To control tonal range

## A CHANGE OF CLOTHING:

While this is not a lighting technique per se, we have included it as a possible solution for maintaining the tonal range within the limits of the film and/or paper.



Detail in the white blouse is lost for the sake of maintaining detail in the darker tones in the hair.



Detail in the black sweater is lost for the sake of maintaining detail on the highlight side of the face.



The selection of mid-toned clothing has shortened the tonal range of the subject so that detail is maintained from highlights to shadows.

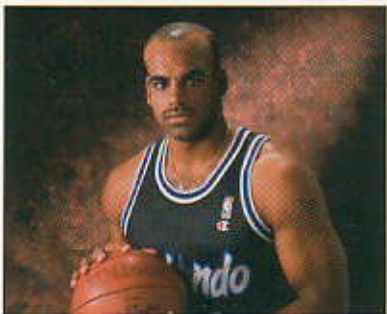
The human eye is drawn to the lightest parts of the subject. Hence, in this case (above left) the use of a white blouse can detract from the main center of interest, which is the subject's face. You may wish to consider this factor in the selection of clothing.

If you have no control over the clothing, you might consider utilizing a barn door, scrim and/or a vignetter to tone down the brightness, as illustrated on page 27.

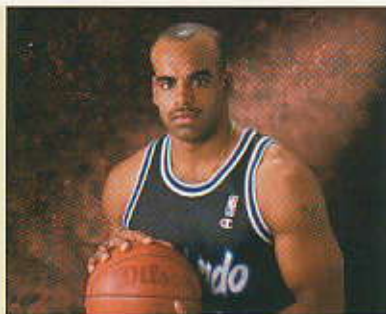


## ALTERING THE AMOUNT OF "FILL":

Boosting the amount of fill reduces the tonal range. Hence, this technique can be used to adjust for subjects that otherwise may generate excessive contrast.



Darker skin tones can tend to block up on the shadow side when using a "standard" 3-to-1 lighting ratio\*.

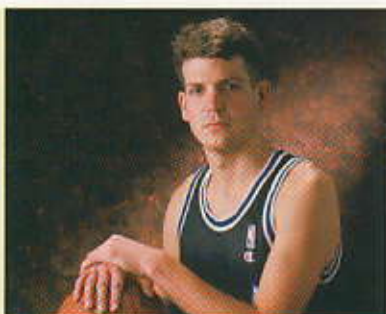


The fill light was boosted one stop to reduce the tonal range in order to retain detail on the shadow side of the face.

Similarly, reducing the fill can add contrast thereby creating "punch" to subject material that might otherwise appear excessively flat.



The desired fill for the photo (above right) produces excessive illumination for this subject.



The fill illumination was trimmed down one stop to create the desired effect.



A Norman 1200N "Smart Pac" was used and the fill illumination was altered via the "TLC Controller". The main light was a 45" (WB45 umbrella), and the fill was a 22" (5X) reflector. The background was illuminated from overhead with a 5C snoot and the hairlight was a 5" (5DL) reflector with a GS5 grid.

*\*3-to-1 Lighting Ratio — A standard photographic term used to indicate that the main light is providing twice the illumination at the subject as the fill. It is called 3-to-1 as opposed to 2-to-1 because the fill is adding illumination to the highlight side of the subject. Hence, two units of main plus one unit of fill equals three total units of highlight illumination to one unit of fill. The effect this has on subject illumination depends on numerous factors such as light placement, the size and diffusion qualities of the lights, the tones of the subject and so forth.*

## VARYING THE SIZE OF THE LIGHT:

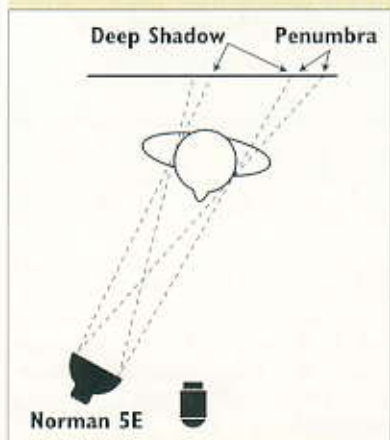
Generally speaking, larger lights wrap more illumination around the subject, thereby shortening the tonal range. Smaller lights tend to produce harsher shadows and wrap less light around the subject, thereby creating greater contrast.



