MonoScapes Workshop

Exposure & contrast control

Rob Gray

The Zone System

Determining the correct exposure for a negative is a process that stumps many beginning photographers. There is no reason why this should be so. It's a simple process, one that has been described by many authors over the years, the most notable being Ansel Adams. Adams described a method of determining exposure and controlling negative contrast he called the Zone System.

Most photographers start by reading one or two books about the Zone System then distilling the parts they find important or manageable and creating what is, in effect, their own system. That's exactly what I did, I created my own system which, while based on Zone System techniques, is not the Zone System.

The Zone System was originally conceived by Ansel Adams and Fred Archer. It was intended to be a method of bringing sensitometry to the masses at a time when film was less forgiving than today's emulsions. The principles are still valid. However, I believe a cutdown version is appropriate for the modern photographer. There's a well known photograph of Ansel Adams, dressed as Moses and holding a stone tablet. The tablet is inscribed with the Roman numerals I–X referring to the ten Zones. "And God said 'Let there be light', and he divided the light into 10 zones" quotes a speech bubble. I'm sure the photo was done for a laugh and that's the way I see it; as a bit of fun. However many a truth is spoken in jest and unfortunately a lot of people treat the Zone System as though it was handed down from on high—the final word.

And God said 'Let there be light', and he divided the light into 10 zones

—Ansel Adams

So, is the Zone System a complicated system for exposure and contrast control requiring much testing of materials and procedures, and access to sensitometry equipment? Or is it a simple method of determining exposure and controlling negative contrast? It can be either. Personally I'll go for the simpler option. Despite an engineering background, my methods are empirical. I hate methodical testing, preferring a simple 'suck it and see' approach.

"So how come every time I find a 'Zone System Made Easy' or 'The Simplified Zone System' book it's three hundred pages long?" you say. I don't know. As with most things, you quickly reach a point of diminishing returns. The Zone System doesn't need to be that complicated. I think many Zone System practitioners are searching for the perfect negative. They are so intent in their search that they fail to notice the warning signs and continue into a quagmire of endless testing and analysing.

I don't think you need a perfect negative. What you do need is a good negative, one that will print well at grade 2 or thereabouts. If it requires grade 1½ or 2½ or even 1 or 3 then that's just fine. It's even acceptable to venture into harder and softer grades under some circumstances. While it's true that a high quality print cannot be made from a bad negative, it can be made from a good one. Therefore my aim is to consistently produce good negatives. I find that by using *techniques based on* the Zone System I can achieve that goal.

My system

As with the Zone System, my system is all about shadows and highlights. It is based on two simple attributes of film, namely:

The density of shadow areas is determined
at the time of exposure.
The density of highlight areas is determined
when the film is developed.

These attributes are a feature of the film/developer combination and are true regardless of the Zone System, my system or any other system. Thus, when exposing film you need to determine two things:

- The *brightness level* of the shadow areas of the scene and, from that, what exposure to use to ensure the shadow detail is retained.
- The brightness level of the highlight areas to determine the overall *brightness range* of the scene, and from that, the developing time required to control contrast in the negative.

That's all you need to know at the time of making the photograph: two things, and you determine them by taking one exposure reading from the shadows and another from the highlights.

To create a negative that is properly exposed and has a contrast that makes it easy to print, you need to know the brightness level of the scene's shadows, and the brightness range of the scene. In this article I will describe how I determine these two scene attributes, how I use this information to achieve correct exposure, and how I adjust the development of my negatives to achieve contrast control.

There are four areas to cover, these being: calibration, brightness level, brightness range and contrast control. A caveat applies to the information that follows. It is correct for the film and developer combination I use (T-MAX 100 sheet film and T-MAX RS developer), my enlarger, my processing tanks, etc. As they say, "Your mileage may vary". For example, if your enlarger uses a condenser head it may well produce a more contrasty print than mine, all else being equal. However I have used the technique described below (or close to it) for several years with numerous darkroom setups and films and found that it works well.

Brightness level

A correct exposure is as vital as it is easy to achieve. I simply take a meter reading from a shadow area of the scene, an area that I feel should appear dark in the final print but that should show reasonable detail, and reduce this exposure reading by two stops. Note that the area metered is not the *darkest* area of the scene but the *darkest area that I think should show reasonable detail in the final print*. There's a difference. There may be several areas that are darker but that carry no important information, I am happy to let these areas go very dark or even completely black in the print.

It's that simple. In the past I would try to find an object with 18% reflectance (18% is middle grey tone, a concept I'll cover soon) and meter directly from that. In theory this approach is the same; in practice I find it is much easier to recognize relative densities, ie. a dark area of a scene, rather than absolute densities, ie. an object with 18% reflectance.

Brightness range

The whole point of any system of this kind is the creation of negatives with a contrast that roughly matches the ability of the paper used to make the print, regardless of the brightness range of the original scene. The photographic paper used to produce a print has a brightness range of approximately five stops; the film you use can probably handle around nine stops; and of course the actual scene can have a brightness range of zero to 20 or more stops. To exercise control over a negative's contrast I first need to know the brightness range of the scene.

I already have a shadow reading so, to ascertain the brightness range, all I need is a reading from a highlight area. In a similar fashion to taking the shadow reading I look for a bright area that I feel should retain reasonable detail in the print, and take a meter reading from that area. Once again there may be areas that are brighter, these would usually be reflections from water etc. and are known as specular highlights. Such areas will print paper-white with no detail and should normally be very small, as large areas with no detail are very offputting in a print.

Having taken a shadow and a highlight reading, I know the brightness range of the scene. I define three possible brightness ranges, these being normal (N), higher than normal (H) and lower than normal (L). Furthermore I

will define these ranges as having the following differences between the shadow and highlight readings:

L	3 or less stops difference
N	4, 5 or 6 stops difference
H	7 or more stops difference

Therefore if I measure a scene and find that it has only three stops difference between the shadow and highlight areas I mark that negative as type L. Similarly, a negative of a scene with 4, 5 or 6 stops difference is marked as type N. Negatives of scenes with 7 or more stops difference are marked as type H. Later, in the darkroom, I will use this information to correctly develop the film.

