



MANUAL FOR
SCIENCE & MECHANICS'
SUPERSENSITIVE
PHOTO METER-DARKROOM

MODEL A-3

BY WILFRED M. BROWN

**INSTRUCTION AND OPERATING MANUAL
FOR SCIENCE & MECHANICS' MODEL A-3
PHOTO METER—THE DARKROOM METER**



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Photos by William G. Weiland

INTRODUCTION Your Science & Mechanics Model A-3 Super-sensitive Photo Meter was named the "Darkroom Meter" because it is widely used for reading easel exposures for enlarging. But it is just as useful for studio photography, copy work and portraiture.

It is used with still, miniature, and movie cameras. The A-3 Photo Meter is excellent for ground-glass exposure readings with microscopes and telescopes and can even be set up for use as a practical densitometer. One of the many new applications for this instrument in scientific photography is exposure determination for holography.

This most versatile Photo Meter gives experimenters, amateur and professional photographers and scientists, the answers to numerous light-measuring problems. The Model A-3 Photo Meter is usually supplied with its 3-foot-long Standard probe, exposure calculator and attractive carrying case.

Accessories for Your Model A-3 Photo Meter Your S & M Model A-3 Photo Meter is designed to use plug-in probes. Probes of

No. 2



Model A-3
Photo Meter
with accessories

various lengths, as may be required for certain research work, can be supplied upon request at additional cost.

An Easel probe, a Mini-probe and a Densitometer probe, each 3 feet in length, are available as accessories at \$7.50 each. A microscope adapter for use with the Standard probe is available for \$5.00.

Zeroing Your A-3 Photo Meter On receipt of your meter, you should inspect it thoroughly and note if the needle points to zero. If the needle points to the left or right of zero, you can zero it quite easily. To do so, place your meter on a level table and make certain that the Range switch and Paper Speed or Sensitivity control are in "off" positions. Use a small screwdriver, very gently, to adjust the screw at the bottom edge of the meter's face, and bring the needle exactly to the zero mark.

TESTING YOUR A-3 PHOTO METER

Battery Test Information The red-and-green arc on the scale of your meter is for battery test purpose only. When the pointer of the meter falls in the green section, the Mallory RM 630, 1.4 volt mercury cells that power the unit are good. When the pointer falls in the red section, the mercury cells must be replaced. For best accuracy, always replace weak mercury cells with the same kind of Mallory mercury cells, that are used in your meter.

Making a Battery Test To make a battery test, press lightly on the push-button switch and hold for a few seconds while you observe the test reading. Your meter should register approximately 40. Make a note of this initial reading for future reference. This is the reading you should obtain from new and good RM 630 mercury cells used as the power supply in this instrument. This reading indicates that your meter should function very well.

You can make a battery test with the probe plugged in or without the probe. In either case, the same test reading should be obtained. We recommend that you make a battery test whenever you are going to use your meter.

Testing Its Functioning Your A-3 meter is easy to use once you become familiar with it. First make certain that the Range switch and the Sensitivity control are in "off" positions. Now plug in the Standard probe and remove the clear plastic cap that protects the photocell. This plastic cap should never be used when taking reflected-light readings.

Point the photocell of the probe toward a lighted 75-watt lamp and put the Range switch on Range one. With the probe about a foot away from the bare bulb, you should get approximately a half-scale reading. Move the probe closer to the lamp and the needle should swing higher up scale, indicating that the photocell is picking up more light. Move away from the lamp and the needle immediately swings down scale, indicating that the photocell is picking up less light.

Place the probe so that you can get a reading of about 5 on Range 1 and then switch to Range 2. The needle should swing up scale to about 50 or full scale. Try out a few readings on Ranges 1 and 2 and make a note of them for later reference. Carefully check out Ranges 3 and 4 to observe the increase in sensitivity. The meter is so sensitive that on Range 4 it will even read the light that penetrates your thumb! Try it and verify for yourself. In a darkened room, on Range 4 you should get a quarter to half-scale reading at about 10 feet away from a common household candle or match.

Now check your Sensitivity control. When it is clicked into the "off" position, it has no effect on the meter. Turn on the control and rotate it clockwise to a setting between 0 and 1 on its dial. Observe the meter readings with this setting on Ranges 1 and 2. Compare them against readings taken previously on the same Ranges when this control was in the "off" position. The Sensitivity control should affect the meter readings on all Ranges, enabling you to cause the needle to rest at any desired point on the scale.

