

The
WESTON
Master III

UNIVERSAL EXPOSURE METER

**SANGAMO
WESTON**

SANGAMO WESTON LIMITED · ENFIELD · MIDDLESEX

MODEL S.141 FORM 3

SANGAMO

WESTON

LIMITED

*Enfield, Middlesex,
England*



Warranty

Your Weston Exposure Meter is an entirely British product and is made by the recognised leaders in fine instrument construction.

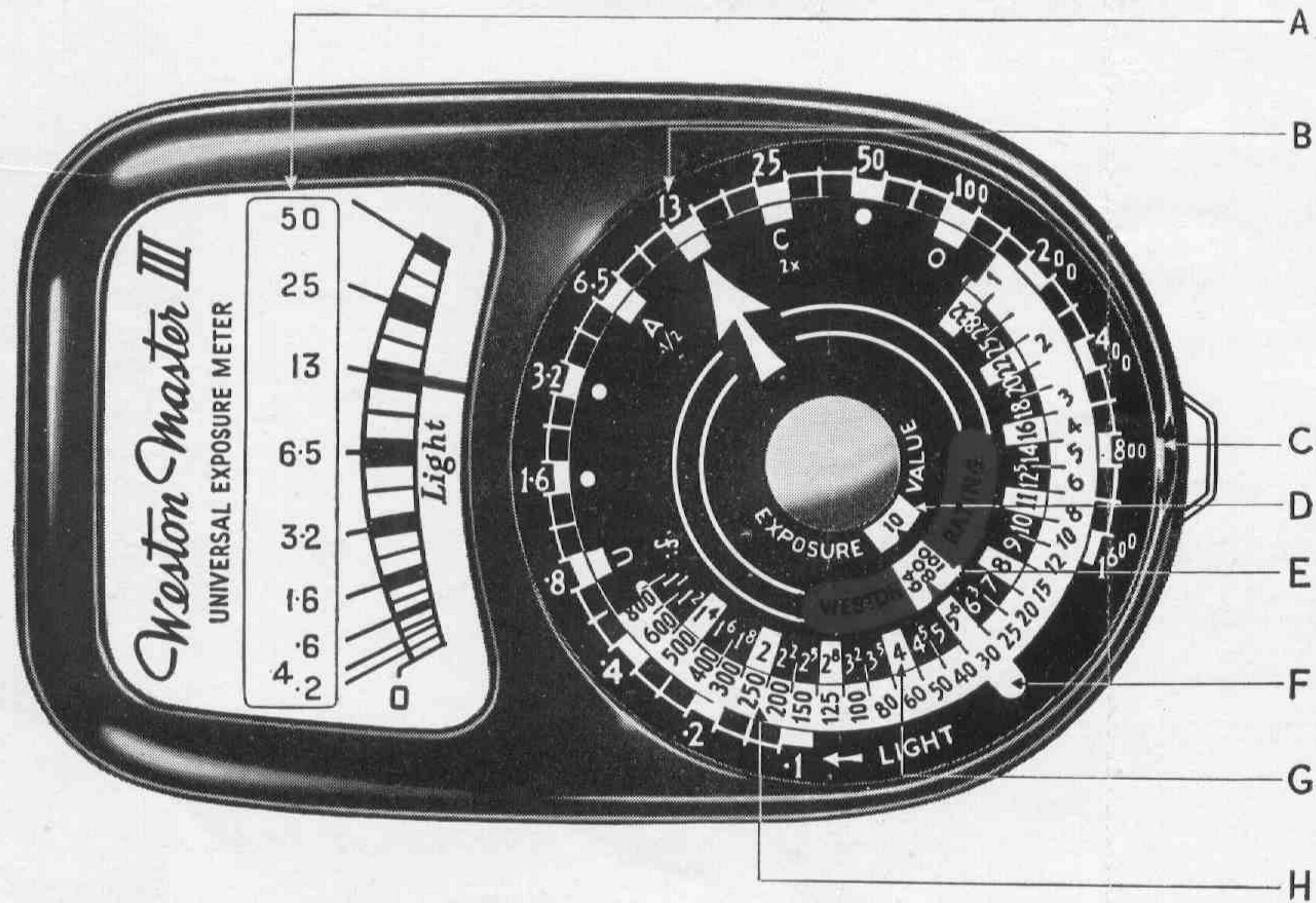
It is warranted against faulty workmanship and defective materials for a period of one year from date of manufacture.

Handle your meter with the care and respect to which a fine mechanism is entitled and it will give you faithful service adding considerably to your photographic pleasure.

An accident may happen, however, and in such a case you should consult your dealer or our Service Department regarding its return to this factory for repair and adjustment.

Use of a leather ever-ready case is strongly recommended. Cases of approved design are obtainable from any photographic dealer. When fitting the instrument into the leather case, the neck cord should be passed through the slot provided in the case.

This Instruction Book must of necessity be fairly concise and it will be appreciated that the use of the Exposure Meter for some subjects is often a matter of individual preference and technique. Several excellent books on the subject of Exposure have been published and of these we would mention: *Exposure Meters and Practical Exposure Control* by J. F. DUNN, M.I.E.E., A.M.I.MECH.E., F.R.P.S.



- A Light scale recording light value of scene.
- B Figures on exposure dial corresponding to above.
- C Tab to release dial for Weston Ratings.
- D Window indicating exposure value.
- E Window indicating Weston Rating.
- F Tab to rotate dial for Weston Ratings.
- G Figures indicating f/stops (lens apertures).
- H Figures indicating shutter speeds (time).

HOW TO USE YOUR *Master III*

On the top calculator dial will be found the following markings: the "normal" arrow, "A" and "C" markings, "U" and "O" markings and dots at the intermediate "whole stop" positions. Thus there is a complete series of markings at "whole stop" intervals between the "U" and "O" markings.

Emulsion Speeds

Your "Master" meter is a photo-electric instrument which measures reflected light. The calculator dial converts the light readings into the correct exposure combinations. Since emulsion speeds differ from one type of film or plate to another and for different kinds of illumination, make sure that you use the correct number from the list of "Weston Ratings" supplied with the meter.