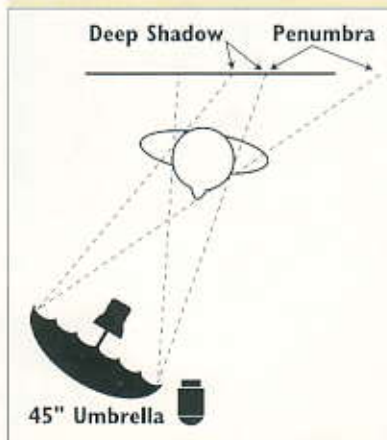
Illumination from a 10" (5E) parabolic reflector at 5 feet from the subject. Contrast is especially apparent at the facial dimples. Also, notice the harshness of the shadow on the background.



Illumination modified with a 45" (WB45) white umbrella, at 5 feet from the subject. Increased softness is especially apparent at the facial dimples. Also, notice the softness of the shadow on the background.



Lighting diagram for the photo above using a parabolic reflector. Notice the great amount of deep shadow created by the small size of the light source.



Lighting diagram for the photo above using an umbrella. Notice the small amount of deep shadow created by the large reflector wrapping the light around the subject.



## VARYING THE LIGHT-TO-SUBJECT DISTANCE:

Moving the main light farther from the subject boosts the contrast by making the light source appear smaller. This creates smaller/brighter highlights and sharper shadows.

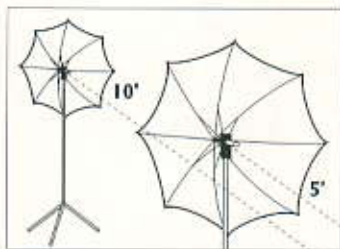


Main light at five feet from subject.



Main light at ten feet from subject.

The stronger contrast created by moving the light back is especially apparent in the shadow cast onto the background. The diagram below illustrates why the light source becomes smaller as it is moved farther from the subject.



Both umbrellas are the same size, but one is twice the distance from the subject.

Notice that when the light is placed at twice the original distance, it appears one fourth as large as opposed to one half as large. This is because doubling the distance causes an object to effectively diminish by half in both dimensions; half

of the height and half of the width equals one fourth of its original size. This greater distance condenses tonal range because the light appears smaller and loses much of its ability to wrap illumination around the subject.

The most dramatic illustration of this effect is the sun. While it is obviously the largest photographic light source that we use in photography, its light-to-subject distance of 93 million miles causes it to appear small thereby becoming a high contrast light, unless diffusion (fog, clouds, a scrim, and so forth) is between the sun and the subject.

Moving a front main light a greater distance from the subject also causes the background to lighten. In-depth information on this is contained in our booklet entitled *THE BATTLE BETWEEN DEPTH OF FIELD AND DEPTH OF LIGHT* (see page 32).

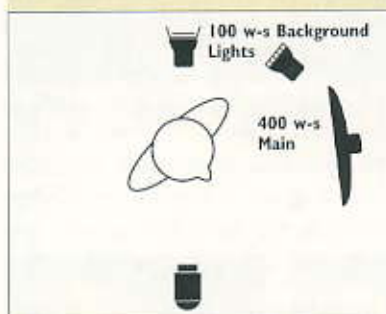


## RIM LIGHTING:

A small amount of rim lighting located next to a deep shadow area can cause the human eye to forgive the surrounding loss of shadow detail.



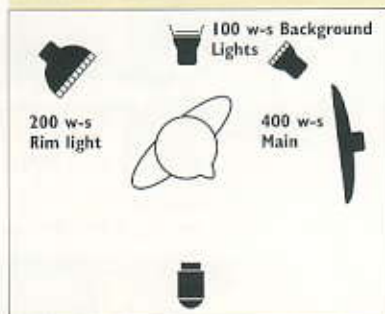
Without the rim light.



The main light was a 22" (5X) reflector. No fill light was used. General illumination on the background was provided by two 5" (5DL) reflectors; one with a blue gel, and one overhead with a G45 grid with a red gel.



With rim light added.



The rim light was provided by a 10" (5E) reflector with a GS10 round grid.

Notice that while this lighting technique did not reduce the tonal range, the rim light does two things to enhance the photograph:

- 1) It provides an added dimension by creating separation between the subject and the background.
- 2) It enables the photograph to retain the mood established by a wide tonal range without adding light to the fill side of the face.

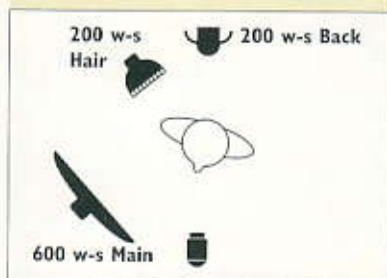
## ACCENT LIGHTING:

Similar to the rim light (page 22), adding a small amount of accent light can bring out details of interest while maintaining the overall effect that you desire.

