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POINTER LOCK

Press to release

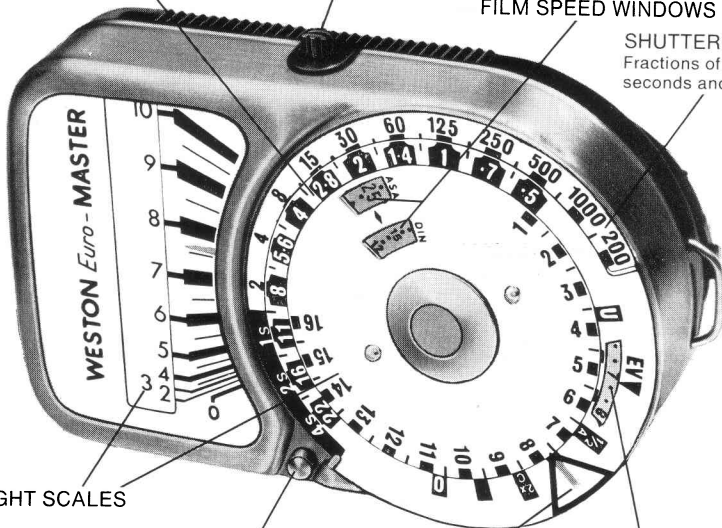
Press and turn to
make inoperative

f/STOPS

FILM SPEED WINDOWS

SHUTTER TIMES

Fractions of a second,
seconds and minutes



LIGHT SCALES

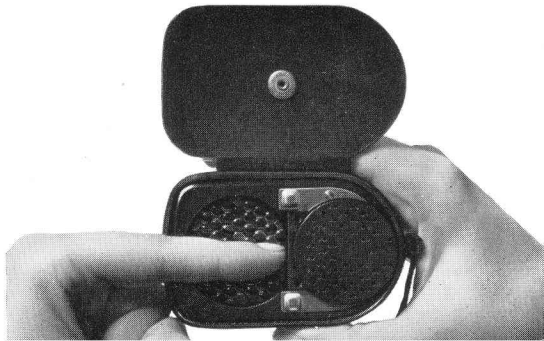
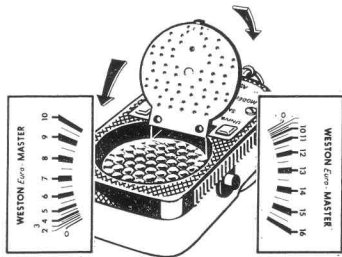
FILM SPEED LOCK

NORMAL ARROW

EXPOSURE VALUE SETTINGS

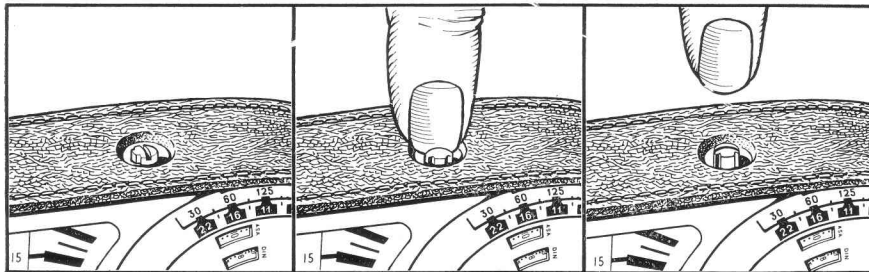
High and Low Light Scales

The illustrations on this page show the method of operating the baffle over the photoelectric cell. When the baffle is closed, the high light scale (10–16) moves into position. The baffle should be kept closed when the light reads 10 or higher. If the light reading is less than 10, the baffle should be opened bringing the low light scale (0–10) into use.



POINTER LOCK

Depressing the lock button enables a reading to be taken; releasing it holds the pointer in place. When the meter is not to be used for a long period leave the pointer unlocked by depressing the button and giving it a quarter turn.



Pointer free, lock ineffective

Button turned to locked position

Pointer locked, depress to take reading

THE INVERCONE

When using the meter to take incident light readings the Invercone is fitted in the manner shown here. Insert the leaf spring first when fitting the Invercone and make sure that the attachment is securely latched into the meter. Remove the spring last when taking the Invercone from the meter.