Set for Weston Rating

Depress tab "C" then turn tab "F" until the Weston Rating number of your film appears in window "E".

Take a Light Reading

Aim the meter at the scene and note reading on light scale

"A". Turn the exposure dial until its arrow points to the same figures as the light reading.

Make Camera Settings

The correct settings for your camera now lie directly opposite each other—the f/stop (lens aperture) settings are on scale "G" and the shutter speeds (time) are on scale "H". Any pair of figures for f/stop and shutter speed lying opposite each other will result in correct exposure (see Selecting the f/stop on page 6).

It should be noted that on scale "H" the numbers in black represent fractions of a second (i.e. $2 = \frac{1}{2}$; $3 = \frac{1}{3}$; $4 = \frac{1}{4}$ etc.), whereas the red numbers indicate whole seconds.

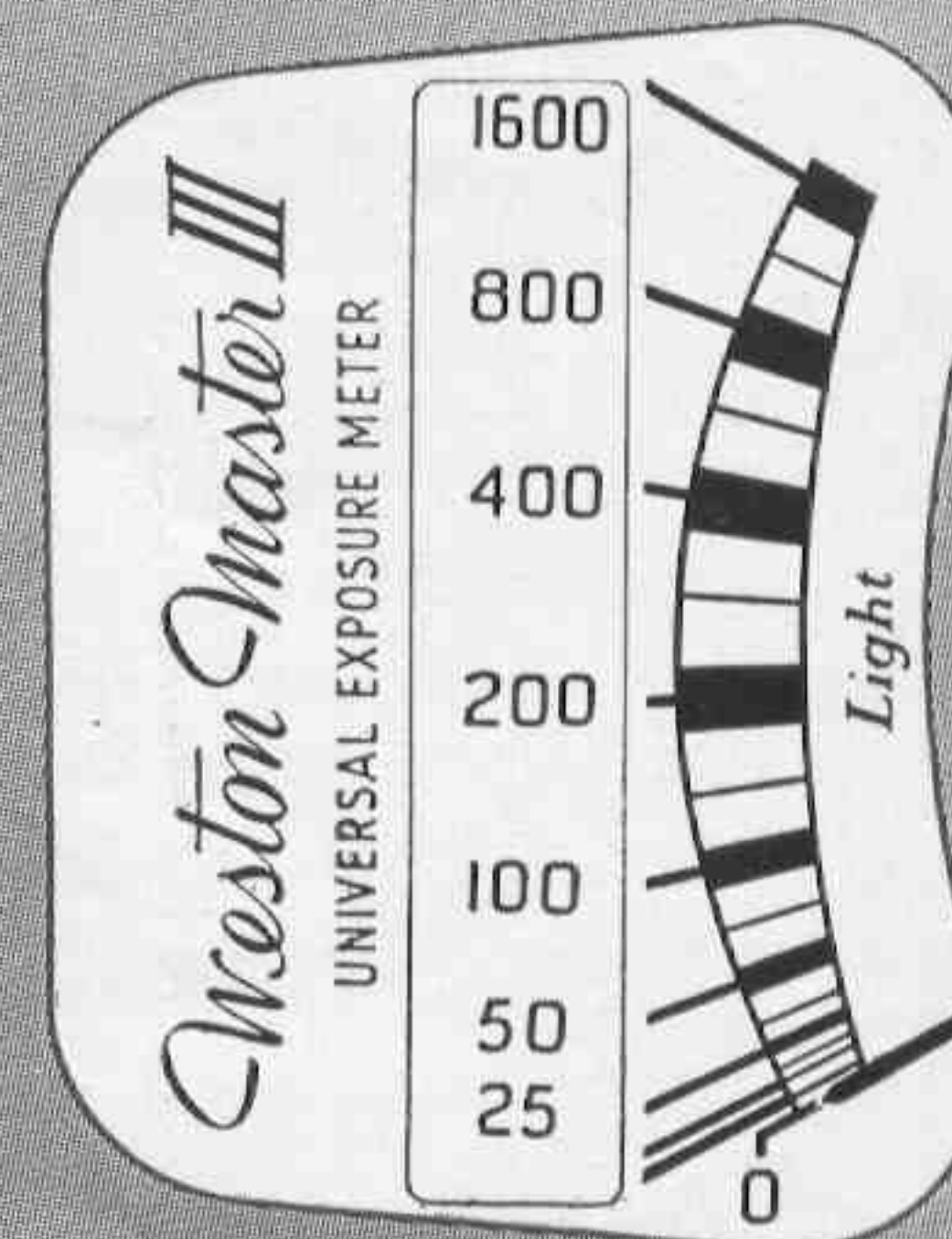
Exposure Values

An additional scale is provided for use with those cameras having shutters calibrated in exposure values.