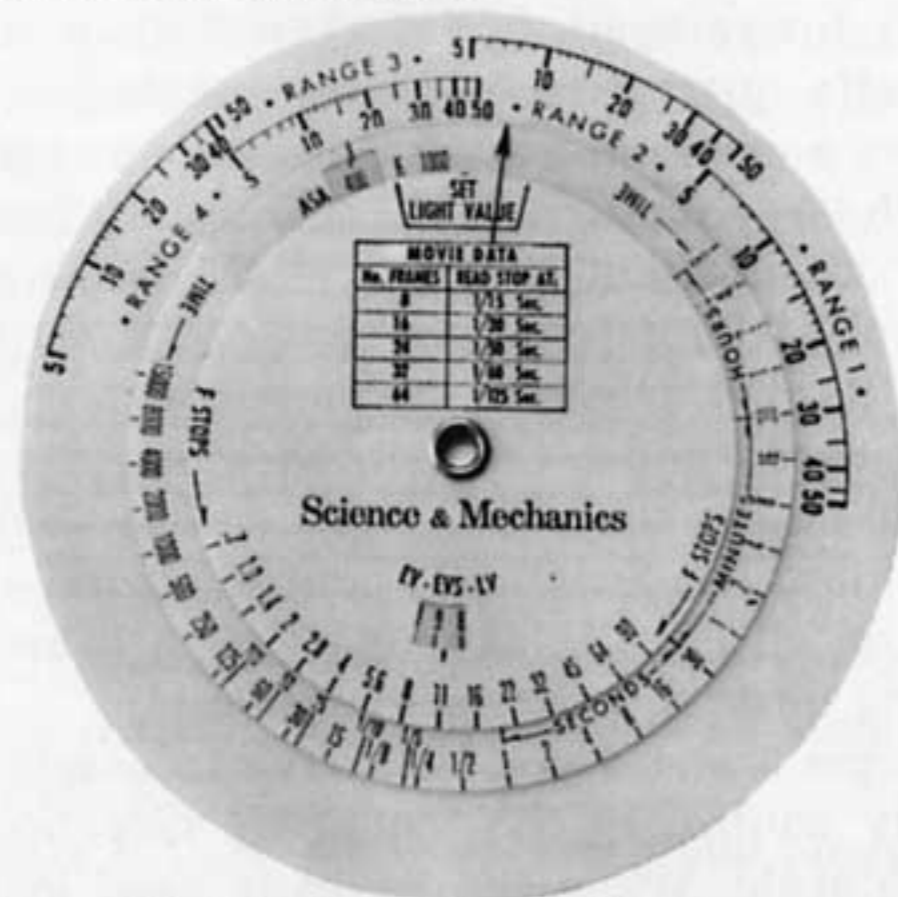
On Ranges 3 and 4 you will have to continue to turn the Sensitivity control in the clockwise direction to keep the needle on scale. When the meter is used in the darkroom, the Sensitivity control should be turned on before the Range switch to prevent the needle from "banging" off scale.

On turning this control "all the way" in the clockwise direction, the needle should dip to zero. Now first turn the Range switch off, and then the Sensitivity control.

Finally, put on the toggle switch and check out the two dial lamps inside the meter. Make certain that this switch is always in the "off" position when your meter is not in dark-room use. Now put aside your meter until you are ready to use it for your work. The information supplied above is to get you acquainted with your Model A-3 meter. It is not presented for you to evaluate the accuracy of the instrument at this time. Rather, it is to show that the meter functions properly when you receive it. You will be able to determine the accuracy of your meter when you put it to the test in real photographic work.

Checking Your Exposure Calculator Your exposure calculator has four Ranges, EV-EVS-LV settings, and is calibrated for reflected light. It gives ASA speeds from 3 to 25,000, f-stops from .7 to 90 and exposure times from 1/15,000 second to 8 hours. It is calibrated in our laboratory for use with the Standard probe of the Photo Meter.

No. 3



You will notice a "light-value" line with an arrow on the top dial. This "light-value" line must be positioned correctly to

determine accurate exposures. Set the second dial to ASA 400 and position the EV-EVS-LV window so that the tiny guide line is midway between 16 and 17. The arrow now points to a certain number, usually from 13 to 22, on Range one of the calculator.

This number is the sensitivity value given to your Standard probe. This value should be recorded for future use. If your Standard probe becomes defective, and you would like to order an identical replacement, you will have to tell us that sensitivity value.

USING YOUR A-3 PHOTO METER

AS A LIGHT METER When using the A-3 meter as a Light Meter you should first make certain that the Paper Speed or Sensitivity control is in the "off" position. This control should never be used when using the instrument as a Light Meter. The Standard probe should be utilized for this application. This probe is designed to give you accurate readings when pointed at the area of interest or at a spot of average illumination in an outdoor scene.

Plug in the Standard probe with the plastic cap removed, and then set the Range switch to an appropriate Range depending on the amount of available light. Use the unit just like you would any commercial reflected-light meter. After taking a light reading of the subject to be photographed, use your S & M calculator to determine the correct exposure. First set the film speed rating in the ASA window, and then position the light-value line on the proper Range for the light reading recorded. Shutter speeds now appear opposite desired f-stops.

Each of the four Ranges on the exposure calculator must be used with its corresponding Range on the meter to obtain accurate exposures. Thus, a light reading taken on Range 1 of the meter must be set on Range 1 of the calculator to obtain the correct exposure. Readings taken on the other Ranges of the meter are calculated in like manner.

FOR ENLARGING EXPOSURES The method explained below is suggested as the easiest way to use your meter in the darkroom until you become familiar with it. As you get used to working with this instrument, you will be able to devise ways for finding densities and color exposures of balanced filter packs. And you will be making correct black-and-white exposures without the use of test strips.

Start out with a negative of average contrast. Set the enlarger lens at a middle f-stop opening, f/8 or f/11 on most lenses. Work at any common magnification and make a test strip by changing the *time* not the f-stop. The test strip should now be fully developed, fixed, rinsed and dried. Then under normal lighting condition, study the developed print and select the best print for highlight and shadow details.

