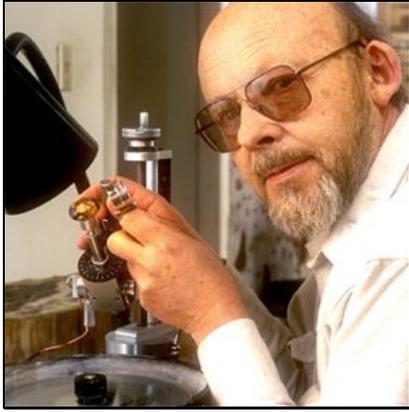


PHOTOGRAPHY OF FACETED GEMSTONES



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Gemstones are not particularly difficult to photograph once some basic problems are dealt with. They are generally small with incredible detail. They have highly reflective surfaces that can reflect light back into the camera lens overexposing the facet and frequently burn into adjacent facets as well. Gemstones also have internal brilliance that act in much the same way as the surface reflections. The technique described is easy to set up, economical and versatile. Some alternate suggestions will be offered at the end.

The photography of mounted gemstones requires different backgrounds and more and larger lighting and will not be covered.

FILM OR DIGITAL: I am a purist and prefer film (I find Fuji Provia works best for accurate color) probably because I have all this perfectly good Nikon equipment. I then have them scanned to a high resolution CD (I usually scan into a TIFF format at about 25 MB file size) that I can use for high quality computer prints or convert to a JPEG file for use on the web. (JPEG is a compression file and is not conducive for the initial photo edit). I can also enlarge the image from the film to 30 x 40 as display prints without loss of detail that only the very top end digital cameras can approach. A digital camera with at least 4 Mega pixels will do adequately if you are producing images for the web or acceptable quality computer prints up to about 8 x 10.

Many digital cameras have features that increase the magnification by 2X or 3X. These features are designed primarily for telephoto work and not necessarily for extreme close-up work. A great many of the digital cameras that have these features reduce the resolution by the factor of the magnification. In effect they focus the image on $\frac{1}{2}$ or $\frac{1}{3}$ of the CCD's built into the camera. This is not very helpful in capturing detail in a gemstone.



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LENSES AND WORKING DISTANCE: One needs to be able to focus on an object from about 6 mm in diameter on up, obtain an approximately actual size image on the film or CCD, working from 6 to 8 inches away. Optically the rule is that the longer the focal length of the lens the narrower the angle of view; hence the greater the working distance. I usually use a 105mm Macro lens to obtain the image size and working distance. I could achieve the same thing using a 55 mm lens but the working distance would be cut to about three inches. This does not allow much room for lights. This is especially true of many of the digital cameras that allow close focusing down to an inch or two. You will have the image size but little room to work the lights. Some digital cameras allow interchangeable lenses and a few even allow the use of regular film camera lenses.

LIGHTING: If you are using film you will need two medium power (80-120 guide number) electronic flash units that are dedicated to the camera in order to photograph on automatic. For digital you will need a couple of lights similar to the light that comes with the Ultra Tec machine. I use two antique gooseneck lights with 100-watt bulbs.

If you take a stone outside on a bright sunny day the stone will have a tremendous amount of sparkles making it difficult to see the individual facets. The same stone on a cloudy day or in the shade will show the true color of the stone and each individual facet. There are several soft boxes, light domes, etc. available that will achieve this soft lighting. I simply use a large, about 12 Inch-diameter, light weight, translucent (not opaque) white (not tinted) plastic mixing bowl that I picked up for a couple of bucks at a discount store. If the bowl you find is too transparent you can scuff it up with a little sandpaper and give it a light coat of white spray on enamel. Then cut a hole in the bottom that just fits the lens. The flexible plastic should grip the lens so that it does not flop around.

I usually use two lights on the outside of the bowl. By moving the lights toward the camera lens or closer to the edge of the bowl as well as moving them very close to the bowl or a few inches away will control the reflections on and within the stone. When the lights are very close to the bowl they will be "hotter", less diffused, than if they are moved further away. Some stones especially those with a low refractive index, are very dark or long and narrow may need a third (or fourth) light. Usually this light will need to be like a spot light placed behind the stone as if you are examining rough. Make sure this light does not reflect off the background into the lens, shine directly into the lens or create hot spots on the crown. Small hand mirrors stuck in modeling clay at an angle behind the stone can also create this backlight.

