Agfa Multicontrast Classic • Photographers' Guide to Films

DARKROOM & CREATIVE CAMERA TECHNIQUES

MAY/JUN 1995
VOL 16, NO 3

EDWARD STEICHEN
by Arnold Crane

THE MAGAZINE FOR SERIOUS PHOTOGRAPHERS.

$4.50 U.S.A.
$6.00 CANADA

A Light Meter Practicum

PART II: TESTING YOUR SPOT METER FOR FLARE

By William Schneider

One day while metering light at a construction scene, I pointed my Soligor spotmeter at an inky black attic opening in an old house and took a reading. I was surprised at how much light the meter registered. To check, I then read the gray bark of a nearby tree in open shade, and, to my surprise, it registered the same amount of light as the black opening into the attic. To the eye, there was a huge difference between the jet black interior of the open attic window and the richly textured tree trunk in open shade, but the meter didn't see it at all. This was a serious discrepancy! While pondering how this could happen I thought of the bright skylight just outside of the meter's field of view. As an experiment, I shaded the light meter's lens from the sky with my hand for another reading. The light reading of the dark attic immediately dropped to a more reasonable level.

This event taught me an important lesson about how flare light can affect optical systems. We have all heard that using a lens hood on the camera lens increases shadow contrast by reducing flare, but who would have guessed it is equally important for light meters as well? At any rate, I went home and painted a cardboard toilet paper tube flat black for use as a snoot on the light meter. I taped it on the outside with black electrical tape to hide its humble origin, and used the same tape to attach it to the front of the light meter's lens. While it was ugly, awkward, and looked like a weapon from a science fiction movie, it was certainly a functional improvement over the original design. I just didn't take it near motorcades or visiting politicians.

In the meantime, I started doing some experiments with the meter that would characterize how it reacted when reading dim subjects surrounded by bright objects. What I found concerning that light meter was distressing—flare light errors became even worse when something bright was in the meter's field of view. That meant that I would have to walk up close to a dark object to eliminate the brighter surrounding objects to get an accurate reading. Of course, the purpose of a spot meter is to take a reading without having to get close, so I replaced that meter with one that tested better for flare control.

The Flare Light Torture Test Machine

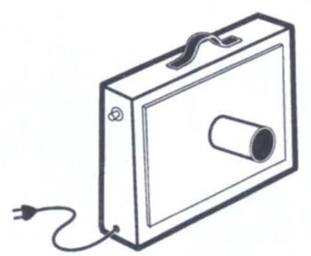

Figure 1. Perform the flare light torture test using a light table and a can painted flat black inside. Perfectionists can line the inside and bottom of the can with black pile fabric.

I made a simple test apparatus to check how much flare a meter can handle. It consists of a light table standing on its side, a tall, narrow can painted flat black inside, and some tacky clay to temporarily hold things in place. An orange juice can, open on only one end, works well for the dark target. Figure 1 shows the arrangement I used for testing flare.

The light table provides an even area of fairly bright light, while the interior of the can becomes a very dark target. The difference in intensity between the light from the table's surface and the interior of the can is extreme—more so than most photographic subjects you encounter in normal situations. It is a true flare light torture test for any optical system! If a light meter can handle this fairly well, you can use it for everyday metering situations with little fear of flare-induced errors.

Testing your Meter

To test your meter, place the light table in a darkened room, well away from a wall that can reflect light back into the open end of the can. Attach the can using tape or putty-like temporary adhesive so that the open end faces out. Turn on the light in the light table, and stand facing the inside of the can. Move close enough so that the black circle of the can's interior is about twice the diameter of the meter's sensor circle (Figure 2). (The test is already severe enough without exploring how closely the spotmeter's marked circle matches the actual sensor area). Move the sensor spot around a bit to see where the light starts to affect the reading. Once you have it sighted inside the can, take a meter reading. Then meter the adjacent light table surface. The difference in stops between the table's light and the dark interior of the can is the contrast limit for your meter.

The dimly-lit can interior is probably below the threshold of your meter's sensitivity so the reading it registers will be almost entirely from flare light. Making the can interior darker would not make any difference in the meter reading because the meter is reading just the flare light that is scattering around inside your meter, not the minuscule amount of light coming from inside the can itself. Prove it to yourself by positioning the meter very close to the can and eliminate much of the surrounding bright field. The reading should go down (in my case the light from inside the can is below the sensitivity of the meter, indicating light too dim to measure) proving that the light it sensed was indeed light scattered from the adjacent bright field.

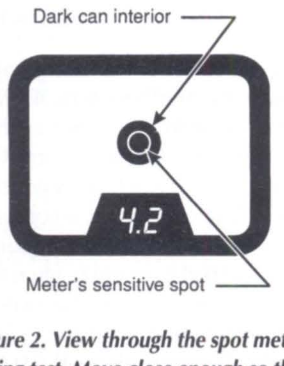

Figure 2. View through the spot meter during test. Move close enough so that the metering spot is about half the diameter of the can's dark interior.

Table I. Results of the flare light test using three different meters. A larger difference between the background light reading and the can's interior reading indicates better flare control.