If it becomes necessary, adjust the time and reprint to your particular taste. Be sure to run these preliminary tests with fresh developer at the recommended developing time. The developer, developing time and temperature used to obtain your best print must be recorded for future use.

From here on the exposure time that produced the best print will be your *standard* printing time for all but very exceptional negatives. You will use your Darkroom Meter to adjust the lens opening for variations in negatives.

Using the Easel Probe Do not remove the negative used for making your test strip from the enlarger and keep the lens set at the same f-stop at which your best print was made. Plug the Easel probe into the Darkroom Meter and then place the probe on the enlarger easel. Set the Sensitivity control between 9 and 10, the Range switch on position 3 or 4 and then put on the toggle switch to light up the dial of the meter. Turn on the enlarger and take off the safe light. Slide the probe on the enlarger easel until the highlights area of the projected image is on the photocell.

Without changing the position of the Easel probe, slowly turn the Sensitivity control counter-clockwise until the meter reads 25 at mid-scale or any other number you wish to use for

No. 4

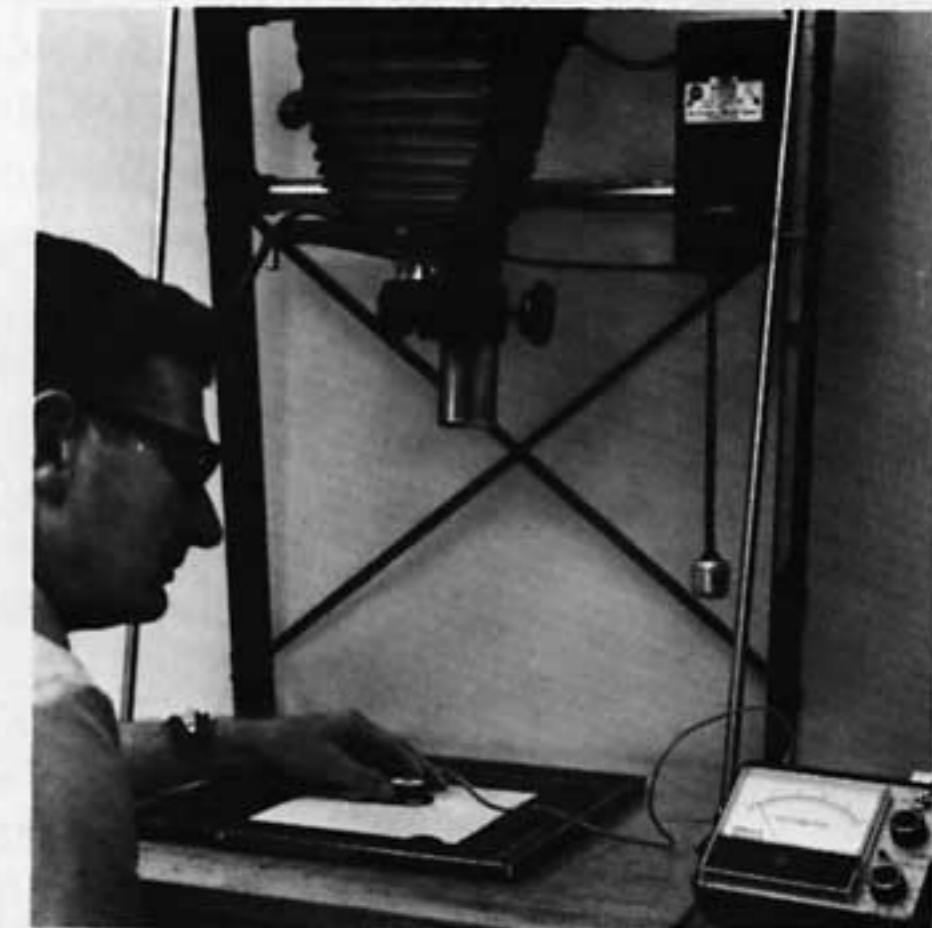


Photo Meter in darkroom action with Beseler M45 enlarger

reference. The positions of the Range switch and the Sensitivity control, exposure time, paper grade and all other pertinent information, should now be recorded for the test-strip print selected. Your Meter has now been calibrated in the darkroom. It is now ready to work for you, making perfect prints every time, regardless of the size of enlargement desired. To print photos from a different negative of the same kind of film, place the negative in the carrier of the enlarger, open the enlarger aperture to the widest, and make the necessary adjustments for the desired size of print. Set the Range switch and Sensitivity control to the same positions previously used. With the enlarger on and the safe light off, place the photocell of the Easel probe in the highlights area of the projected image. Now slowly close the enlarger aperture until the meter reads the same reference number previously chosen.

Remove the probe from the enlarger easel. Use the paper with which you calibrated your meter and make your prints. The printing paper chosen must be the same as that used in making your test prints. Also, the exposure time, developer, developing time and temperature must be the same.

Your Darkroom Meter must be calibrated for each make of

paper used. To work with other brands or grades of papers, for example, if you have been using contrast grade 2, and want to print softer negatives on grade 3 to increase print contrast, simply repeat the test procedure using the softer negative. Again, record the *standard* time and the settings of the meter.