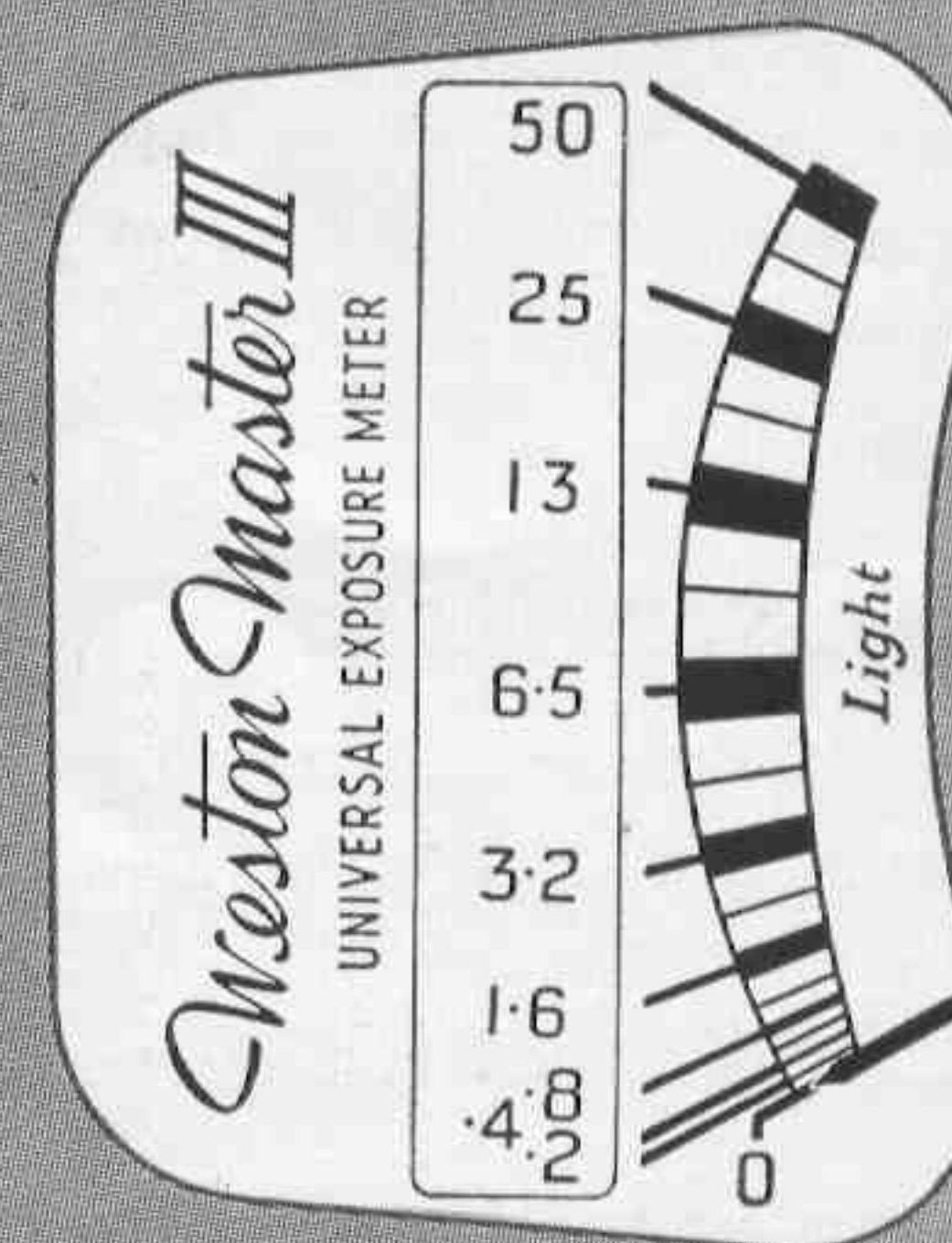
The exposure value for any scene is obtained from the meter after presetting the Weston Rating, taking a light reading and setting the exposure dial in the manner previously described. The appropriate exposure value is then to be found in window "D".



The baffle half open and the release latch "J"



**HIGH RANGE
LIGHT SCALE**



**LOW RANGE
LIGHT SCALE**

High Range Light Scale

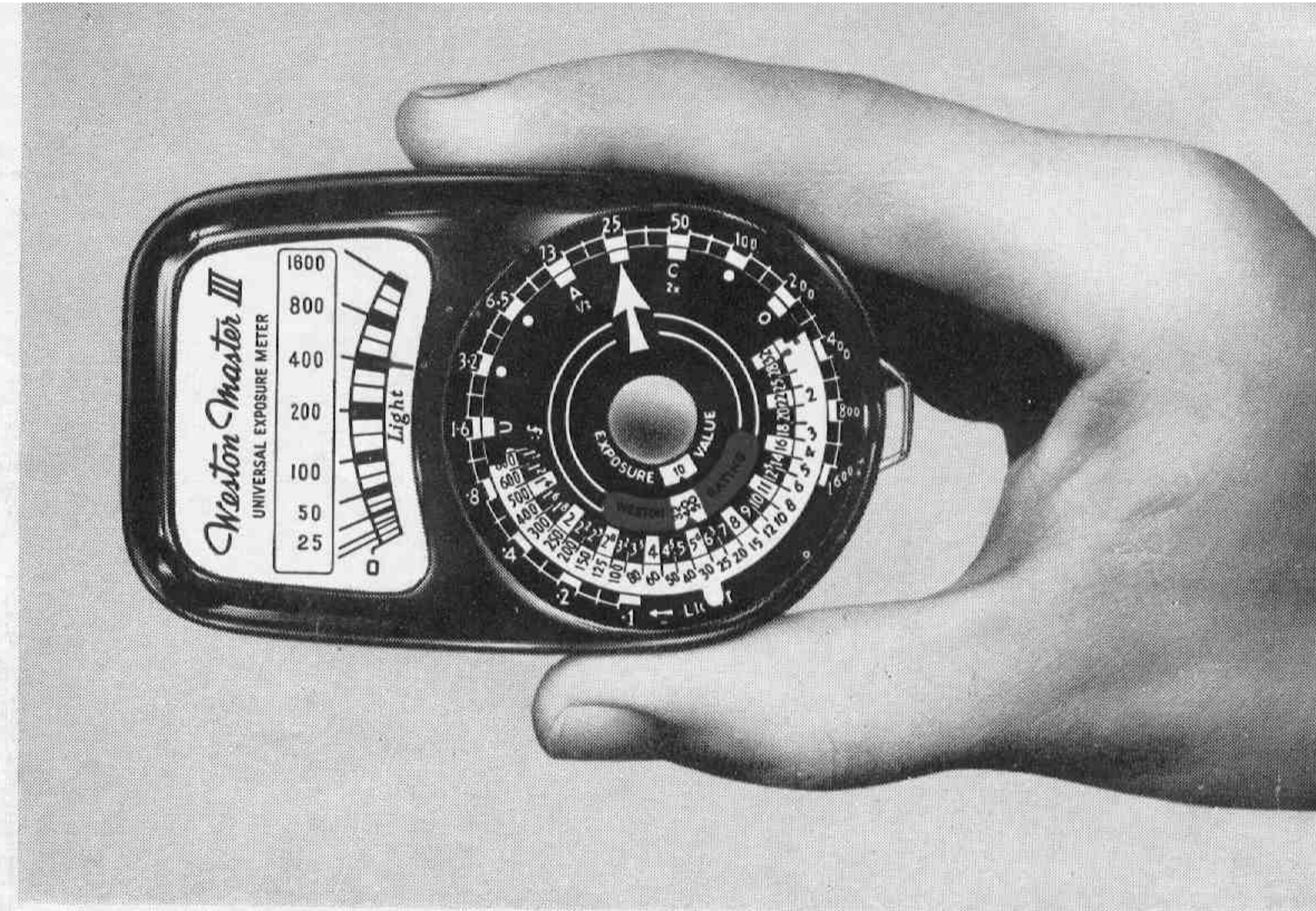
On the rear of the meter a hinged baffle will be found. The light sensitive photo-electric cell is directly beneath the baffle. When the baffle is closed, the high range light scale is in use. This scale measures relative brightness units from 0 to 1600 and is for use for all average and brightly lighted objects. Keep the baffle closed if the light reading is 50 or higher.