Extreme brightness range

The above technique will provide high quality negatives from scenes with a brightness range between 2 and 8 stops. But what about scenes that have a higher or lower brightness range than that? I don't recall ever encountering a scene with less than 2 stops brightness range. As for natural scenes with a larger than 8 stop brightness range, they are also extremely rare. There is a technique known as 'compensation development', which involves very little agitation of the film while it is in the developer, that can be used to provide extreme contrast reduction in negatives. However I have never felt such extreme reduction was necessary. Maybe it's the nature of the Australian light or maybe I just don't 'see' photos that have such a high brightness range. Of course if this is true it may be subliminal, based on the knowledge that I cannot produce a good negative from such a scene. If I *could* produce a good negative, through the use of techniques like compensation development, I may start to see a whole new landscape.

The grey meter

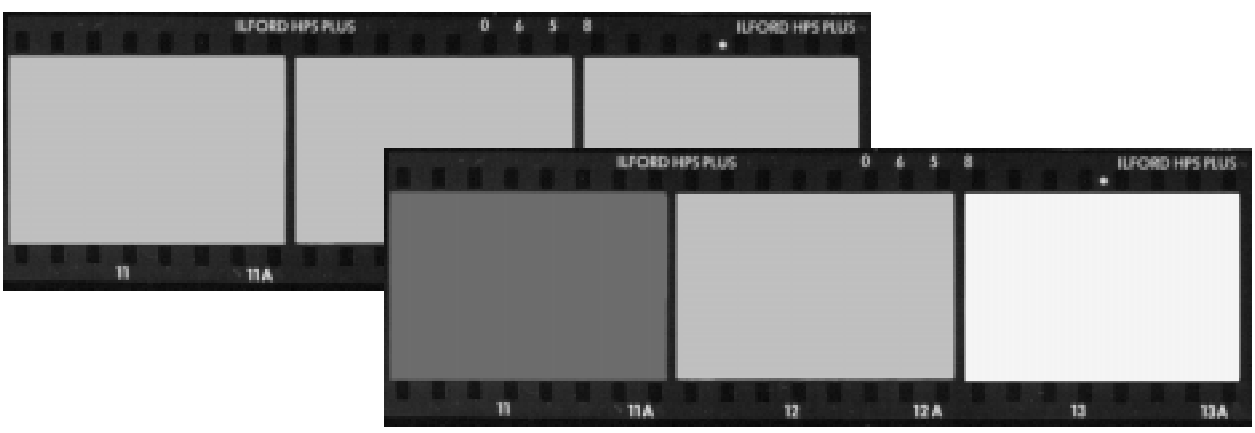
Bruce Barnbaum calls exposure meters 'Grey meters'. What he is referring to is the fact that light meters are calibrated to provide a correct reading when pointed at an object of middle grey tone (18% reflectance). If you are photographing a Kodak Grey card or some green grass (nature's grey card) then the meter will give you a correct reading. Bad luck if you are photographing snow or the inside of a coal mine.

If you blindly use the meter reading to determine your exposures, everything you photograph will turn out grey. To illustrate this point try the following experiment. You need five things, a piece of white cardboard, a piece of black cardboard, a piece of grey cardboard (a Kodak Grey Card if you have one), your meter and your camera. Take them all outside and place the cardboard pieces next to each other. Now fill the frame with the black cardboard, take a meter reading, and take a photo. Repeat the process with the grey and white cardboard then process the film. All three photos are of subjects with extreme differences in brightness, therefore the density of the negatives will be vastly different, right?

Wrong.

The density of the negatives will be *exactly the same*. This is your grey meter at work, diligently converting everything it sees into middle grey.

Now repeat the exercise. This time photograph the grey cardboard using the meter's reading, over-expose the white cardboard by two stops and under-expose the black cardboard by two stops. Process the roll and you will find that the three negatives now have vastly different densities. If contact printed such that the image of the grey cardboard is the same as the original



These two contact strips show the results of the experiment discussed in the text. Note that, in the top strip the cardboard pieces are all the same density, while in the bottom strip their density varies, as indeed they should.

subject, the print of the white cardboard will be much lighter, and the print of the black cardboard will be much darker. This is a rendition that is closer to the actual subjects than the first example.

This is all very well, but we don't usually take full frame photos of cardboard. If we did then we could use any old exposure and print the negative to look right. Most scenes however have a full range of tones and include hundreds of objects. If we don't get the exposure right some of these objects will be too light or too dark to print. To correct this you should under-expose dark objects and over-expose light objects. I use the terms under and over-expose to refer to values that are relative to the reading produced by the meter and not to imply that you incorrectly exposed the negative.

Most people find this to be counter intuitive; it seems reasonable to give more exposure to a dark object. However what we are trying to do is fit the brightness range of the scene 'onto' the range of tones the negative is capable of reproducing. I think this is better described diagramatically. The figures on pages 14–17 are *conceptual* diagrams that represent the placement of the grey levels from a scene onto those of the film and from there onto the paper used for a print. In each diagram the left-hand bar represents the brightness range of the scene and the right-hand bar represents the brightness range the film is capable of capturing (the straight part of the film's characteristic curve).