It is a good idea to make a set of negatives of various contrasts to use permanently as masters for your Darkroom Meter. Arrange them on an illuminated panel in the darkroom along with a chart to show exposures and all other necessary information, and darkroom problems will be simplified.

For Contrast Techniques Without changing the enlarger adjustments, your S & M Darkroom Meter will automatically tell you which contrast grade of projection paper to use. Place the Easel probe in the brightest spot on your easel and record the lens opening and the reading on the meter. Then place the probe at the spot which appears darkest and adjust the lens f-stop to get the same reading. The difference in the two f-stops will immediately tell you the contrast range of your particular negative.

A high contrast negative will require a softer enlarging paper, while negatives of limited contrast will need paper number three or four as well as possibly a more contrasty developer. Once more, just as you tested to determine paper speed, you can match exact contrast measurements with your S & M Meter to the characteristics of your particular favorite enlarging paper-developer combination. Once you gain experience in making and using these simple calibrations, you can always pick the best paper for your negative after a quick contrast-span measurement with the meter.

In addition, readings from different sections of the projected image can give you immediate dodging information. Do you need darker skies? lighter shadows? Meter measurements of these sections will tell you promptly the exact lens opening for each area of the negative.

FOR STUDIO, LABORATORY AND COPY PHOTOGRAPHY
We open this section with some practical illustrations on the

use of this Photo Meter. This, we hope, will generate ideas for new applications. Photos 5 and 6 will demonstrate that the instrument can be used to make slides for medical instruction or visual aid. Photo 5 shows an x-ray plate trans-illuminated

No. 5



**Photo Meter
used in x-ray
copying
—ground glass
application**

in a typical viewing box. The portion of interest of the x-ray is duplicated in the image on the ground glass of the view camera. The required exposure is based on the reading of this area on the ground glass as determined by the meter.

The resulting negative can be made into a lantern slide and projected before a large audience of medical people. The probe of the meter was shielded from extraneous light by the focusing cloth. The f/1 stop on the S & M exposure calculator was used for determining exposure time and Royal Pan sheet film was utilized.

Photo #6 shows that the meter is used to take exposure readings from an inexpensive duplicator. This set-up may be used for making color slide duplicates, B & W negatives and B & W slides. The camera is an Exakta VX fitted with a mag-