HIGH LIGHT SCALE

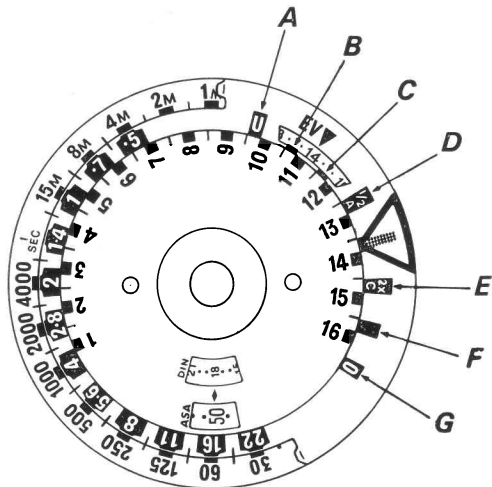
Simply slip the Invercone into place over the closed baffle as shown.

LOW LIGHT SCALE

If the meter reading with the baffle closed and the Invercone in position is less than 10 on the light scale, remove the Invercone, open the baffle as shown and replace the Invercone.



CALCULATOR DIALS



- A** 'U' position permits exposure determination by measurement of darkest object.
- B** Provides quick means to decrease exposure by three f/stops.
- C** Provides quick means to decrease exposure by two f/stops.
- D** 'A' position provides a means of giving half exposure.
- E** 'C' position provides a means of giving double exposure.
- F** Provides quick means to increase exposure by two f/stops.
- G** 'O' position permits exposure determination by measurement of lightest object.

For the values of unnumbered positions on the dials see page 18.

SETTING THE CALCULATOR

Set the film speed dial by depressing the lock button on the front of the meter and turning the light scale until the speed (ASA or DIN) of your film appears opposite the reference mark in the appropriate window. For film speeds which do not appear on the dial, see page 18. See also 'Equipment Errors' on page 19. If you are using the incident light method fit the Invercone as described on page 5.

Aim the meter as described for reflected light or for incident light readings and operate the pointer lock as shown on page 4 to retain the correct light reading. Transfer the light reading to the calculator. To do this, turn the outer dial by means of the lugs until the normal arrow is opposite the same reading on the light scale.

When transferred to the camera, any combination of shutter times and f/stops opposite each other on the calculator dial will give the same correct exposure. The combination selected will depend upon whether you want a fast shutter time with a large aperture (low f/stop numbers) to arrest action, or greater depth of field calling for a smaller aperture (high f/stop number) and a slower shutter time.

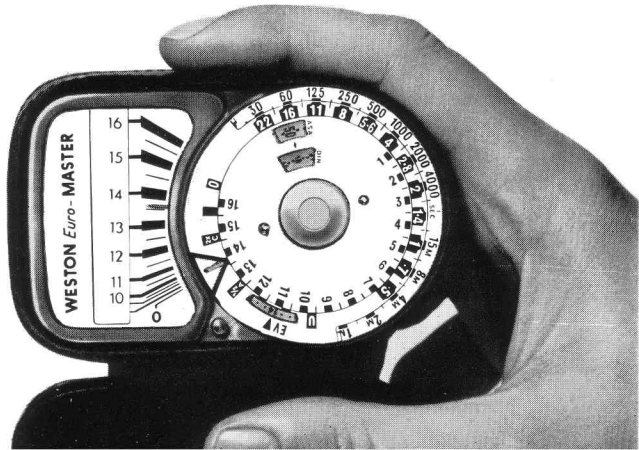
Cameras calibrated in exposure values, can be set to the value appearing in the EV window.

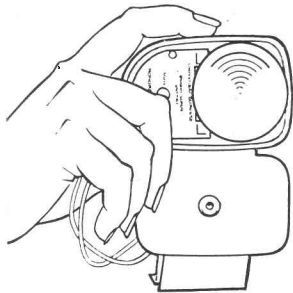
When used as described in succeeding pages the meter indicates the correct exposure. Depart from the exposure indicated when special effects are sought.

USING THE METER

Reflected light and incident light methods each have their uses but it should be noted that the latter is particularly recommended for colour reversal work. For reflected light readings the meter is used alone. Hold it as shown here, being careful not to obstruct the photo-electric cell with your fingers or the neck cord. For outdoor general scenes, when the reading is taken from the camera position, tilt the meter sufficiently downwards to avoid measuring sky areas which would inflate the reading and cause under exposure.

The reflected light method may lead to under exposure if used for backlit scenes particularly where specular reflection is present such as occurs from wet surfaces. This under exposure. may however, result in a pleasing picture in certain circumstances, Under exposure will also occur when exceptionally bright light sources or unusually large white areas are contained within the meter's viewing field. Conversely over exposure may result if the meter is directed to include unduly large dark areas.