As you have probably figured by now there are two aspects we need to

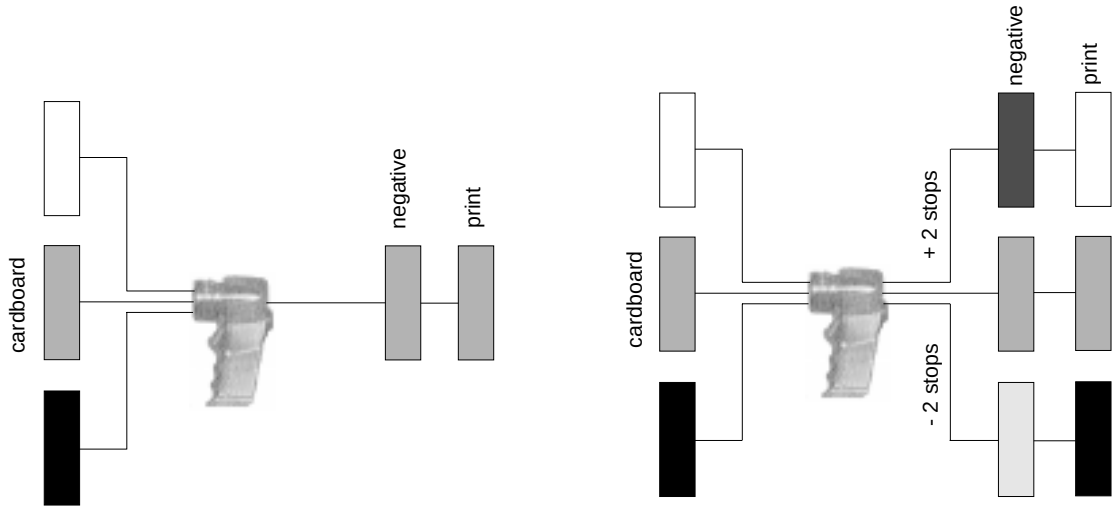


Figure 1.

look at, the brightness level of a scene's shadows and the brightness range of the entire scene. We will start by looking at brightness level, then having mastered that, move on to controlling brightness range by adjusting the film's contrast.

Spot meters

It may seem pretty obvious, but in order to determine an accurate exposure you must know *exactly what you are taking a reading from*. With most hand-held and in-camera meters you don't have a clue. Some are centre weighted; some average the light from the entire scene; and some have a pseudo spot setting; with the worst of all being any kind of multi-segment intelligent metering. The upshot of all this is that you are unlikely to know just what is being metered. Even if you do, it's almost certain that the area being metered is too broad to be of much use.

I say this because it's typical to require a meter reading from the underside of a rock on the far side of a stream. This is not a trumped up example. This is normal. The only convenient way to do this is with a spot meter, a genuine spot meter with a 1° angle of view, not the so-called spot setting on your camera. There are methods often recommended to simulate a spot meter with a camera such as moving closer to the subject and/or changing to a telephoto lens. I find that neither of these options works well in the field. I'll explain more after covering how I deal with some practical situations.

Calibration

This is the area of least interest to photographers who don't also wish to be lab technicians. It's also the area that can get the most complicated, with terms like densitometer, gamma, D-max and base plus fog. You can feel defeated before you start. The good news is that you don't need to know about any of that stuff to produce very high quality negatives.

I start with the basic premise that all films have over-rated speeds—This may not be strictly true but I've never found one that didn't—and that this over-rating is in the order of 100%. So, the first thing I do is rate my film at half the manufacturer's recommended speed by changing the dial on my meter, for example, from 100ISO to 50ISO. The next premise is that all film manufacturer's recommended development times are far too long and designed to produce 'gutsy' negatives. I don't need negatives as dense as the manufacturers seem to, so I reduce the development time to 70% of that stated in the film's spec sheet.

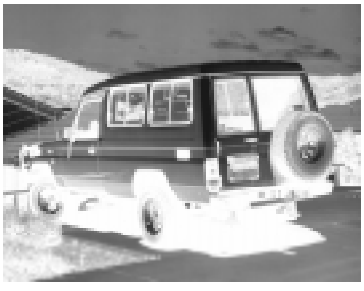
Now I am ready to test. I find a subject with about five stops of brightness range (An off-white car on a sunny day is about right), take a reflected exposure reading from a dark part of the scene that has reasonable detail, (eg. under the wheel arches), reduce the exposure reading by two stops (ie. if the meter reads 125th @ f8, I reduce the aperture to f16), and take the photo. Then I take four more exposures, one at half a stop less than the first, one at half a stop more, one at full stop less, and finally one at a full stop more. I process the five sheets using a development time that is 70% of the manufacturer's recommended time and make a quick 8x10 print of the first negative. I make this print using whatever exposure and paper grade is required to achieve a good quality print. If I have a print exposure of approximately ten seconds at f16 and a paper grade of 2 then I've finished calibrating.

If the exposure time is shorter than ten seconds I move to a darker negative; if longer I use a lighter negative, until the exposure *is* about 10 seconds. When I find the right negative I adjust the film's ISO to a lower or higher value. For example, if the negative I chose was one stop more dense than the first one I halve the ISO setting on my meter or camera. In this case the ISO would now be at a quarter of the manufacturer's value. Conversely if the negative used is a stop less dense, I double my film's ISO back to the manufacturer's recommendation. In practice I have always settled on the first negative and left the ASA set at 50% of the recommended value.

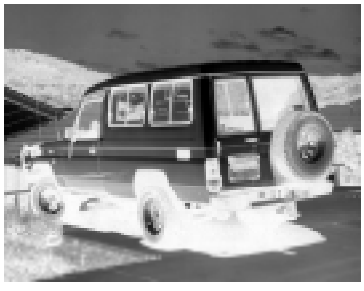
Now I look at the paper grade the print was made on. If the paper grade is 1½ or lower I repeat the process, subtracting 20% from the film's development time. Similarly, if the grade was 3½ or higher I increase the film's development time by 20% and try again. Once again, in practice I have never had to repeat the process, I find that the above starting points are close enough for me to start photographing, with maybe a slight tweak of the settings over the next few process runs.

Using the above calibration procedure I obtain the exposure and processing settings for a scene of so-called normal brightness range. But what about scenes of greater than normal or less than normal brightness range? I'll discuss that shortly but first I should point out something. The above procedure will give you your personal film speed and normal processing time *for a given combination of film, exposure meter, metering technique, camera, processing technique, enlarger, etc*. If you change film, or the way you agitate while processing, or the music you play while agitating, or buy a new enlarger or change anything in the process/print chain of events, you probably invalidate your findings and should repeat the calibration.