No. 6

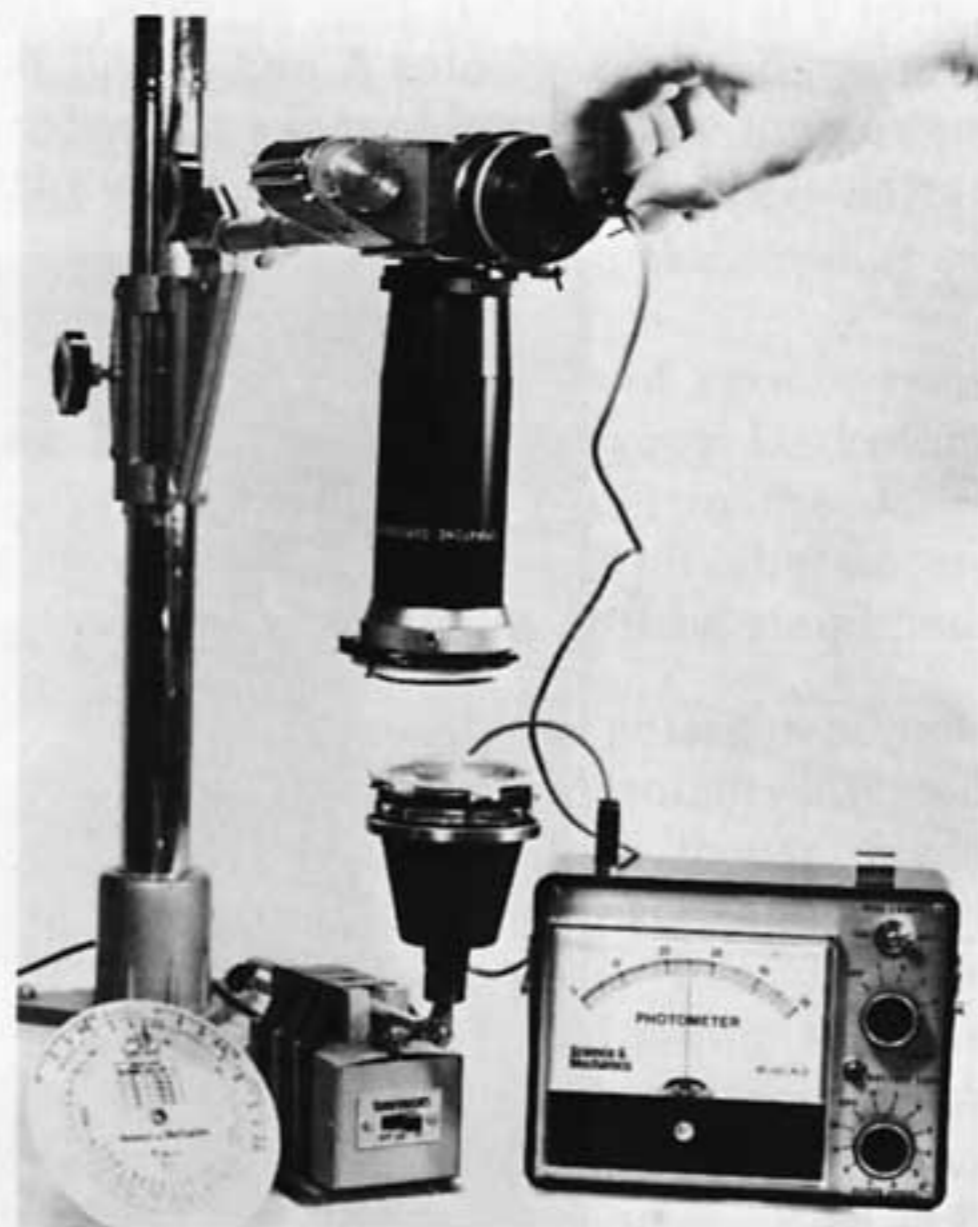


Photo Meter utilized in slide duplication

near finder and an improvised light trap to exclude extraneous light. The duplicator is a Spiratone Dupliscopes and the illuminator is a 6 volt Tensor lamp which has favorable color temperature for Kodachrome A Professional film.

Photo #7 illustrates the use of the Photo Meter with its Standard probe in obtaining exposure readings in photomicrography. The Exakta camera is equipped with an Ihagee magnear finder with top lens shielded by an improvised light trap. Between the camera and the microscope there is a Spiratone Macrobel bellows for controlling image size, and there is an Ihagee Model II microscope adapter between the bellows and a Spencer medical microscope.

Photo #8 shows the use of the A-3 meter in table top, close-up photomacrography. The Mini-probe is used here to measure the field visible in the prism eyepiece. Of course, a suitable dark cloth or other shield must be utilized to keep out stray light. The Exakta camera is fitted with a Spiratone

Macrobel bellows and a normal 50mm Zeiss Tessar lens.

This kind of work is simplified when you take advantage of the meter's sensitivity. Ordinarily, in copy photography, the cameraman is plagued with a variety of calculations he

No. 7

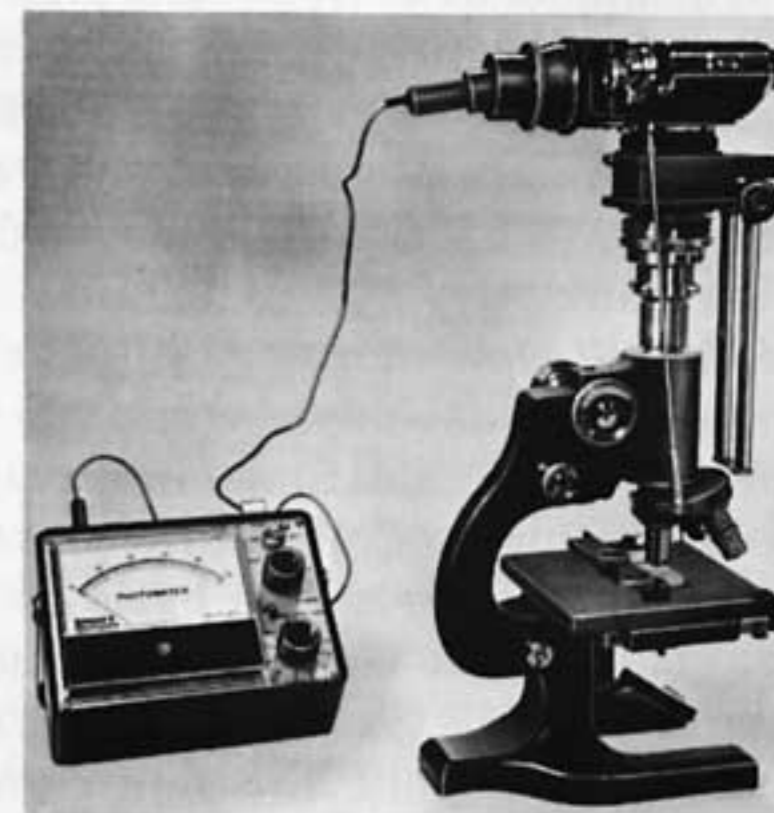
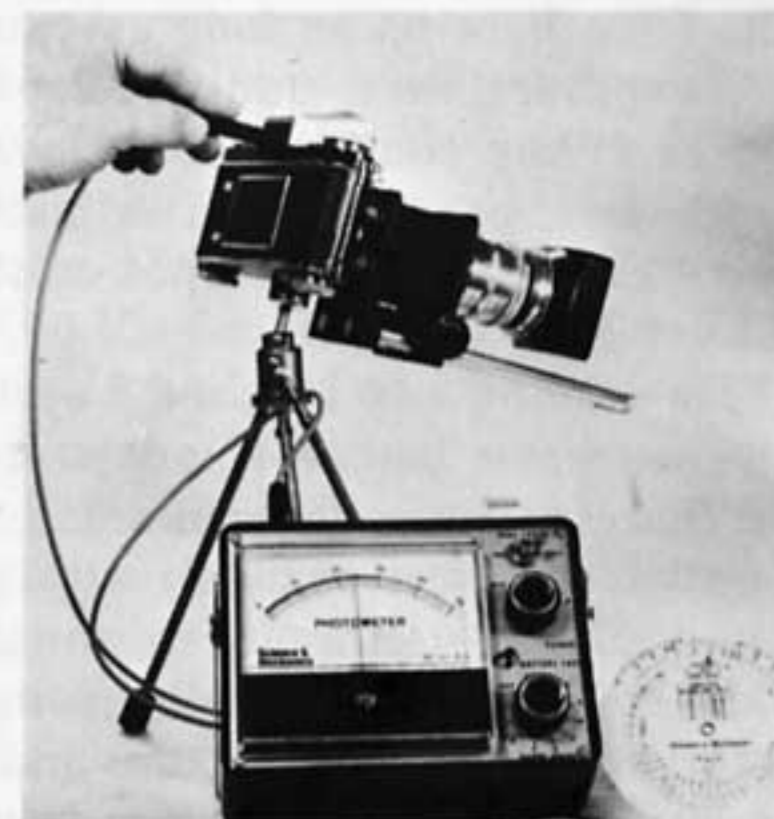