Low Range Light Scale

When the light reading is less than 50, open the baffle by releasing latch "J" and turn it back against the case so that the latch engages holding it wide open. The low range light scale automatically appears measuring relative brightness units from 0 to 50. The first division, -2, indicates a very low order of subject brightness, even for indoor scenes.

Aiming the Meter

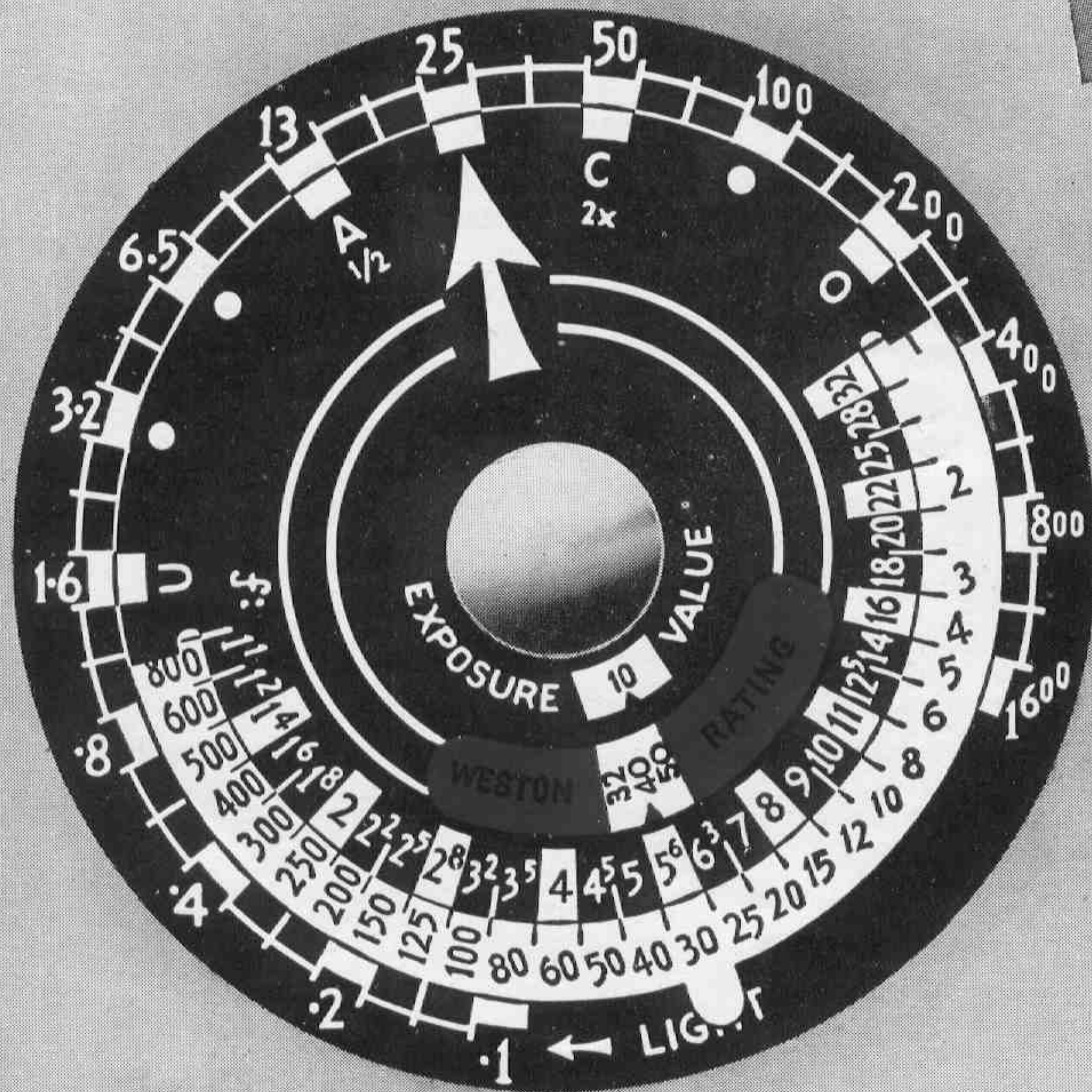
Aim the meter, as shown here, looking across the top of the case at the subject. Tilt the meter slightly downwards to avoid measuring the sky, which, being very much brighter than the rest of the subject would "inflate" the reading,



resulting in under exposure. See that the photo-electric cell is not obstructed by your fingers, the neck cord, or the ever-ready case.

When making close-up readings, make sure that you do not cast a shadow with the meter or with your hand on the object being measured.

SELECTING THE F/STOP



For each picture taken there is a choice of a number of different exposure combinations of f/stop and shutter speed. With the exposure dial set as illustrated on this page you might select an f/stop of f:6.3 at 1/25th second or an f/stop of f:22 at $\frac{1}{2}$ second. Any one of the combinations shown on the dial would result in a correct exposure (provided the figures taken were directly opposite each other) but the selection of the correct combination depends upon the requirements of the subject.

If the scene is an action one, select a fast shutter speed. If maximum depth of focus is needed, then you can select a slower shutter speed with its corresponding smaller stop opening. Remember the smaller the aperture the higher the f/stop number.