The use of grids is especially handy for this purpose. The diffusion quality of the grid spot lighting can be altered by adding an RP-1 Diffusion Dome to the reflector. Also, our square grids have slots that place diffusion between the flash tube and the grid, thereby enabling you to control the softness of the light while retaining the grid spot. Placing diffusion in front of the grid causes the columniated light to scatter, depending on the amount of diffusion.



Without the accent light.



The main light was a 22" (5X) pan reflector. A 10" (5E) reflector with G-10 grid was used overhead to provide illumination on the cap. The background was illuminated by a 5" (5DL) reflector feathered downward.



With accent light added.



The accent lighting was provided by a 10" (5E) reflector with an RP-1 diffusion dome and G-10 grid.

You may wish to obtain a copy of our video tape entitled PHOTO TECHNIQUES 1 for additional information on lighting with grids, the Tri-Lite Optical Spotlight and DeCapua Light Hose (see page 32).

## FEATHERING:

This technique is easier to accomplish when using parabolic reflectors, where the light diminishes from side to side. Some light modifiers, such as soft boxes and umbrellas make feathering difficult because they tend to produce even illumination over a wide area. A common situation for using this technique is when shooting a candid with the light either hand-held or mounted on a movable camera bracket.



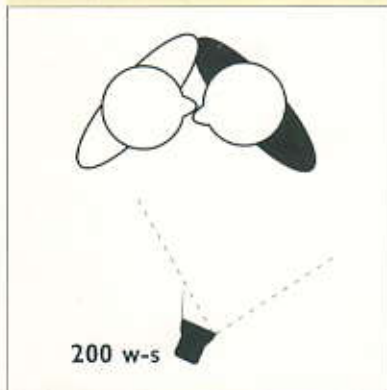
This candid was taken with flash fill. Notice the loss of detail in the wedding dress and in the dark gray tuxedo.



The light was feathered downward and to the right to bring out detail in the tuxedo. A card was taped to the left side of the reflector to screen light off of the wedding dress.



A Norman 200 w-s battery portable with 5" (2D) reflector was pointed straight forward.



The light was feathered and the power boosted to 200 w-s to reduce the tonal range.

Either the use of a light meter, Polaroid™ test print, and/or being familiar with the light fall-off characteristics of your equipment is needed to create predictable results with this technique.



## MAIN LIGHT POSITIONING:

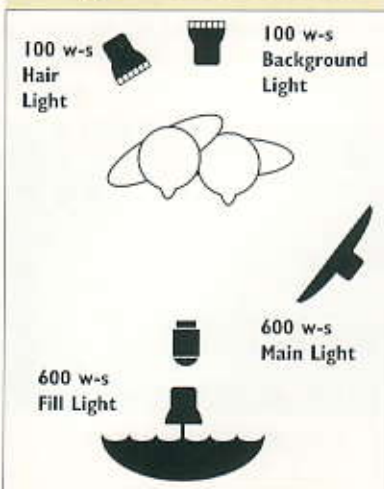
Often times skin tones vary greatly from subject to subject. An easy way of bringing tones into balance is to position the main light nearest the subject with the darkest skin tone.



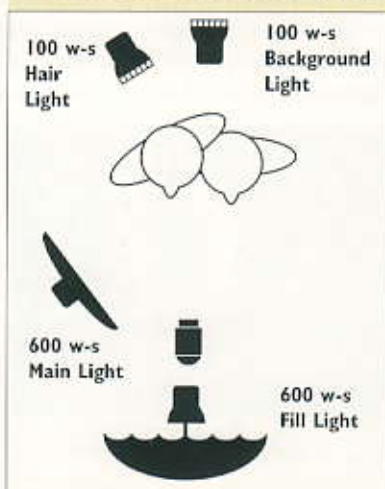
The main light is positioned nearest the lighter subject, which exaggerates the tonal balance.



The main light is positioned nearest the darker subject which brings the skin tones into a better balance.



A 22" (5X) reflector main light was used, and the fill was a 56" (S56) silver umbrella. 5" (5DL) reflectors with GS-5 grids were used on the background and hair.



The direction of the main light was reversed to decrease the tonal variance.

Obviously, another means of accomplishing this objective would be to reposition the subjects as opposed to repositioning the lights, and in many cases reversing the subject positions may be the easier solution.