	Minolta Spotmeter F	*Zone VI modified Pentax Spotmeter*	*Zone VI modified Soligor Spotmeter*
Background light, EV	11.9	11.3	11.8
Can Interior, EV	3.8	5.7	6.8
Difference, stops	8.1	5.6	5.0

My Results

My Minolta Spotmeter F shows an 8-stop difference between the illuminated background and the dark opening of the can while my older modified Soligor shows only a 5-stop difference between the two. A friend's borrowed Zone VI modified Pentax fell between the Minolta and the Soligor in flare control. (See Table 1). I regard the Minolta meter as having good flare control compared to the other meters I have owned. Eight years' experience has proven that it produces consistently good exposures when metering shadows in contrasty situations, like a wall of icicles against a dark stone cliff. However, the test shows that even the Minolta meter would be error-prone when reading the light coming from a Zone 1 area if that area is adjacent to a Zone IX object (8 stops difference). In a situation like that, I would have to walk forward to eliminate the bright object from the meter's field of view in order to get an accurate reading.

My Soligor meter is much more limited, and a more typical scene having adjacent objects of Zone III (or darker) and Zone VIII could potentially cause metering problems. The Pentax is not as good as the Minolta, but is better than the Soligor.

Because the meters see flare light in dark areas that are adjacent to light areas, they indicate more light than is actually there. This affects Zone system photographers who base exposure on shadow readings. The artificially high shadow readings cause underexposed, thin shadows in the negative, and, during film testing, may cause us to settle on an E.I. that is artificially low. Underexposure is a serious problem that can't be fixed in printing. Some photographers claim that they get better results when they base their exposures on highlights rather than shadows, and perhaps that is true when flare-prone spotmeters are used. Because flare affects only darker shadow areas and not highlights, readings of highlight areas are more likely to be accurate.

I prefer to use shadow readings to determine exposure settings, and read the highlights to determine developing time. This method requires either a meter that is highly corrected for flare, or intelligent use of a meter that isn t.

Off-Axis Flare

Off-axis light that illuminates the front lens of a spot meter affects readings too, but can be controlled easily. You can simply fit a snoot to the front of the lens to block the offending light rays. Be sure it isn't too long, causing vignetting of the meter's field of view. A good lens hood attached to the front of your light meter also works, especially if you can find one deep enough to be effective. The black painted toilet paper tube that I mentioned earlier makes an inexpensive snoot to block unwanted light.

If you want to explore how much your meter is affected by off-axis light, you can take some readings in a darkened room, using a bare light bulb outside the meter's viewfinder but shining on the front surface of the lens. Take several readings, shading the light from the lens with your hand, and compare them to readings made with the light unshaded.

At any rate, this kind of flare light is easy to control with a deep lens hood or snoot over the lens front, so don't worry too much about how your meter performs on this test. Just be aware that you have to fix it.

I solved two problems simultaneously when I adapted the front lens tube assembly from an old Soligor to the front of my Minolta Spotmeter F. First, the hollowed-out tube from the Soligor is several inches long and provides very good shading from off-axis light. Second, it has a set of rotating dials that makes working with the Zone system much easier than using the digital readout alone. Figure 3 shows a photograph of the meter with the Soligor front tube in place. I had to take the parts to a machinist to make them fit the Minolta meter, but the investment was a small one for such a useful improvement.

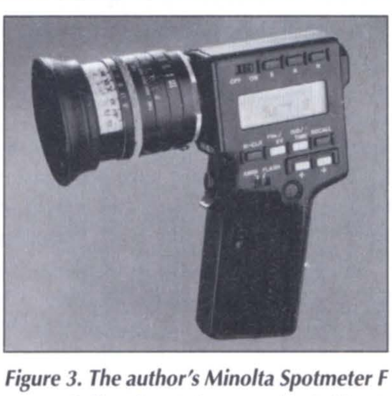

Figure 3. The author's Minolta Spotmeter F uses a Soligor lens tube assembly (without the lens) to block off-axis flare light. It also provides useful zone system dials.

Conclusion

All optical systems are subject to the effects of flare light, and light meters are no exception. My tests show that spotmeters vary widely in their control of flare-light-induced errors. Off-axis flare light, although a problem, is the easiest to control with a few simple modifications—snoots, deep lens hoods, etc. Flare coming from light within the meter's field of view is much harder to control, as its severity is a function of the manufacturer's design. This kind of flare light is difficult or impossible to fix easily, so the photographer must learn to use his or her particular spotmeter intelligently in difficult situations. Using the flare light test apparatus described in this article will give you an idea how your meter responds to in-viewfinder flare light, and prepare you for making intelligent judgments in practice.

Coming Up

My modified Minolta Spotmeter F won the flare light test this month, but next issue's article shows it to be overly sensitive to infrared light. The article will describe a test for judging meter sensitivity to infrared light, and compare several different light meters. In the meantime, try pointing your TV or stereo infrared remote control into the sensor of your light meter, and take some readings. Surprised? Stay tuned! ■

Athens, Ohio resident William Schneider teaches photography and desktop publishing classes in Ohio University's School of Visual Communication. Before obtaining his MFA degree in photography, Schneider worked 7 years as an engineer in the research labs of Battelle Memorial Institute in Columbus, Ohio. He is an active participant in the emerging computer graphics field, but still enjoys quality time in his traditional darkroom.

For more on the basics of flare, see Ralph Steiner's "Flare: Angel or Devil?" in the March/April 1995 issue.