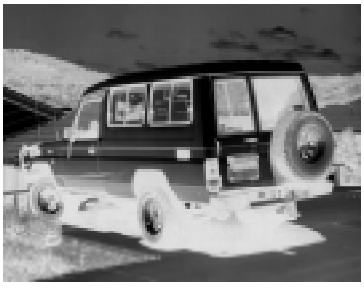
The exposure made with a ½ stop less exposure than the reference negative. If this negative is selected then the film should be rated at ISO75.

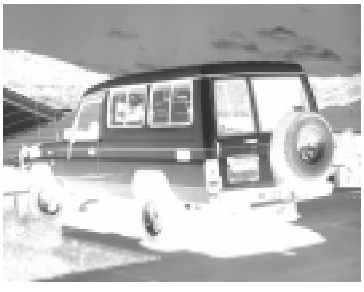


The reference exposure made with an ISO rating of 50% of the manufacturer's recommendation. If this negative is selected then the film should be rated at ISO50.

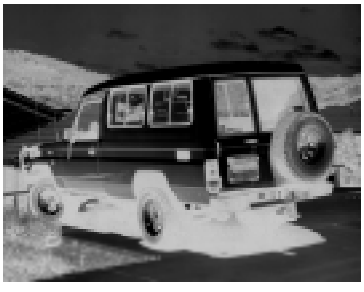


The exposure made with a ½ stop more exposure than the reference negative. If this negative is selected then the film should be rated at ISO37.





The exposure made with 1 stop less exposure than the reference negative. If this negative is selected then the film should be rated at ISO100.



The exposure made with 1 stop more exposure than the reference negative. If this negative is selected then the film should be rated at ISO25.

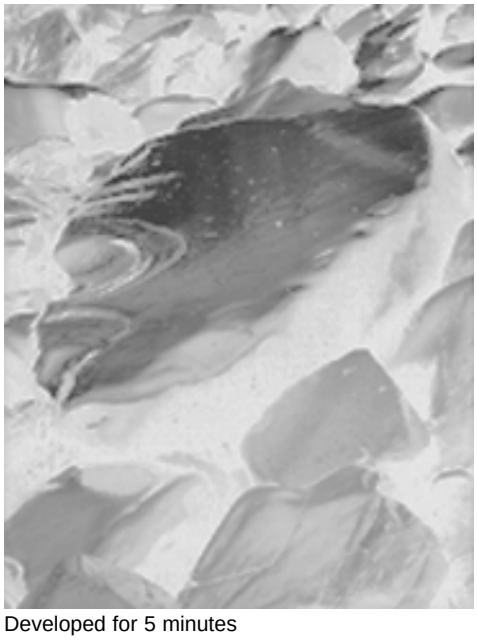
Contrast control

The following technique assumes that average black & white films and recommended developing temperatures are being used. I'll be more specific than that. I currently use this technique with FP4+ at 21ºC and T-MAX 100 at 24ºC, processed in dip and dunk tanks and agitated for the first thirty seconds then for five seconds every thirty seconds after that. I find it works well. However if you are a press photographer processing at 70ºC with continuous agitation because you have a five minute deadline (and in many other scenarios I'm sure) the following technique may not be valid.

I'll make two statements regarding the development of the above films:

1. When film is developing, the shadow areas are fully developed in about two minutes. Any more time has very little effect on the shadows.
2. The developing time is always *longer* than two minutes, even after reducing to 70% as I recommend.

So, while the time spent by the film in the developer does vary, it is usually between five and fifteen minutes. It is never as short as one or two minutes. Therefore, when developing, you have no control over shadow density. Highlight areas however continue developing for a long time, becoming denser and denser by the minute. The figures on the previous page show this. These figures represent three negatives of the same scene. Each has the same exposure, but the development times have been varied. Notice how the shadow detail is virtually unchanged, while the highlights vary from thin to extremely dense.

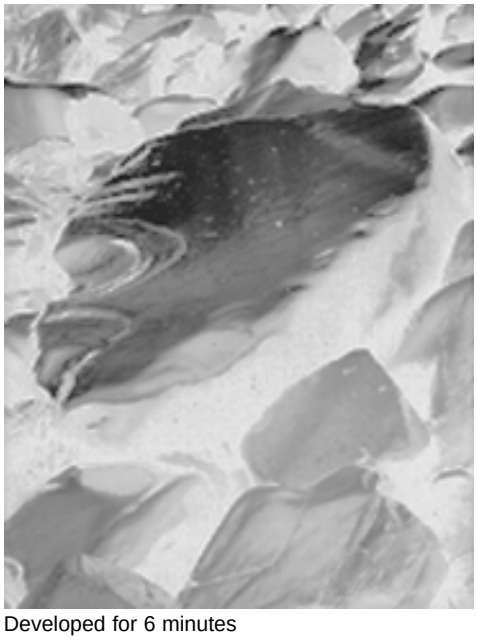


Developed for 5 minutes

We can use this feature to control the contrast handed to us by nature when the photo was taken. Rather than produce negatives of different contrasts from the same scene, we can produce negatives of the same contrast from different scenes. From scenes with vastly different brightness ranges we can produce negatives that print on the same grade of paper.

Bearing this in mind we can now look at negatives as they come in from the field. Those marked as type L (a scene of lower than normal contrast) require more development than type N negatives, while those marked as type H (a scene of higher than normal contrast) require less development than type N negatives. Simple isn't it? The only questions are "How much more?" and "How much less?".

For starters I add 20% to the normal development time for type L negatives and subtract 20% for type H. As I process and print more negatives I will tune the times according to the results I get. For example, if I find that prints from type H negatives are *always* a little contrasty, printing on grades 3, 3½, 4 or higher, I reduce the developing time even further. If an occasional print uses a higher grade it's usually because I misread the brightness range of the scene, so there's no need to adjust anything, just be more careful with my meter readings.



Developed for 6 minutes

Developed for 7 minutes

Exposure

As it happens many scenes are of average brightness range and consist of subjects that are middle grey in nature. The example shown here is a scene with even illumination over the entire image and with a subject that is middle grey.