In close ups or very near subjects, bear in mind that the depth of field covered by the lens is considerably reduced and

that, in order to obtain sharp definition over the parts of the subject nearest and most distant from the camera, the smallest possible f/stop should be used.

Direct Reading Feature

A useful feature of the "Master" meter is that with the following Weston Rating and f/stop values, the light reading is a direct indication of the shutter speed required, e.g. when the pointer indicates 100, the shutter speed required is 1/100th second, etc.

<i>Weston Rating</i>	<i>f/stop</i>
8	f:2·8
12	f:3·5
16	f:4
20	f:4·5
32	f:5·6
40	f:6·3
64	f:8
125	f:11
250	f:16
500	f:22

Classification of Scenes

It will simplify the classification of scenes to remember that the exposure meter measures the average value of light or brightness coming from the entire scene. Thus for normal exposures the arrow position on the calculator dial is used. For those scenes, however, requiring less or more than the normal exposure the "A" and "C" positions may be employed, where $\frac{1}{2}$ or double normal exposure is required.

The following recommendations apply primarily when black and white negative film is being used.

Flat scenes lacking in contrast, such as distant views and landscapes on dull days, generally require less than normal exposure and more than normal development for best reproduction. Set the "A" position on the calculator dial opposite the light value measured for such scenes.

The contrasty scene such as a sunlit street with dark shadows for best reproduction requires more than normal exposure and less than normal development. Set the "C" position on the calculator dial opposite the light value measured for these scenes.

Remember, however, that about eighty per cent. of all scenes require a normal exposure and when in doubt about any scene, use the arrow position on the calculator dial.

CAMERA POSITION METHOD



The normal method of use of the meter is at the camera position, i.e. close to the camera. It is a simple method and the one most frequently used. This method gives a correct exposure for the overall scene and does not isolate any particular object from an exposure point of view.

Make a light reading (avoiding sky areas) and set the calculator dial as already described. Choose a combination of f/stop and shutter speed consistent with the subject to be photographed.

Generally, the arrow position on the calculator dial should be used. For flat scenes, or for scenes with extreme contrast of highlights and shadows, use the "A" or "C" position as described on page 7.

The camera position method should not normally be used for back-lighted snow, sand or water, since specular reflections can result in under exposure of the shadowed areas. (See page 15). But for landscapes, general views and other photographs where a quick reading is wanted the camera position method is quite satisfactory.