PESKY REFLECTIONS; Occasionally there will be a reflection, bright hot spot, that one finds distracting and just doesn't seem to go away no matter where you move the lights. Are you a perfectionist? First examine the room. Is it coming from a ceiling light somewhere? A window where the curtains are left open? Is it a reflection off the wall or a white T-shirt? Or the lighting set up itself? It may be necessary to build a black mask. Use a piece of matt-black poster board or construction paper perhaps 1-2 inches wide



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and 4-6 inches tall folded to stand up. Then move this mask around between the stone and the bowl until the reflection disappears.

The worst reflection is from the table of the stone. It is also the easiest to fix. It can be so bright that it overpowers the entire stone. By turning the stone very slightly the reflection from the dome will be eliminated. With a little practice the reflection can be controlled leaving a very slight "highlight" on a portion of the table. This is a very nice effect as it adds a little visual depth to the stone. It is also a nice one on the star facets if it is not too bright.

A polarizing filter can be used that will also control the reflections. Some digital cameras will not allow the use of a polarizing filter.

Did I forget to mention that taking a "perfect" picture could take as much time as cutting the stone in the first place?

SET UP: You will be working near the edge of a table or desk with the camera on a tripod shooting down at about 45°. The plane of the table of the stone should end up being about parallel to the plane of the film or CCD with the culet centered. The stone is resting on a pavilion facet so that to make the plane of the table and film plane exactly parallel the tilt of the camera should be the same as the cutting angle of the pavilion facet on which the stone lies. But, putting an angle indicator on the camera is a little extreme!! It's ok to tilt the stone if you want a diagonal view. If you tilt the stone too much the stone will "window" as you will lose the internal brilliance causing a portion to go very dark or light. As the camera is moved back and forth or up and down to obtain the magnification you need, the parallelism will change so the camera will need to be tilted a little more to line up with the table and center the culet. The image should be as large as the camera will allow. It's assumed you will crop the final image so try to obtain as large an image as possible. Everyone has seen images of stones that have much more background than stone.

I clean the stone thoroughly using alcohol and a lint free cloth and then give it a shot of canned air just before setting it up. Be careful you don't blow the stone across the room. Some stones like tourmaline attract dust from the air very quickly and anti-static sprays or brushes don't help a great deal. You need to work as quickly as possible. The few dust spots that show up in the photo can be eliminated with the most basic photo editing software but not very easily if you have dust spots on film going directly to a print.

BACKGROUNDS: You have also seen images of stones on a cloth background that look like stones on a cloth background (Not very "arty"). The background should be totally non-distracting. The color should be near the same value, light and dark, as the stone so that it is not over or under exposed. The color depends on your mood more than anything else. It can be a complementary color or an adjacent hue. I prefer the color to be less saturated, grayer, than the stone. Plain neutral gray is fine. I have a whole file

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of letter size printer samples that work for me. When I need a color I don't have I print a color from the computer on heavier photo paper.

Backgrounds such as crystal clusters, ceramic tile, rock tile, textured rubber mat, vinyl, suede, textured paper, I generally find a little too busy for single stones. These can be used more creatively with mounted stones.

BASICS: I place a sheet of non-glare glass (about 10 x 12") about an inch above the table on 1 x 2's. The background paper can be slipped underneath and changed as I normally shoot batches of stones at a time. The paper is far enough away from the stone so that it is out of focus. The non-glare glass will generally give only a very faint reflection of the stone if any at all and only a weak hint of the very slight texture of the non-glare glass. Using a polarizer filter can control the reflection. The glass may also pick up a reflection from whatever is directly behind the set. White walls are great; white in bright pink housecoat may not be.

If you like reflections a sheet of plate glass can be used. It will definitely reflect whatever is behind the set. Both surfaces of the glass will reflect the stone so it is actually a double reflection that varies by the thickness of the glass.

Mirrors can be either plain or tinted. The reflection of the stone will be separated from the actual stone by the thickness of the mirror. Very thin mirrors work best. In this case the background color must be placed vertically a few inches behind the stone.