With a scene like this you could easily use the reading given by your meter. After all the subject looks for all the world like a Kodak Grey card. Figure 2 shows this. The meter assumes that the subject is middle grey (it was correct in this case) and provides a reading that places the subject in the middle of the film's range. So far so good, but what if the scene was predominantly dark, but with some important highlights?

The second image shows a scene that is extremely dark. The diagram shows what happens if the photographer takes a meter reading from the entire scene and uses that reading directly. Once again the meter assumed that the subject was middle grey (however this time it was wrong) and placed the subject in

Water Lillies

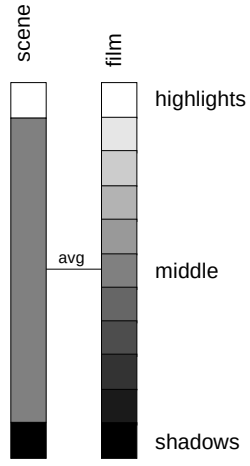


Figure 2. Meter reading used directly for a middle grey scene. The brightness values of the scene are averaged and this value is used by the meter to place the exposuse in the middle of the film's range. In this case the scene is predominately middle grey so everything is OK.

Canyon Shapes

the middle of the film's range. This wouldn't do any harm to the reproduction of the shadows, but what about the highlights? As Figure 3 shows, the highlight areas have been pushed right off the end of the film's range. The film will be incapable of separating the detail in these areas and they will appear 'blocked up' in the print, that is assuming that you can print them at all. It is probable that they will be too dense to print without so much burning-in that you just fog the paper without showing any detail.

What we need to do is shift the scene's brightness range down to match that of the film.

Figure 4 shows the same scene, but this time the photographer has taken the reading given by the meter then reduced that reading by two stops. As you can see the scene's brightness range now 'fits onto' the film. The resultant negative will have a full range of tones with detail in the shadows and no blocking in the highlights.

Figure 3. Meter reading used directly when the scene is predominately dark. All brightness levels are integrated to one average and this value is used by the meter to place the exposure in the middle of the film's range. As we have more above the average that below it we loose the highlights 'off the end' of the film. These highlights will be blocked up and very difficult to print.

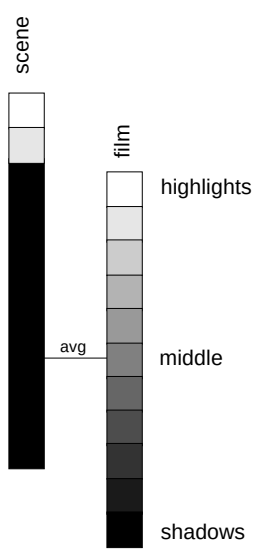
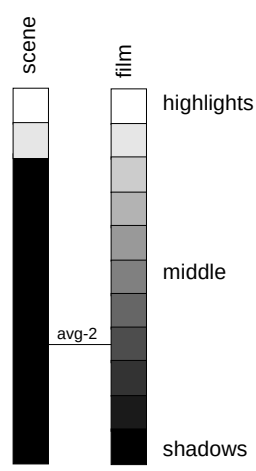


Figure 4. Meter reading reduced by 2 stops. By 'under-exposing' we effectively move the scene's brightness level down. The shadows are now placed closer to the bottom of the film's range and all the scene's details will be reproduced by the film.



Contrast

Let's assume that, by now, we have exposure under control and realise why the reading given by a light meter needs to be interpreted rather than used blindly. The next step is taming the brightness range of the scene.

The scene in the photo reproduced on the oposite page had an extremely wide brightness range. As you can see in Figure 5 the scene's brightness range is larger than that of the film. When this occurs the highlight tones are compressed resulting in loss of detail and blocked highlights. If I had simply exposed according to the details on the previous page, without any thought given to the brightness range of the scene, I would have developed the film normally and obtained a negative with highlight compression and detail loss.

If however I take a highlight reading I will realise that the scene's brightness range is in fact too large to be faithfully recorded by the film. What I need to do is reduce the contrast of the negative so I have no highlight detail 'falling off the edge' as it were. This reduction is performed by developing the film for a period of time less than that used for scenes of normal brightness range.

This will fit the scene's brightness range onto the film as shown in Figure 6 and, if we were only interested in producing negatives, that would be the end of the story. However we want to make prints. This introduces a further complication.

The photographic paper used to make a print has an even more limited tonal repertoire than the film, so the reduction needs to be somewhat larger than would be required if we were just making negatives. Figure 7 shows this further reduction.

The next step is to look at some practical examples of exposure reading. However I think it's worth discussing some practical aspects of light meters (or is that grey meters?) first.

Figure 5. Meter reading of the shadow area, -2 stops, used as the exposure. The shadows are placed towards the bottom of the film's range which is good. However the scene's brightness range is such that the highlights are way out of the range of the film.

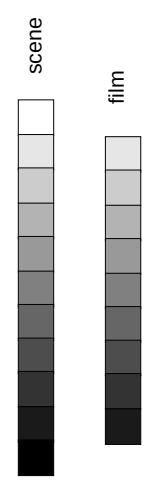


Figure 6. Same as before but with reduced developing time for the negative. The scene's brightness range has been reduced to fit within the film's capabilities.

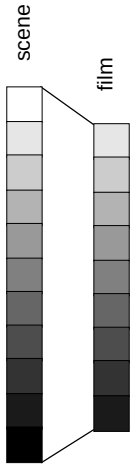
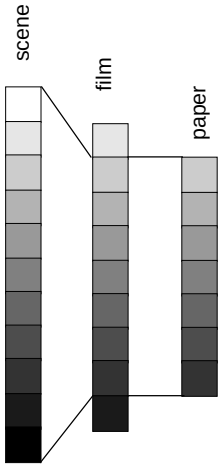


Figure 7. Same again but with more reduction to the developing time for the negative. Now the scene's brightness range has been reduced to fit within the paper's capabilities.