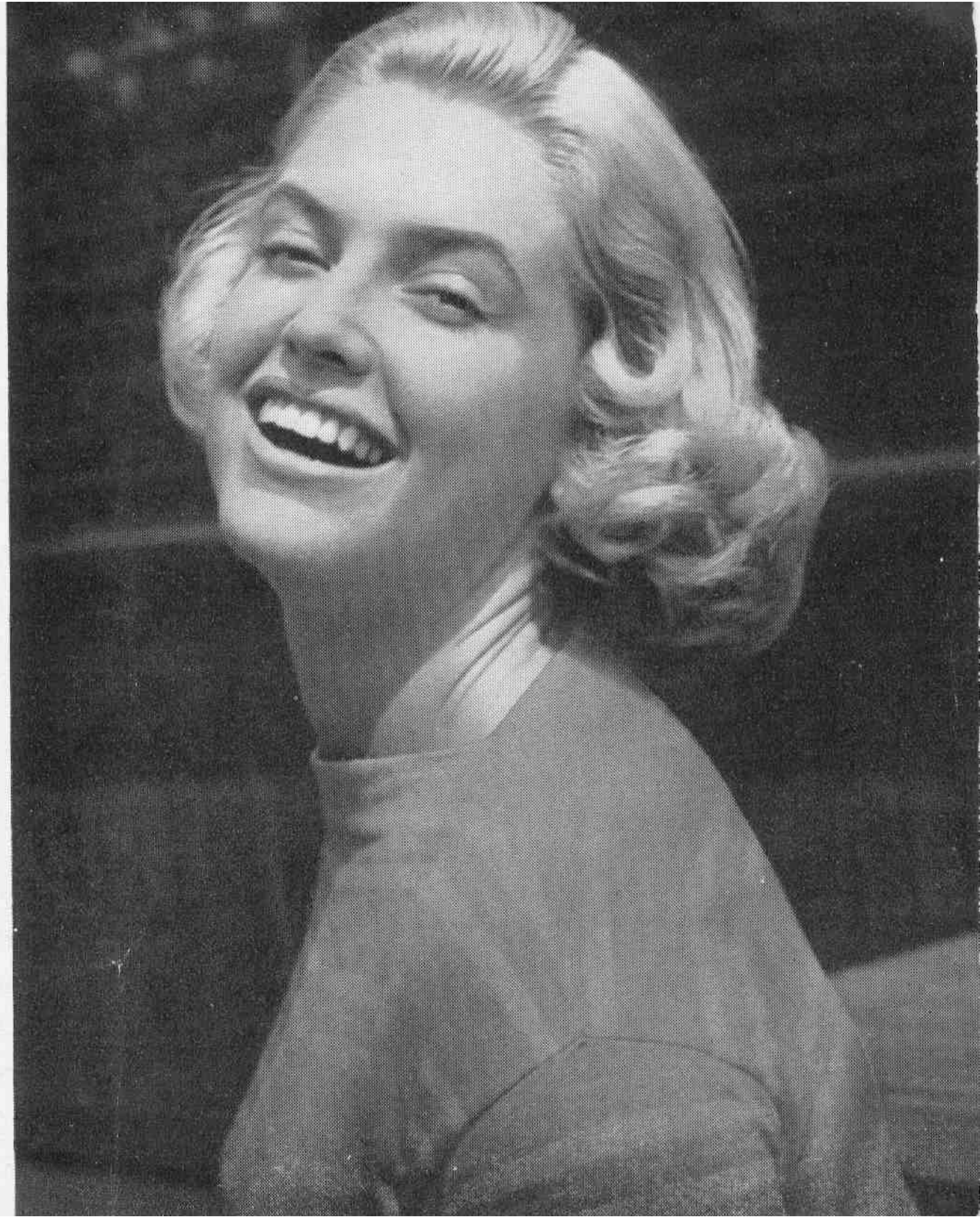
THE CLOSE-UP METHOD

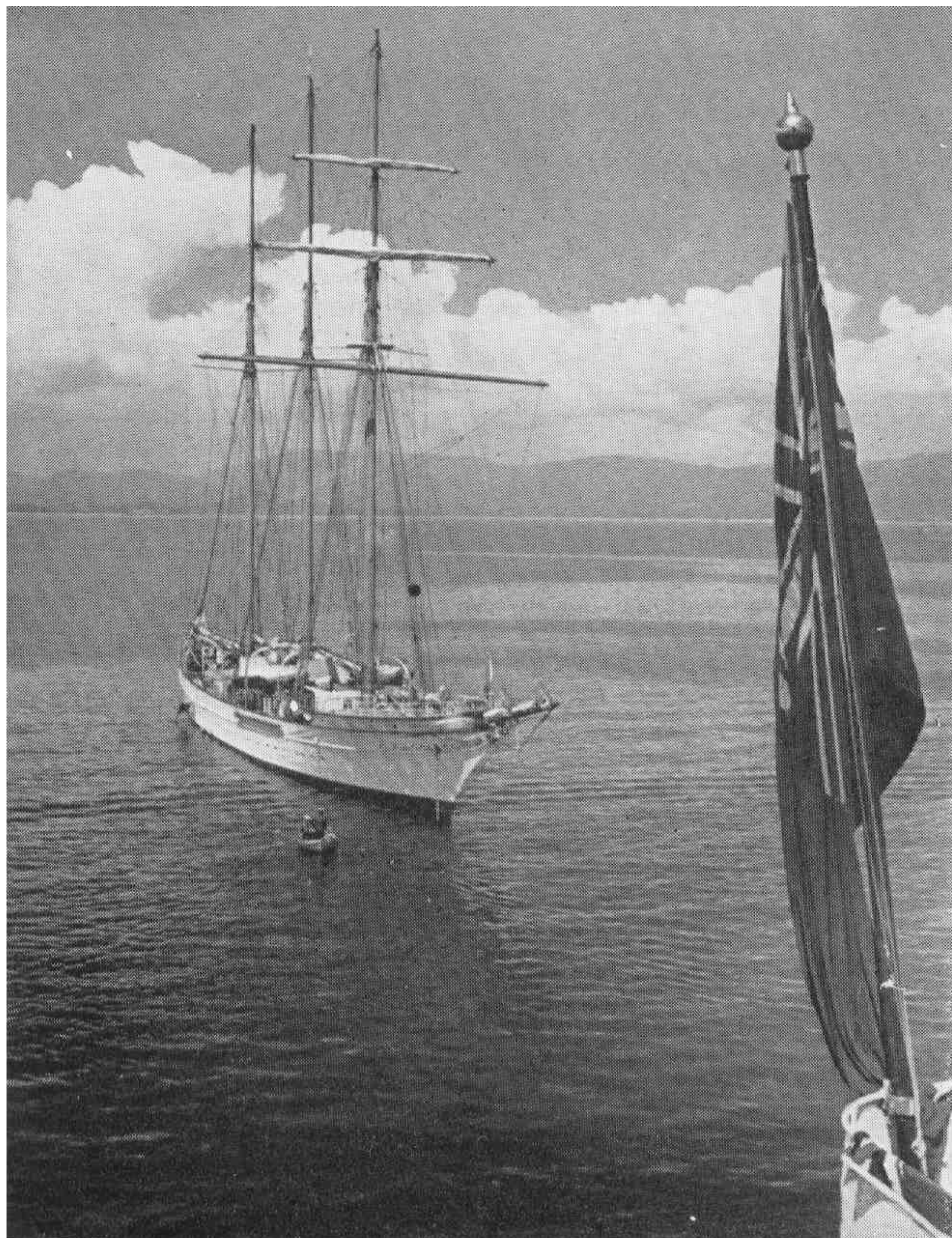
In the close-up method the meter is held close to the subject being photographed. In this way the film is exposed particularly for the one centre of interest and the background is subjugated accordingly.

Hold the meter close to the principal object, about as far away as the object's smallest dimension. The meter can be held closer than this distance, but no farther away. If the object is the face, six inches is sufficient. The distances can be increased to say five feet if it is desired to isolate a small group of people from the background, or even to ten feet in the case of larger surfaces. Make quite certain, however, that no light reaches the cell from unimportant objects.

When making a reading, make sure that you do not cast a shadow on the subject with the meter or with your hand. Also do not let your body interfere with the natural illumination of the subject. To avoid casting shadows, the meter may have to be held at an angle to the direct light on the subject, i.e. you can measure the reflected brightness by standing slightly to one side.

Having taken a close-up light reading, set the calculator dial to the arrow position and make your camera settings.





SUBSTITUTED READINGS

It is not always possible or convenient to take close-up readings. In such cases, substituted readings of nearby similar objects can be made. In the adjacent example, a close-up reading of a white handkerchief would be a substitute for the hull of the yacht and a close-up reading of the shore close by would suffice for the darkest object. Similarly a white handkerchief can often be substituted for a white wall or a lady's blouse. But ensure that the lighting is the same and that the objects are similar.

BRIGHTNESS RANGE METHOD

The Brightness Range Method consists of measuring the light values of the lightest and darkest objects of the subject and thereby balancing the exposure midway between the two extremes. It is the most accurate method known for the determination of correct exposure and is recommended for the best possible negative from an exposure viewpoint.

In an average scene, various objects reflect different amounts of light—the dark objects little light, the bright objects much light. In a fine photograph, all objects should be correctly exposed and thus the above extremes should be measured.

Make a close-up reading of the darkest object (for example, a dark hedge) in the scene and note the light value. Then make a close-up reading of the brightest object (for example, a white wall) again noting the light reading. If you are not sure which are the darkest and lightest objects measure several that appear so, and take the lowest and highest readings respectively.