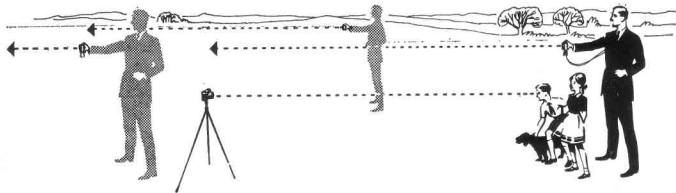
For incident light readings fit the Invercone as shown on page 5 and hold the meter as shown here; use the index finger to operate the pointer lock.

Point the Invercone along or parallel with the camera axis towards the camera position from the principal subject position; side, back and front lighting are all taken into account.

When extremely precise readings of subjects with a high degree of back lighting are called for, it is advisable to remove the meter from its case and hold it vertically instead of horizontally.

SUBSTITUTE READINGS In outdoor work where it is impracticable to get to the subject, a substitute reading may be taken at any location where the lighting is the same as at the subject. The meter with Invercone must be pointed in the same direction as for a reading at the subject position.

In the diagram below, the best position from which to take a reading is shown by the solid figure. Ghosted figures show alternative positions from which a reading can be taken, provided that the illumination at each of them is the same as at the subject. The arrows indicate the direction in which the Invercone is pointed.



UNUSUAL CONDITIONS

Reflected light method

For scenes in which the contrast is low, also for those where there are abnormally large dark areas, the use of the 'A' position which halves the exposure is recommended. Scenes with large light areas, as well as those of high contrast, call for use of the 'C' position which doubles the exposure.

These recommendations apply primarily when monochrome negative film is used. For colour photography, see page 14.

Incident light method

Straightforward use of the Invercone usually gives entirely satisfactory results. However, some scenes call for a modified exposure, this being particularly true when using colour reversal film. Without exposure adjustment, an area of water or other sparkling surface will appear in the transparency very light and devoid of detail, as, in fact seen by the naked eye. However objects with the light behind them will be well portrayed. Frequently, plenty of detail in the sparkling area is preferable. Giving less exposure than indicated by the normal use of the Invercone will achieve this; to this end the Invercone may be pointed directly at the sun thereby considerably reducing the exposure indicated. According to personal preference, any exposure between this and 'normal' may be used.

BRIGHTNESS RANGE

The following variant of the reflected light method aims at centring the exposure between two extremes. In any scene, various objects reflect different amounts of light. To produce a good photograph, all objects should normally be exposed within the latitude of the film; thus the extremes of brightness should be measured.

Take a close-up reading of the darkest object (for example, a dark hedge) and note the light value. Then take a close-up reading of the lightest object (for example, a white wall) again noting the light reading.

Set the arrow on the calculator dial midway between the darkest and lightest object light values, i.e. the arrow should be the same number of divisions or

blocks from the darkest light value as it is from the lightest.

You can then read off a suitable combination of f/stop and shutter time for the scene or, alternatively, the exposure value.

Most monochrome negative emulsions can record a long range of deep shadows and bright highlights in a single negative. A knowledge of the limits of this range can prevent unnecessary loss of detail in extreme shadows or highlights when long range subjects are encountered. See 'U' and 'O' Positions' on page 6 and page 12.

THE 'U' AND 'O' POSITIONS

The 'U' and 'O' positions on the calculator dial show the recommended limits of subject brightness, the ratio of these being 128:1. For a given setting of the dial, all objects whose light values fall on or between these two limits will be correctly exposed. Any object having a light value below the 'U' position will be under exposed and any object with a light value above the 'O' position may be difficult to reproduce satisfactorily.

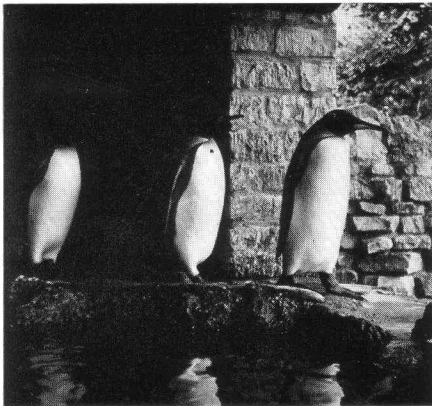
By setting the 'U' position opposite the darkest object light value, the indicated exposure will be just sufficient to reproduce that part of the scene.

Where the overall brightness is of a low order, such as in a dark hall or cave, it may be impossible to obtain a reading from anything but a very light object. If the 'O' position is set opposite this light object light value, the indicated exposure will ensure satisfactorily exposed highlights.