Examples

The photo opposite is a typical landscape. In the past, before I started using techniques based on the Zone System, I was only interested in exposure. The idea of modifying contrast didn't enter my mind. I knew that meters were calibrated for middle grey so I would try to find a section of the photo that corresponded to this middle grey. Objects such as grass and granite are good choices but it's not always obvious what to take a meter reading from. In this example I would try to get a reading from the sunlit part of the granite boulders, and actually would have got a reasonable exposure as they are pretty close to middle grey. However you won't always be that lucky. Trying to choose objects that correspond to absolute values is the wrong way to go about things.

When I measure the brightness range of a scene I am interested in taking exposure readings from two areas of the scene, the shadows and the highlights. With my usual flare for creative names I call these readings the 'Shadow reading' and the 'Highlight reading'. Let's define these two terms.

Shadow reading

Look around the scene and ask yourself the question "What is the darkest part of this scene that I think should show detail *in the print*?" Note that this isn't the darkest part of the scene, only the darkest part that should show a reasonable amount of detail in the final print. This is the shadow area.

In the example photo, the shadow area is the black hole of dark rock surrounded by snow, or under the rock in the lower left of the scene. There are darker areas. These will lose all of their detail in the print.

Highlight reading

Now look around the scene again and ask yourself the question "What is the lightest part of this scene that I think should show detail *in the print*?" Note once again that this isn't the lightest part of the scene, only the lightest part that should show a fair amount of detail in the final print. This is the highlight area.

In the example photo, the highlight area is the bright snow at the upper right of the scene. There are lighter areas. These are called 'specular highlights' and will be totally white in the print. So what's the procedure when confronted with a scene like this? It's as simple as the proverbial one, two, three.

1. Decide which is the shadow area and take a meter reading from that area. Reduce that reading by two stops. That is your exposure.

2. Decide which is the highlight area and take a meter reading from there. If the reading is 4, 5 or 6 stops brighter than the shadow area record that the negative depicts a scene of normal brightness range. If it's 3 stops or less record a low brightness range and if it is 7 stops or more record a high brightness range.
3. Expose the negative.

That's it, two meter readings and an exposure. Who said that obtaining a correct exposure was difficult?

This example scene had a very high brightness range. The highlights were actually eight stops brighter than my selected shadows area. Without using some form of contrast control for the negative it would not be possible to print detail in all the important parts of the image. I would have to let the rock go completely black, let the snow blow out to paper white, or not take the photo.

On these two pages I show ten example photographs and briefly describe where the meter readings were taken and why. Note that I do not record where readings are taken from and don't always remember, so in some cases the comments really indicate what I would do if confronted by these scenes again.

Highlight area This will be light but show detail in the print.

Specular highlight. This will be paper white in the print showing no detail.

Shadow area. This will be dark but show detail in the print.

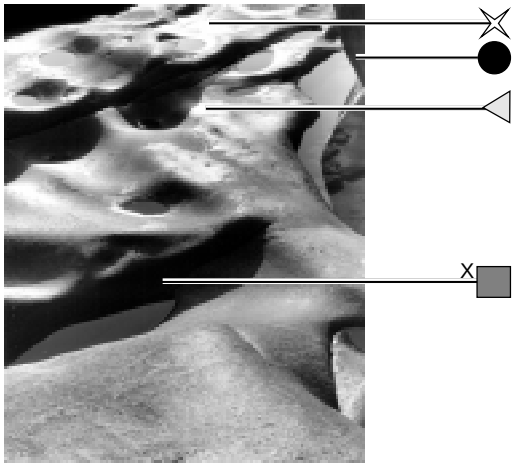
Area that will be black in the print with no visible detail.

X This mark indicates the reading used to base the exposure.

Moggy's

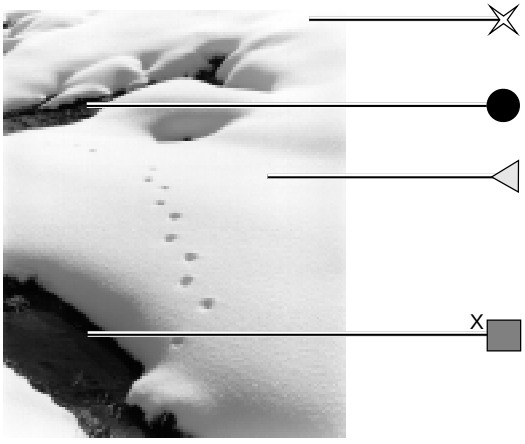
The base of the old tumbled down jetty was the darkest part of this scene and the shadow area I based my exposure on. Initially I thought I would have trouble retaining detail under the verandah of the right most shed, then I realised that it was quite well lit by reflections from the concrete slabs in front of it. These slabs were very bright but not very large from my viewpoint so I elected to let them go white. Similarly with the main shed's roof.

Forms in Rock



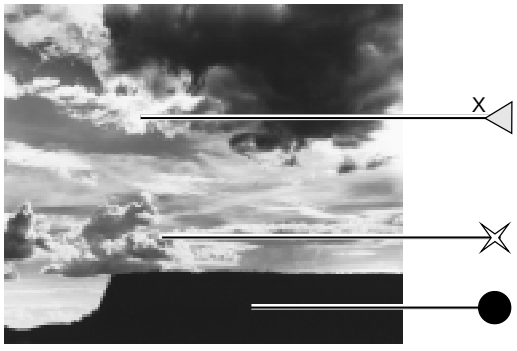
Here we have a large brightness range and large areas of shadow where it is important to keep detail. At the other end of the scale we have large areas of bright reflections. Unlike the shadows however I was content to let these highlights go to paper white and so took my highlight reading from a spot slightly darker than the brightest area.