Set the arrow on the calculator dial midway between the darkest and brightest 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 brightest. You can then read off a suitable combination of f/stop and shutter speed for the scene, or alternatively, the exposure value.

Most black and white negative emulsion can record a long range of brightness in any one subject but there are limits to the range of deep shadows and bright highlights which can be recorded with reasonable truth in a single negative. A knowledge of these limits can prevent unnecessary loss of detail in extreme shadows or highlights when long range subjects are encountered.

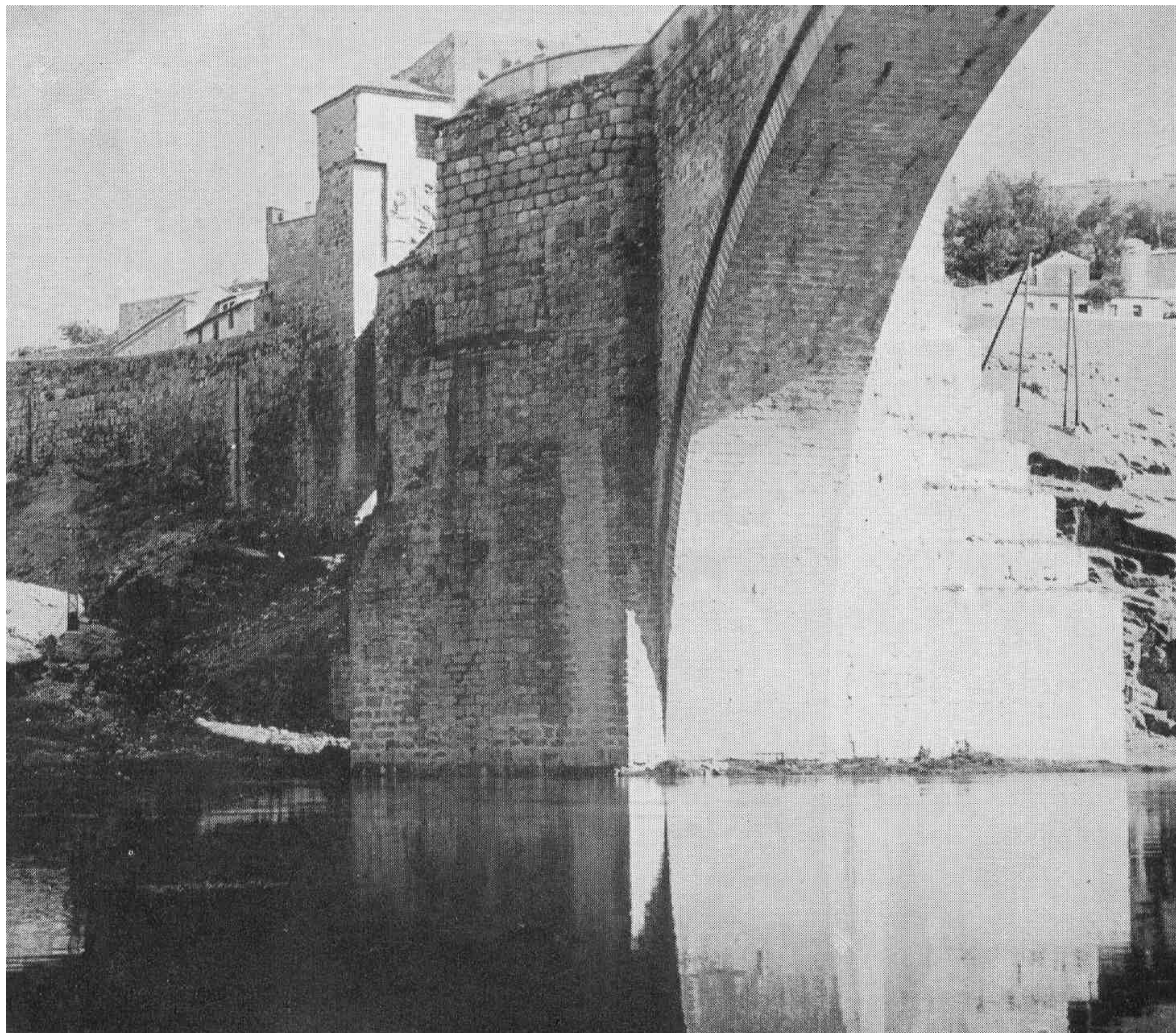
THE "U" AND "O" POSITIONS

The "U" and "O" positions on the calculator dial show the limits of subject brightness which the average black and white film can record on a single negative, the ratio of these being about 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 over exposed or be difficult to reproduce.

By setting the "U" position opposite the darkest object light value, the indicated exposure will be just sufficient correctly 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 might be impossible to obtain a reading from anything but the brightest object. If the "O" position is set opposite this brightest object light value the indicated exposure will just avoid over exposing the highlights.

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



HIGHLIGHTS AND SHADOWS

In a scene such as that shown here, the brightness range greatly exceeds the film range, i.e. the patches of sunlight may give a light reading of 500 and the deep shadows a reading of 1·6. The average film range is thus not wide 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.

COLOUR PHOTOGRAPHY

COLOUR FILM RANGE

The range of scene brightness which can be recorded on colour film is far more restricted than that of monochrome material, the ratio being in the order of 30 to 1. Therefore the brightness ratio in general should not exceed this figure.

For best colour rendering it will generally be found that the light value range of the extreme colours will lie between the dot positioned one whole stop above the "C" position and the dot positioned one whole stop below the "A". Objects whose light values lie outside this range may suffer in colour rendering.

Brilliance in colour photography is obtained through colour contrast and not from highlights and shadows as in black and white photography. The method recommended is the Brightness Range Method described on page 10.

First, make a close-up reading of the darkest colour in the scene. Then take a close-up reading of the brightest colour.

Set the arrow position on the calculator dial midway between the light values of the darkest and brightest objects and make your camera setting.

The above method centres the exposure in the middle of the film range and is ideal for the average subject where the colour contrast is low and the illumination flat. If, however, the darker colours are of principal interest a longer exposure is required. Alternatively, for the best reproduction of the brighter colours, a shorter exposure will 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 brighter colours.