# LIGHT MODIFIERS:

Numerous types of photographic light modifiers are used to create artistic effects and to control tonal range. The list of these products is growing as you continue to dream up additional ways to refine light control to make your work easier. These include many variations of barn doors, diffusers, grids, flags, flats, light boxes, light tents, mirrors, reflector boards, scrims, umbrellas, vignettes, and so forth.

In discussing this, a local commercial photographer jokingly said to me, "If it weren't for gaffer's tape and black paper, I'd have to close my studio." His point was that there is more than one way to skin a cat. Whether you choose to build custom light modifiers, form make-shift ones, or use commercially available products, depends on your personal preference, the value of showmanship in your business, and the depth of your pockets.

The following pages illustrate some of the ways to control tonal range with light modifiers.

## ADDING OR SUBTRACTING DIFFUSION:

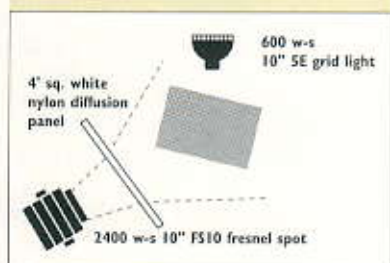
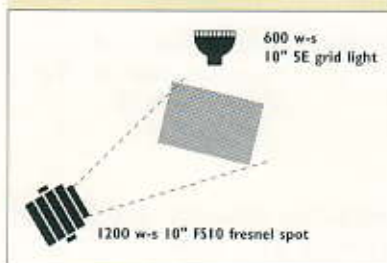
Diffusion scatters the light direction and penetrates into textured areas better than harsher undiffused lighting. This technique is less subtle than varying the size of the light source, unless the size of the diffusion material is larger than the effective size of the light source.



Harsh lighting.



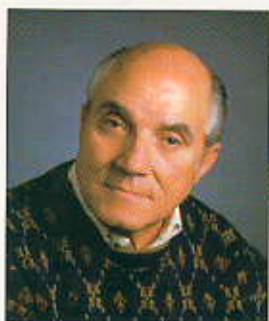
Diffused lighting.



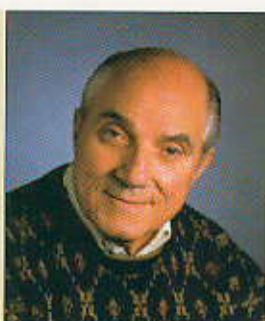


## FLAGS, SCRIMS AND BARNDOORS:

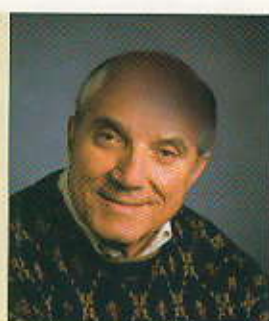
These are handy tools for toning down highlight areas. One prevalent application is to reduce or remove the highlight on the foreheads of subjects with receding hairlines.



This photograph utilizes a 22" (5X) pan reflector main light and a 5DL background reflector.



A scrim (12" x 24") was used to tone down the highlight on the forehead. It was made of cheesecloth, attached to a lightweight frame and placed midway between main light and subject.



A similar size flag, made of black felt, was placed in the same location to eliminate the highlight on the forehead.

Another popular application is to tone down bright clothing by using a scrim and/or vignetter, as shown:



Photograph utilizing a standard four-light portrait illumination: a 22" (5X) pan reflector main light with a grid light on the hair, 5DL background light and a 45" (WB45) white umbrella fill.



A scrim (cheesecloth) was clamped between two stands at shoulder height to tone down the illumination on the blouse.



Adding a translucent plastic vignetter in front of the camera lens toned the blouse down further, thereby drawing attention to the face.



## MIRRORS AND CARDS:

These are especially useful for adding accent lighting or toning down highlights in small product photography. An accent mirror can be an ordinary pocket type mounted (taped) to a small block of wood, and used to reflect light to a specific area of the subject. Cards can be made of any material that creates the effects that you desire.



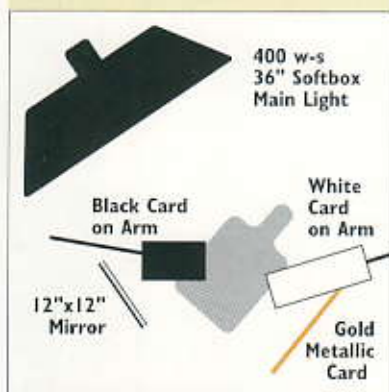
This bread loaf was lit with a single soft box, positioned at the left-rear.