Where the brightness range of the scene exceeds a ratio of 128:1 use of the 'U' position may involve some sacrifice of detail in the extreme highlights. Conversely, use of the 'O' position will cause loss of shadow detail.

HIGHLIGHTS AND SHADOWS

In a scene such as that shown here, the brightness range greatly exceeds the film range. Patches of sunlight may give a light reading of 14 and deep shadows a reading of 4 (this represents a range of approximately 1000:1, since a change from one number to the next on the light scale represents a light ratio of 2:1). The average film range is thus not long enough to give printable details in



both the highlights and shadows, although a good average exposure can be obtained by using your meter as already described.

According to the effect you require, however, you can choose to expose for details in the shadows by using the 'U' position or, alternatively, for detail in the highlights by using the 'O' position (see paragraph headed 'The "U" and "O" Positions' on preceding page). The foregoing is particularly true of short range, slow films. Many films, however, have a range greater than 128:1 and when using such material, use of the 'U' position is often preferable.

COLOUR PHOTOGRAPHY

The incident light method is recommended for most colour photography.

The beginner should avoid extreme lighting conditions and allow the colour to provide the contrast. For outdoor shots, if possible expose when the sun is reasonably high (i.e. above about 30° from the horizon) as the colour of the light is normally most suitable during this period. Watch the reflection values of the surroundings, i.e. a white dress can be turned pink by light reflected from a red object. Outdoors avoid shadows and subjects in shadow, as these are illuminated by skylight which is more blue than sunlight, for which the film is balanced. An ideal scene is one having low contrast and even illumination.

When the scene contains large areas of a light tone, the reflected light method will result in an inflated reading and consequent under exposure. In such cases a reading could be taken of an average portion of the scene, avoiding the areas of light tone, but it is preferable to use the incident light method.

COLOUR FILM RANGE

The range of scene brightness which can be recorded on colour film is far more restricted than that of monochrome material. For colour photography the ratio between the lightest and darkest parts of the scene should in general not exceed about 32:1, i.e. a difference of 5 in the reading on the light scale when using the meter without the Invercone.

For best colour rendering it will generally be found that the brightness range of

extreme colours will lie between the mark positioned one whole stop above the 'C' position and the mark positioned one whole stop below the 'A'. Objects whose brightness values lie outside this range may suffer in colour rendering. Effective pictures in colour are obtained from colour contrast rather than from highlights and shadows as in monochrome photography. The brightness range method described on page 11 may be used.

First take a close-up reading of the darkest colour in the scene. Then take a close-up reading of the lightest colour. Set the arrow position on the calculator dial midway between these light values and make your camera setting.

The above method locates the exposure in the middle of the film range and is suitable for the average subject in flat lighting. If the darker colours are of principal interest, a longer exposure may be preferable. Conversely, if the lighter colours are of interest then a shorter exposure may be necessary.

It must be appreciated that varying the exposure to suit one end of the colour range may affect true rendering at the other. A useful suggestion is to use the 'C' position when exposing for the darker colours and the 'A' position for the lighter colours.

Correct exposure will, of course, give the best results, but if in doubt remember that when using reversal film slight under exposure gives better colour rendering than over exposure. With negative/positive colour processes, however, the opposite is the case and slight over exposure is preferable to under exposure. In both forms of colour photography, it is normally desirable to avoid shadows and extreme contrast in lighting until plenty of experience has been gained. Some fine *contre-jour* effects are attainable, however, to which end the use of the Invercone (see page 9) is especially recommended.

CINE PHOTOGRAPHY

A cine camera is essentially the same as a still camera except that it exposes a series of pictures at a fixed shutter time setting.

For cine work the incident light method is recommended but the brightness range method could be used.

The standard number of frames exposed by the average amateur cine camera is 16 per second at a shutter setting of $1/30$ th of a second. For other frames per second than 16, the shutter times are proportional. Use the settings shown in the following table:

8 frames per second $1/15$ th	32 frames per second $1/60$ th
16 frames per second $1/30$ th	38 frames per second $1/100$ th
24 frames per second $1/50$ th	64 frames per second $1/125$ th

Some cameras may have a different shutter time at 16 frames per second, such as $1/40$ th or $1/50$ th and the f/stops for these should be read off against this shutter setting on the calculator dial. If the shutter time on your camera is unknown ascertain it from the camera manufacturer.