Photo Meter used in photomicrography

must make whenever he changes size of image, bellows extension or lens. When you are shooting at distances greater than 2 ft. from the subject, the problem can usually be solved

No. 8



Close-up and photomacrography with the Photo Meter

by means of a bellows extension scale. But f-stops are not accurately calibrated on all lenses, so you may find close-up

formulas do not work out.

With the Supersensitive Darkroom Meter, these and many other variables are handled by Ground Glass technique in one simple reading, if you take time to set up a test exposure. Begin with a subject of average size. Light it up as usual and shoot a series of exposures. Make one on the "nose," one a half stop over, another a full stop over. Then shoot a series the same way under-exposing by even half stops.

Be sure to check your work and make an accurate record of the shots. During the test do not disturb the positions of the lights. Now develop the film, making sure that time, temperature, developer, etc., are all set at good average working conditions. Standardize your agitation procedure to avoid shifting contrast. Now proof the negatives and select the best exposure on the basis of tonal quality.

Go back to the camera and place either a white card, or a standard Kodak grey card in the scene right at the subject position. Now open the shutter and read the light on the ground glass with your A-3 Photo Meter. If you are working on the top end of Range 3 or 4, you will need to cover the glass with a focusing cloth to exclude stray light.

The reading you now have on the meter will produce results from here on as long as you utilize the same kind of film, exposure time, and developing procedure. Point your camera at any subject—copies, portraits, through the microscope—and, provided you adjust the diaphragm until the needle rests at the same spot on the scale of the meter, you will get good exposures.

This method can be used on view cameras, 35mm reflex cameras, press cameras and twin lens reflex cameras. You will find, however, that on some cameras, the ground glass is not exactly the same density at all points. The remedy is to mark a certain point on the ground glass for the probe of the meter and to take all readings at that particular point. For greatest accuracy, avoid working right on dead center of the glass. Select a convenient spot about half way between the center and edge of the negative.

Once the set up has been run, you can switch to other

films by translating with your S & M exposure calculator. Occasionally you will find that there is a variation in batches of film, even of one certain type. It is suggested that you follow the professionals' method by buying your film in quantities large enough to fill your needs for at least 3 months ahead. Stick to one or two basic films, and your technique will improve steadily.

Many photographers have expressed interest in reading through the lens of SLR 35mm cameras since more accuracy than is provided with built-in light meters is needed. A new accessory Mini-probe, $\frac{3}{8}$ inch in diameter, is now available for this purpose from S & M Instruments Division. This Miniature probe can be used to read through many small camera eyepieces, and, as on the Exakta ground glass finder, even smaller targets can be read. It is about half as sensitive as the average Standard probe. If your camera has a center bright spot, or a rangefinder image, you will need to experiment to find out the best way to utilize this Miniature probe with your S & M exposure calculator to obtain accurate results.

AS A PRACTICAL DENSITOMETER

On Easel Densitometry A practical and systematic method to determine the correct PAPER GRADES for darkroom printing can be developed by finding the density range of negatives with the use of the Darkroom Meter and your enlarger.

Plug in the Easel probe. Set the Sensitivity control to 7 or 8, the Range switch on position 3 and put on the toggle switch to light up the dial of your meter. Now turn on the enlarger and take off the safe light.

With an f/8 lens stop and no negative in the carrier of the enlarger, the Sensitivity control is adjusted so that the meter is balanced to 50 exactly, using your Easel probe at the EASEL with the enlarger light. Then with a negative in the carrier, two readings are taken: one reading of the DARKEST area of the negative and the other of the LIGHTEST area. And from the tabulated chart given, the correct Paper Grade is found.

Paper Grade Chart			
Darkest		Lightest	Grade
1		26-49	0
1	Section #1	16-25	1
1		10-15	2
1		7-9	3
1		4-6	4
2		31-49	1
2	Section #2	20-30	2
2		13-19	3
2		8-12	4
3		30-49	2
3	Section #3	18-29	3
3		11-17	4
4		26-49	3
4	Section #4	16-25	4

The DARKEST reading which should be taken FIRST, must fall between 0 and 5 on the meter's scale. If the darkest reading does not fall into this 1 to 4 zone, then decrease the enlarger f/stop until it does so. And afterwards, start the procedure all over, again, to find the true DARKEST and LIGHTEST readings, according to this method, as explained earlier.