SPOTLIGHT EFFECT: Trickier. When I print a colored background I leave an unprinted white (or very slightly tinted) shape, usually round or slightly oval, about ½ to 1¼ inches in diameter about a third of the way down. White labels will also work. This blank spot is usually about the size of the stone. When it is out of focus it will appear slightly larger than it is. Place this under the glass so that the stone appears over the "spot" while looking through the camera lens. The distance below the glass can control the sharpness of the edge of this "spotlight" and by the aperture control on the camera (if your camera allows some manual control) that controls depth of field.

More Tricky: So you like the reflection of the stone AND the spotlight effect. Use a mirror with the background containing the blank spot. Set the background vertically behind the stone. Then move it forward and back, up and down, and left to right until the "spotlight" is where you want it in relation to the stone and it has the sharpness you desire. If this background spot is precisely the same distance from the stone as the film plane of the camera it will be in sharp focus. Sound easy? In moving the spot you will quickly discover that it moves upside down and backwards when looking through the camera.

MULTIPLE GEMSTONES: In order to keep all the stones in focus one is required to shoot straight down from a tripod or copy stand type of arrangement. The background must have a non-reflective surface so the light will not bounce back into the lens. I use moderately heavy colored paper. It can have a slight texture. Arrange the stones table

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down on the backside of the paper and mark the position of the culets. Use a paper punch for the culet to project slightly through the paper and hold the stone upright. Then turn the paper over and set the stones. Set up the paper on 1 x 2's to allow the stones culet to project through the paper. The 1 x 2's should be fairly close to the stones so that the paper doesn't sag. The hole should be large enough so that the stone sits level without tipping over but not project beyond the girdle and be seen through the camera. Some of the holes may need to be larger so that all the tables are approximately in the same plane so they will all be in focus. Observe the reflection of the bowl light on the table of the stones and tweak the tilt of each stone so the reflection (or lack of a reflection) is the same on all the stones. At this point a problem may need to be eliminated. The reflection on the table may still be too intense. I have a mask made out of black foam-core about the size of a coffee can lid with a hole for the camera lens. This mask slipped on the lens between the dome and the stone eliminates the light coming through the bowl near the lens and takes care of the reflection on the table.

With a little practice single gemstones can be photographed in about 15 minutes per stone using a basic set up.

Some digital cameras have very short lenses and it may be difficult to attach the bowl securely directly to the camera. There are some choices. 1. Place the stone on plain paper with a hole for the culet. Place of bowl over the stone and shoot through the hole in the center of the bowl. This works fine but limits creativity. 2. With a little ingenuity you can build a bracket that mounts to the tripod head and holds the bowl fixed in position just in front of the camera lens so that as the camera is tilted the bowl is too. You may need a slightly smaller diameter bowl as the larger one could contact the tripod shaft hindering downward tilt of the camera. 3. In a separate bowl, cut a hole about two thirds of way up the side for the lens to shoot through. The stone can be on glass or a mirror but as the entire bowl covers the stone the background will be white. To use colored backgrounds remove the back third of the bowl and stand the colored background against the bowl section. This works very well and the lighting is very good. But it is unwieldy if you have fat hands as one must reach inside to tweak the position of the stone. 4. Quick set up. Construct a cylinder out of white butcher or freezer paper about 10 inches in diameter. This can be taped to the glass. Cut a hole on the side for the lens about the some distance up as the stone (when in focus) is from the edge of the lens. Slip the colored background in the back or leave the back open. This is not quite as efficient as the bowl but works very well for stones that have about the same length and width.

If you have any questions or comments e-mail me at absjcs@msn.com

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“Photos Of Stones All Cut On My Ultra Tec”



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Ametrine, Bolivia, 28.36 ct.
Freeform, Barion style. on
plate glass using polarizer



Sapphire, Tanzania,
unheated, 1.92 ct. on
gold tinted mirror



Sapphire, Tanzania,
heated, Freeform 2.69 ct.
on mirror, blue vertical
background with “spot”



Malaya Garnet, Tanzania,
Freeform,
5.89ct on non-glare glass
“spot” underneath



Kunzite, Afghanistan,
18.24 ct. on plate glass
no “spot”. Reflection
blurred with computer



Tourmaline, Afghanistan.
3.36 ct. Dichroism ct,
Mirror with small vertical
“spot”