ADDITIONAL NOTES — STILL AND CINE

High Altitudes Films are sensitive to ultra-violet radiation, of which there is a considerable amount present at high altitudes. To eliminate the effect of this, it is always good practice to use a haze or ultra-violet filter. No exposure correction is necessary so use the meter in the normal manner.

Copy Work When copying pages of a book or photographs in black and white or colour use the Invercone.

Alternatively divide the nominal film speed by 4, set the resulting value in the film

speed window, and take a reflected light reading from a white card placed over the subject.

In either case set the normal arrow to the light reading obtained and select the camera settings in the usual manner.

Television Place the camera on a tripod, or other firm support, and focus on the lines across the screen. Switch off the room lights. Take a reflected light reading of an average picture holding the meter about 250 mm (10 in) from the screen. Set the normal arrow at this reading and select the camera settings in the usual way. As the television picture is completely repeated 25 times per second the ideal shutter speed is 1/25th second. Many cameras cannot be set to this. In such cases 1/30th or 1/15th can be used, probably causing a band of darker tone to appear across the picture, considerably more marked at 1/30th second. However, at 1/15th second, definition over some parts of the picture may suffer slightly due to the fact that some of the scanning lines will be exposed twice.

Sunsets and Silhouettes Using the reflected light method, aim the meter directly at the subject and set the normal arrow at the reading. The sun itself should actually be setting or hidden by cloud.

Aerial Pictures Use the reflected light method, aiming the meter downwards to prevent the sky from inflating the reading. As a general guide, below 1,000 feet use the Meter reading indicated; from 1,000 to 2,000 feet set the arrow on the calculator dial one space higher than the meter reading, thereby reducing the exposure by 1/3 f/stop; from 2,000 to 4,000 feet, set the arrow two spaces higher than the meter reading (an exposure reduction of 2/3 f/stop). Above 4,000 feet, set the 'A' mark instead of the arrow to the meter reading (an exposure reduction of one f/stop). If no other filter is in use, a skylight filter, haze filter or ultra-violet filter should be used, in which case no exposure correction is required.

UNNUMBERED POSITIONS ON THE CALCULATOR DIALS

In these tabulations, the figures which actually appear on the dials are in bold type.

Shutter Times				ASA Film Speeds		Lens Apertures f/stops	
Sec.	Sec.	Sec.	Min.				
1/4000	1/60	1	1	12K	200	0.5	4
1/3000	1/50	1 $\frac{1}{4}$	1 $\frac{1}{4}$	10K	160	0.55	4.5
1/2500	1/40	1 $\frac{1}{2}$	1 $\frac{1}{2}$	8K	125	0.63	5.0
1/2000	1/30	2	2	6.4K	100	0.7	5.6
1/1500	1/25	2 $\frac{1}{2}$	2 $\frac{1}{2}$	5.0K	80	0.8	6.3
1/1250	1/20	3	3	4.0K	64	0.9	7
1/1000	1/15	4	4	3.2K	50	1	8
1/800	1/12	5	5	2.5K	40	1.1	9
1/600	1/10	6	6	2.0K	32	1.25	10
1/500	1/8	8	8	1.6K	25	1.4	11
1/400	1/6	10	10	1.2K	20	1.6	12.5
1/300	1/5	12	12	1.0K	16	1.8	14
1/250	1/4	15	15	800	12	2	16
1/200	1/3	20		640	10	2.2	18
1/150	2/5	25		500	8	2.5	20
1/125	1/2	30		400	6	2.8	22
1/100	2/3	40		320	5	3.2	
1/80	4/5	50		250	4	3.5	

Equipment Errors Photographic equipment is sometimes subject to small errors, e.g. in shutter times and f/stops. Sometimes these errors cancel each other but it is possible for them to be additive, resulting in consistent under or over exposure. These errors can be compensated for by adjusting the film speed (ASA or DIN rating), lowering it if results are consistently under exposed and raising it if over exposed.

Zero Correction If the pointer of your meter does not register zero when no light strikes the cell, it requires a slight adjustment. Cover the cell with your hand or a card and with a small screwdriver rotate the zero corrector on the back of the meter until the pointer indicates zero. Tilt the meter at an angle of about 45° when making the adjustment. Zero correction is only very occasionally necessary and should be made with great care.

Warning The exposure meter should not be subjected to temperatures in excess of 50°C. Such temperatures are often encountered in the glove compartment or on the parcel shelf of a car or in hot sunshine.

The Invercone may be cleaned with a cloth damped in a detergent solution. Use a soft cloth to wipe dry. Do NOT immerse in water.