This Paper Grade chart will provide a ready reference for selecting the correct paper for printing. The use of the chart will, therefore, eliminate arithmetic problems frequently associated with finding the correct paper grade. For example, once you find the darkest reading first, you will know which SECTION (1, 2, 3 or 4) of the chart to use. Then when you read the lightest area of your negative, the chart will immediately indicate the RIGHT PAPER GRADE to use for your prints.

This information was developed with the Easel probe with its full 1/2 inch diameter aperture. The chart should be checked against your particular darkroom printing assignments and should be modified if need be. But, once it is ironed out to

your satisfaction, it will prove an invaluable, quick and easy guide for accurate paper grade determination.

If you make a diaphragm with a smaller aperture to cover the Easel probe, you may have to use Range 4 of the meter and do some fascinating research to come up with an equivalent chart. Such a chart should present no difficulty to develop as long as you are willing to invest a little time to do so.

Making And Using Your S & M Densitometer The practical and inexpensive densitometer, shown below, can be utilized for determining the densities of B & W and Color negatives. It is comprised of the Darkroom Meter and a Light Source. Complete information is supplied to construct the Light Source. This simple S & M Densitometer is presented here mainly for



the beginning photographer. However, those who are advanced in photography will also find this instrument handy, with the appropriate red, green and blue filters, for determining Filter Packs for color printing.

Of course, the photographer should realize that it would take a little time, at first, to get the correct information for

such work in color photography. But once the technique is mastered, and worked out, with the aid of Kodak E-59 pamphlet on Practical Densitometry, quick, dependable and satisfying results will be obtained. And on processing your work, the color fidelity of your prints will pleasantly surprise you too!

Finding Densities Of Negatives You will find it very easy to determine the densities of negatives with your S & M Densitometer. Prepare the equipment for use. Turn on the current for the Light Source and rotate the dimmer switch for low illumination. Put the Range switch of the Darkroom Meter on Range 3 and make certain that the Sensitivity control is off. Now bring down the MOVING ARM of the Light Source over the beam of light and press down the push-button switch to get a reading on the meter. Then rotate the dimmer switch accordingly and bring the needle of the meter to 50 exactly. Release the push-button switch and MOVING ARM of the Light Source.

Now place any part of a negative over the beam of light to find its density; bring down the MOVING ARM on the nega-

DENSITY DETERMINATION CHART

Meter	Density	Meter	Density	Meter	Density	Meter	Density
1	1.69	14	.54	27	.26	40	.09
2	1.39	15	.51	28	.25	41	.08
3	1.22	16	.49	29	.23	42	.07
4	1.09	17	.46	30	.22	43	.06
5	1.00	18	.43	31	.20	44	.05
6	.91	19	.41	32	.19	45	.04
7	.85	20	.39	33	.18	46	.03
8	.79	21	.37	34	.17	47	.02
9	.74	22	.34	35	.15	48	.01
10	.69	23	.32	36	.14	49	.00
11	.65	24	.31	37	.13		
12	.61	25	.30	38	.11		
13	.57	26	.28	39	.10		

tive; press down the push-button switch and note the reading on the meter. Go to the Density Determination Chart given and look up the density for that number. For example, a reading of 10 on the chart is a density of .69; 25 is .30; 35 is .15 and so on.

Range 3 of the meter is used to read densities from 0 to 1.0. Density readings above 1.0 and up to 2.0 are close together and difficult to read on Range 3. So, to read densities above 1.0 easily and accurately, simply turn to Range 4 and add 1.0 to the reading obtained.

While finding densities of negatives, you should check to see that the meter still reads 50 exactly without a negative in the path of the light. If the meter does not, then adjust the dimmer switch again to get that exact reading before proceeding with your work. If you use a constant voltage transformer with the Light Source of your densitometer, you will get steadier and more accurate readings from the meter. It is a good idea to practice finding the densities of different areas of negatives to develop experience for improving the quality of your prints.

Finding the Density Range Density readings are useful to the photographer. From these readings, he can determine the Density Range of his negatives. We have just seen how the density of one portion of a negative can be found.

The Density Range of that same negative is the difference in reading obtained by measuring the lightest and darkest areas. The Density Range enables the photographer to match his negative to the correct grade of printing paper.

It is a simple matter to determine the Density Range of a negative with your S & M Densitometer. With the meter set at 50, place the lightest area of your negative directly over the beam of light and then take a density reading. Make a note of this reading. Now take a reading of the darkest area, and again make a note of this second reading. Check the readings against the Density Determination Chart and find the densities. Subtract the smaller density from the larger and the difference is

your Density Range. For example, suppose your meter reads 26 for the lightest area and 4 for the darkest. Checking the chart you will obtain readings of .28 and 1.09 respectively. Subtracting the smaller from the larger gives .81 which is the Density Range.

Finding Paper Speeds By applying the Density Range of .81 against the Paper Grade Chart below, you will know exactly what grade of printing paper to use for the negative you have just read.

PAPER GRADE CHART

1.4 and over	use a grade 0 paper
1.2 to 1.4	use a grade 1 paper
1.0 to 1.2	use a grade 2 paper
0.8 to 1.0	use a grade 3 paper
0.6 to 0.8	use a grade 4 paper
0.6 or under	use a grade 5 paper

From the example worked out above, .81 falls between 0.8 and 1.0 on the Paper Grade Chart, indicating the use of a grade #3 paper. As stated earlier, this is a simple method for determining the approximate densities of negatives. Undoubtedly, many people will add improvements to this simple method, as they become adept in this type of work.