Dawn Inlet



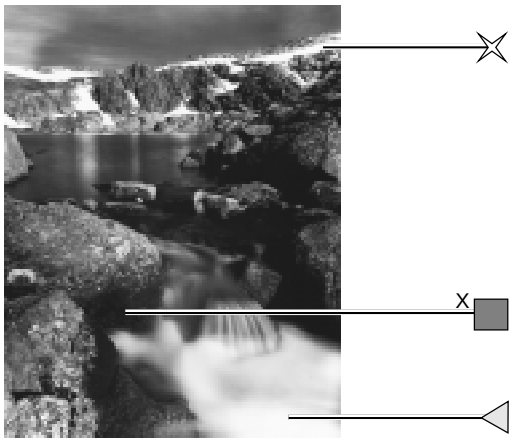
A scene consisting almost entirely of bright snow will play havoc with your exposure if you don't think about it. Remember your light meter sees only a middle grey world and will produce a reading that will convert any subject to middle grey, regardless of its brightness. Do you want this snow to be grey, I doubt it. It's more likely you want nice bright, almost white, snow. If you are using an averaging meter simply increase the metre's reading to 'over-expose' by two stops.
With a spot meter I was able to accurately measure the shadow areas in the creek and base my exposure on that. Finding a highlight area was simple, just about everywhere else was bright enough to qualify.

A Storm is Born



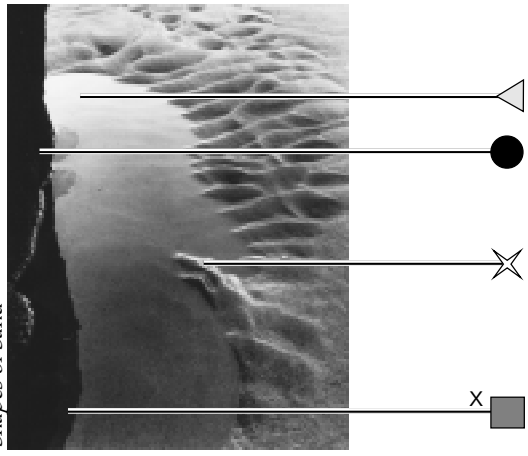
I felt that these clouds would not last for long and so dispensed with the usual formalities. I usually take a reading from the darkest part of the scene and reduce this reading, There is no reason however why I cannot take a reading from the brightest part of the scene and increase it. That's what I did here. I was not interested in retaining detail in the mountain and there was no other convenient dark area so I took a reading from the light part of the cloud and increased that reading by two stops. Note that a red filter was used for this photo. With a scene like this a red filter has the effect of increasing the brightness range. The lighter parts of the clouds are white and not unduly affected by the colour of the filter, however the dark parts of the clouds are blue and are greatly affected. This results in an increase of brightness range and an increase in the 'storminess' of the clouds.

The Birth of Blue Lake Creek



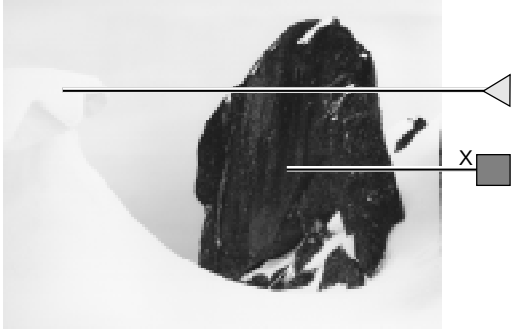
Although snow has a bad reputation with photographers using averaging meters there is not enough in this scene to influence the reading. A normal camera's averaging meter would give good results here. In my case I measured the snow with my spot meter and found it was just a tad brighter than the water in the foreground. I elected to calculate my brightness range using the water and let the snow blow out just a little.

Shapes of Sand



With this photo I was prepared to let the dark mass of rock on the left go completely black. The metered shadow area is the area of this rock's reflection in the water. The brightness range was quite low requiring extra development to give good contrast in the sandy shapes, especially where they are under water.

Snowave Meets Tor

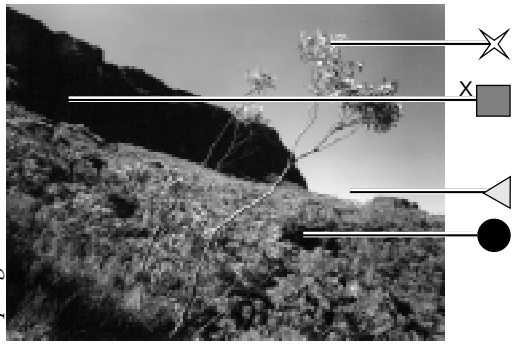


An almost impossible situation, overcast and very dull, yet I wanted to breathe a little life into the snow. There was no particular area I wanted to go completely black and no specular highlights. The rock was mostly dark grey with areas of even darker moss-like vegetation. I metered from the bare rock, deciding that the moss could go black. At the other end of the scale I had the light grey snow. I used extended development, not to separate the rock from the snow but to provide enough contrast to make the scallop shape at the top of the snow wave stand out a little. I like the photo but admit that it's almost impossible to print with the life I envisaged.

Hidden Valley

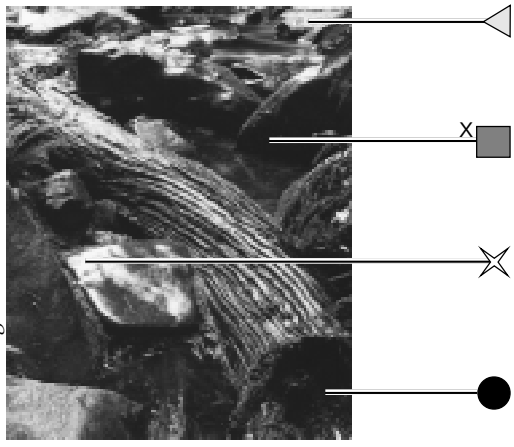
This scene has a fairly average range of tones and could probably have been well metered with a standard meter. However I wanted to keep the detail in the shadow areas of the cliff face at the opposite side of the valley. I was also using an orange filter, this will darken the shadows more than the sunlit areas which makes it even more critical to get the exposure right.