A mirror was added at the front-left to lighten the front surface of the loaf. A gold metallic card was used to reflect warm light on the right side. A white reflector card was positioned overhead to provide a metallic reflection on the knife blade, and a black card was utilized to shield some of the light from the bread slices.



Lighting diagram for the bread loaf scene (above).



Lighting diagram showing corrections made to the scene.




## REFLECTOR FLATS:

A reflector flat is a large version of a reflector card. Flats and cards are often used to reduce tonal range by boosting the amount of fill on the subject. This is easily controlled by positioning the flat to the desired angle, using the modelling lamps to visualize the results. Polaroid™ prints and flash meter testing can be used to check the results. Often times, flats are suspended from overhead, mounted on light stands or freestanding on the floor. Common materials for flats include, but are not limited to, painted plywood, Gatorfoam™ and Foamcor™.

In high-key portrait photography, a fill flat might be placed below the subject to boost the illumination under the chin, eyes and nose, as shown.

		
<p>The main light is above the camera and the majority of the tones are light, generally creating a happy mood.</p>	<p>A reflector flat was added to reduce the tonal range, by adding fill under eyes, nose and chin. This also diminishes skin wrinkles and blemishes.</p>	<p>The flat was made of a 2'x4' white ceiling panel. It was placed on a small table directly in front of the subject.</p>

Another common use of flats and cards is to create highlight reflections on shiny surfaces. The larger the flat, the larger the reflection.

		
<p>BBQ Smoker without highlights. A single umbrella light was placed over the camera.</p>	<p>Two flats created the highlights. Each was angled to create the desired effects.</p>	<p>Lighting diagram shows the main light source and the positioning of the flats.</p>



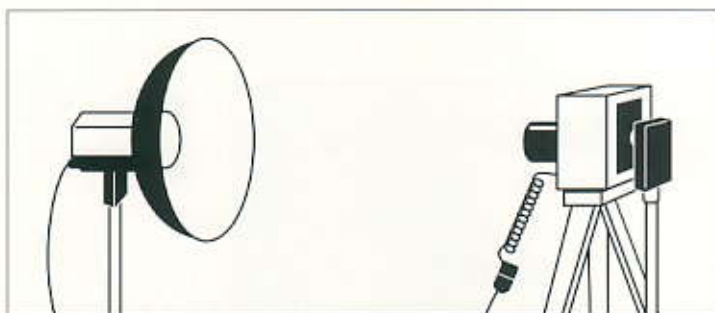
You have probably developed your own techniques for controlling tonal range. The number of light modifiers that can be invented, and their applications, are limitless. That's part of the fun of being creative.

## A CAUTION ABOUT SHUTTER SPEED

A normal shutter speed of  $1/125$  second does not generally effect the amount of flash entering the camera lens. However, some of the more recent electronic flash units can produce flash durations that are sufficiently long to cause the shutter to clip off part of the flash and create under exposures.

This phenomenon is generally more pronounced when using the flashtube at higher output levels and/or when using the camera at larger aperture openings. At larger aperture settings the shutter can progressively restrict the light as it is closing. It is less likely that smaller aperture settings will cause this because the shutter does not interfere with the light entering through the lens until near the end of its closure.

It is wise to test your equipment to determine under which shooting conditions, if any, your exposures are affected. One easy method of testing for this is to open the camera back and take through-the-lens flash readings with the flash meter in the *incident* mode. The meter should be mounted in a fixed position, such as on a stand, as close to the lens as possible to ensure consistent readings.



Through-the-lens flash readings check if the shutter speed clips the flash. The flash is triggered at the camera lens via a standard sync cord.

Start with the flash unit on its highest power level and the camera shutter at  $1/30$  second. Progressively increase the shutter speed until the meter reading shows a decrease in exposure. Bear in mind that focal-plane shutters will sync only at specific speeds. It is good to run this test series using a range of camera f-stops to identify the conditions where your exposures are affected.



# IN CONCLUSION

The three most important principles for good tonal quality are:

- 1. Proper exposure.***
- 2. The use of a flash meter in the reflective mode to read the tonal range of the subject.***
- 3. Utilize lighting techniques that produce the correct tonal range for the end result that you desire.***

We think you will find that putting these concepts into practice will prove to be a rewarding experience by enabling you to maximize your artistic creativity in a manner that produces predictable results economically, time-after-time-after-time.

Good luck and have fun!

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