We repeat, once more, that this information on density is presented as a simple introduction to beginners in this area of work. Each user of this S & M Densitometer should eventually do his own research to develop his particular density chart to the degree of accuracy desired. There is a dire need for inexpensive densitometers that equal those that are worth several hundred dollars, a need which your S & M Darkroom Meter can help fill with great satisfaction.

COLOR EXPOSURE DETERMINATION

Your S & M Easel probe that is used for exposure determination for B & W is also suitable for COLOR EXPOSURE at the

easel of the enlarger. The information that follows is given as a guide for finding color exposures with the color negative and correct filter pack in the enlarger. The readings indicated below were taken with the full 1/2 inch aperture of the sensor of the Easel probe.

These readings were made with the Darkroom Meter set on Range 3, the Sensitivity control off and with the lens of the enlarger stopped down to the indicated number on the chart below. You may find that you have to modify these readings for your particular requirements. However, the readings given here should, at least, provide you with a good trial exposure for your color prints. And with a little research on your own, you will be well on the way to masterful color printing.

EXPOSURE CHART FOR COLOR PRINTS

Size	Seconds	Readings
8 x 10	10	2
5 x 7	5	3
4 x 5	5	1 1/2
Wallet	2	9

MAINTENANCE Your Model A-3 Photo Meter was designed to last for many years. Normal care, especially during transportation will prevent almost all problems. Handle your meter like your best camera. Never throw it haphazardly into a photo-gadget bag. The probe is well protected, but it should not be dropped on hard surfaces. Use a wad of lens tissue occasionally to clean the surface of the photocell.

Never expose the meter to steady hot sunlight, as on the back seat of a car. Heat will build up inside the black case and "fry" the dry cells. Get in the habit of keeping your controls always in the "off" position when the meter is not in use. The "D" batteries for the two dial lamps should last for weeks, and for months in ordinary use, but will run down rapidly if you forget to turn off the DIAL-LAMP switch overnight.

Whenever this happens, it is a good idea to remove the 4 corner screws for the face plate of the meter and check the batteries, especially if they have been in service for months. Sometimes such a heavy overload causes the batteries to leak gas. They will rupture, and the corrosive battery liquid will trickle out. If it isn't wiped off promptly, it can damage the battery holder and other parts. For this reason, it pays to use the best grade of "D" batteries.

After months of use, the Mallory mercury cells that power the meter, will sometimes cause galvanic corrosion of the small battery holders. The holders can be wiped clean and then touched up with emery cloth. You may put a smear of vaseline over the cleaned terminals to help protect against future corrosion. If holders become badly corroded, you can replace them at very little cost. Normally, meter owners report that mercury cells last about six months.

Test these 1.4 volt Mallory mercury cells occasionally and replace them whenever low readings are obtained, as explained earlier. Be sure the new mercury cells are the correct type and that they are inserted with the proper polarity, that is the + side down.

Your S & M A-3 Photo Meter was designed to provide rugged, long life, dependable service, with minimum maintenance problems. Certain routine maintenance will guarantee you infallible performance and extend the trouble-free life of the unit. S & M Instruments Division keeps a stock of every part utilized in this meter.

SUMMARY Some specialists have developed their own techniques for using this instrument in various scientific applications, including photomicrography, microphotography, densitometry, production photofinishing, copying, slide-duplication, foot-candle measurements and even holography. We feel certain that you, too, will soon be discovering new applications in your line of work for this most versatile photo meter.

We will be glad to hear from you when you come up with something new. We are always willing to disseminate technical information to advance the science of photography.

THIS IS YOUR METER GUARANTEE

This meter is unconditionally guaranteed for 90 days from date of purchase against all factory defects.

We guarantee the quality of all parts shipped, however, we are not responsible for damage that occurs in shipment, or in use. If your meter arrives in a crushed or broken carton, please write immediately to S & M Instruments Division describing the condition of the package. Give us complete information; date of order, date of shipment, order number, etc., so that we may process insurance claims promptly. As soon as your insurance claim has been filed a new meter will be shipped to you.

If your meter does not operate properly, write a short letter also to S & M Instruments Division, describing the trouble. You will receive an immediate reply. In most cases, our experts will be able to tell you how to correct the trouble. *The most common meter complaints are due to broken photocells, and shorted batteries.*

If the photocell of any probe is broken, you can order a new probe for \$7.50. The mercury batteries used in this meter should last for many months, if you keep the Range switch and Paper Speed control off, when the meter is not in use. If the Range switch is left on for a few hours accidentally, the battery will begin to run down. When these batteries are allowed to rest overnight, they will usually recover after such abuse. However, when in doubt, it is best to use new batteries—available at \$.75 each.

You may return your meter to S & M Instruments Division at any time for complete inspection and repair for a service charge of \$10.00. This includes the calibration and checking of the meter, photocell, and all other parts, but does not include the cost of replacing parts that may be broken in use or in shipment. These parts will be replaced and you will be billed accordingly. Whenever returning merchandise, be sure to tag it clearly with your name, complete address, and nature of complaint.



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