Saplings and The Castle



The main highlight area to measure in this image is probably on the leaves of the sapling. Even with a spot meter I could not conveniently measure one of these small leaves so I used the lowest part of the sky for my highlight reading. I was content to let the brightest leaves and the side light on the tree's trunk go to paper white. The massive cliff face that forms The Castle was in shade, I used it for my shadow reading because I wanted to retain the detail in the rocks. When using a filter to modify a scene you have to be aware of the effect the filter is having on the elements of the scene. In this case I used an orange filter. The cliff is in shadow and lit by blue light (from the sky) whereas the side of the tree is lit directly by the sun. Therefore the filter will darken the shadows considerably more than the tree. This means that the overall brightness range of the scene will be greater than that indicated by my meter.

Striated Log



This photo largely consists of specular highlights, in fact it's these highlights that create the interest. I had seen this log several times before making this image, and have seen it since. But only once, immediately after it had rained, did it look anything more than completely boring.

Light meters (again)

Earlier I said I would come back to light meters after we knew what was required of them in the field. It should be obvious by now that to properly expose and process film we need to know two things, the brightness level of the shadow area in the scene, and the brightness range of the entire scene. Further we know that we do this by taking exposure readings from two places and that those two places may be very small and/or quite far away.

I ask you then, using a normal meter (either hand-held or in-camera) how does one take a reading from a rock face that is 500 metres away across a swamp? A bit far fetched? Not really. The exposure for *Hidden Valley* was based on the dark shadow area of the cliff face in the centre of the photo. I could not approach the cliff and, even with 35mm equipment, I don't carry lenses long enough to single out such a small area. With large format I wouldn't have a chance. Consider the roof of the boatshed in *Moggy's*. How would you meter that?

Another problem with in-camera meters is that once the camera is placed on a tripod—you do use a tripod, don't you?—and lined up on your photo, you have to remove it to take a meter reading. You could of course take the reading first, but what if the light changes?

I'm not suggesting that you can't do well without a spot meter, just that it's much less convenient, and you will be relying, to a large extent, on guesswork. So if you can, buy a spot meter.

Grain

Unless you are using grain as a creative element in your photos it is usually considered objectionable in a print. With smaller cameras the problem is exacerbated because of the greater magnification required when printing. In the section on calibration I suggested rating the film at 50% of the speed suggested by the manufacturer, and developing for 70% of their recommended time. This is the same as saying "Over-expose and under-develop". In general this is good advice, regardless of any system you may use. If you over-expose and under-develop your negatives they will have more detail in the shadows and less density in the mid-tones and highlights. This in turn will reduce the grain in the negative, and of course in any print made from that negative.

Roll film and contrast control

I have to admit that the processes described here are more useful to those using sheet film. However I realise that most photographers use roll film. As a roll film user you should at least be aware of the relationship between shadows and highlights and how they are affected by exposure and developing. If you gain nothing but properly *exposed* negatives, then you're ahead of the pack. If you can also control the contrast of your negatives then you are streets ahead. And the good news is you can, even if you are not using sheet film. There are methods a roll film user can employ to approach the control enjoyed by a sheet film user. There are even whole books on the subject, but I'll just briefly cover four methods.

Short rolls. For 35mm users, try using short rolls of 12 exposures if you can buy them in your favourite film, or maybe roll your own from a bulk roll. Medium format users will already be using rolls of 16 or less exposures. With short rolls you will probably use most of the roll on one subject, or at least in one area that has the same brightness range. When you finish the film, mark it as described earlier and process accordingly.

If you haven't finished a film and the light changes or you move to a new location with a different brightness range, pull the film out and start a new one. You may waste a few frames, but look at it this way—if you process a film with negatives of scenes that have vastly different brightness ranges, you will effectively waste much of that film anyway because at least some of the frames will receive inappropriate development. I suppose you could reload the film, wind it to the last exposed frame (plus 1 to be on the safe side), and continue. Personally I feel this would not be worth the effort and may in fact damage the film. Every time the film passes through the canister's felt light trap there is a chance of scratches occurring from dust on the felt, especially when you are in the bush. Once the film is rewound I think it's better to leave it there and start a new roll.

Multiple bodies/backs. You can use multiple cameras or, with most medium format cameras, multiple film backs. Simply label each as being for low, normal or high brightness range subjects and swap as required. Of course there is a quite a severe weight penalty with this method.

Pre-exposure. It is possible to reduce the contrast of a single negative by pre-exposing it to some non-image light. Basically this is done by photographing an

Over-expose and under-develop. In general this is good advice…

object of even tone (and well out of focus) and under-exposing it by three stops, then double exposing your image onto the same frame.

Films have a threshold below which any light falling on the film does not show as density after processing. Pre-exposure raises the film to just below this threshold. When you follow up with light from your subject the film emulsion is ready to rock-n-roll and any light from the subject will manifest itself as density in the developed negative. As pre-exposure affects the shadow areas a lot more than the highlights the end result is a reduction in contrast.

Selenium toning. Individual negatives, or the whole roll for that matter, can have their contrast increased after processing with selenium toning. Selenium increases the density of exposed areas proportionally, thus the density of the highlights increases much more than that of the shadows, which is another way of saying that the contrast has increased.

Of all the above methods, I think that using short rolls is the most practical and the easiest to implement. With short rolls holding exposures of subjects with the same brightness range, you have almost as much control as a sheet film user.

That's my system. As I said, it is based on Zone System techniques but it is not the Zone System. I fully admit that correct usage of the Zone System should produce more consistent negatives than those produced by my system, however I feel that my negatives are well within the tolerances required to produce high quality prints. My goal is to produce negatives that print on grade 1, 2 or 3 with the occasional negative of a scene with an unusually low or high brightness range requiring a paper grade outside this range. I achieve this by using the technique described above, however I have deliberately been a little vague in the area of actual times used etc. This is because there are so many variables that you really have to test for yourself, using your own equipment; water, agitation action, enlarger, paper etc.

As an example let me make a comparison between myself and John Sexton. For scenes with a normal brightness range I develop T-MAX 100 in T-MAX RS developer. So does he; but that's where the similarity ends. I rate the film at 50ISO, he rates it at 80ISO, I develop for six minutes in straight developer with intermittent agitation. He develops for 10½ minutes in diluted developer with continuous agitation. In short, there is no 'right' way; there is only the way that is right for you and your situation.