Usually the most pleasing colour transparencies result from exposure for the brightest colours. Correct exposure will, of course, give the best results but if in doubt remember that 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 important to avoid shadows and extreme contrast in lighting wherever possible.

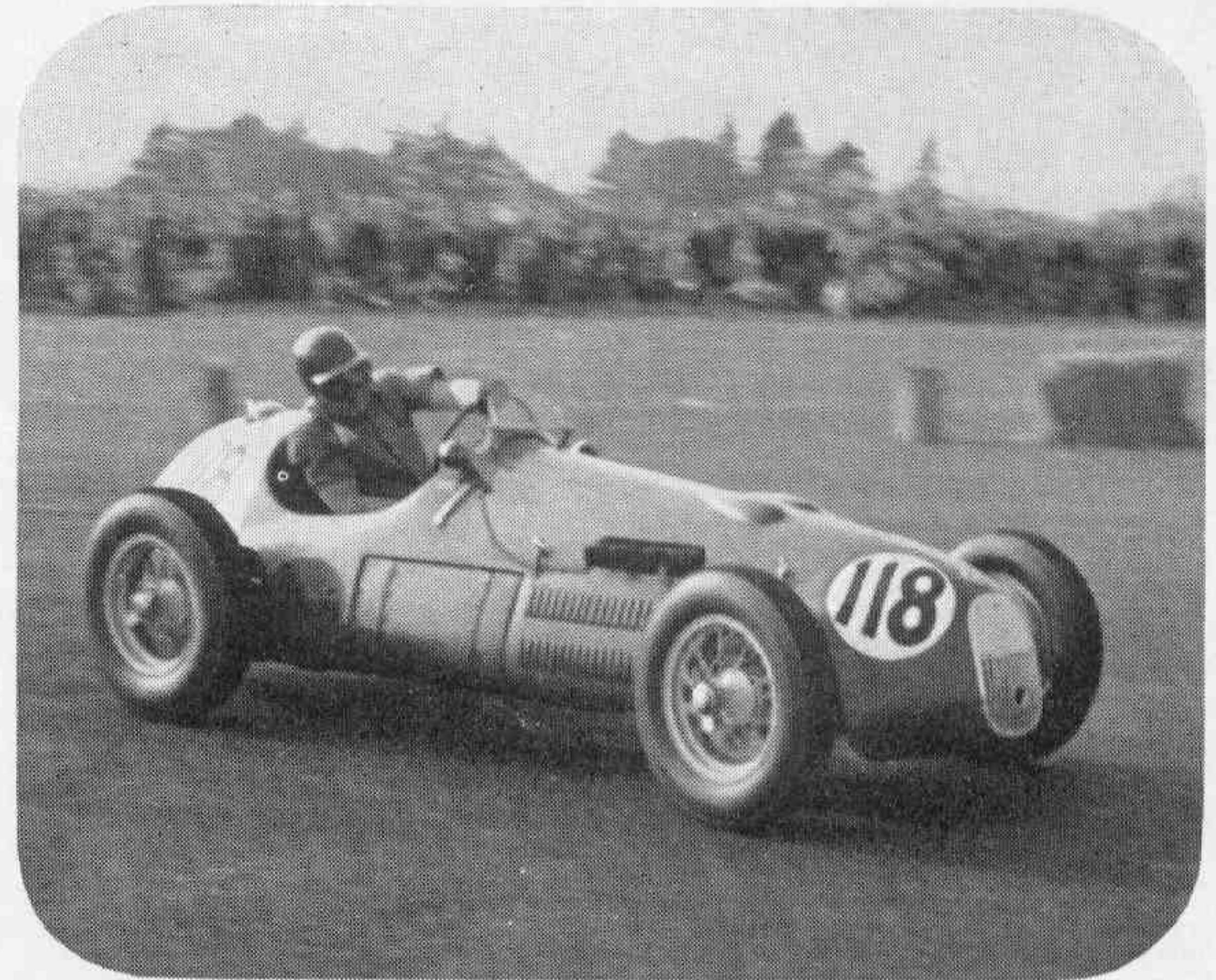
CINÉ PHOTOGRAPHY

A ciné camera is essentially the same as a still camera but it exposes a series of pictures in a given interval at a fixed shutter speed. For best exposure results, the Brightness Range Method described on page 10 is recommended.

Make close-up readings of the darkest and brightest objects in the scene and set the arrow position midway between the light values obtained. The correct f/stop to use will then be found opposite the particular shutter speed of your ciné camera.

The standard number of frames exposed by the average amateur ciné camera is 16 per second at a shutter speed of 1/30th of a second. For other frames per second than 16, the shutter speed is proportional, use the settings shown in the following table:

8 frames per second				1/15th
16	„	„	„	1/30th
24	„	„	„	1/50th
32	„	„	„	1/60th
48	„	„	„	1/100th
64	„	„	„	1/125th



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

Colour Ciné Film

Follow the accompanying instructions and those given for still colour film photographs. Until experience has been gained avoid extreme lighting conditions and allow the colour to provide all the necessary contrast. For outdoor shots, expose between 10 a.m. and 3 p.m. if possible as the quality of the light is normally best during that period. If the sun is shining it should be directly behind the camera. Watch the reflection values of the surroundings, i.e. a white dress can be turned pink by a red reflection. Avoid shadows and subjects in shadow. 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. Best results are obtained on a clear sunny day.

ADDITIONAL NOTES — STILL & CINÉ

Backlighted Subjects

If the meter is aimed directly at a back-lighted subject, i.e. one where the main lighting comes from behind, it is obvious that the light value reading can be inflated resulting in under exposure.

To overcome this, turn around and make the reading on a similar object with your back to the lighting so that your body casts a shadow on the substitute object.

For example, in the adjacent picture a close-up reading could be made of your hand for the sails or a handkerchief for the hull of the boat ensuring that the substitute object is in shadow.

For all beach scenes where sand is back lighted, or sparkling snow scenes, light readings should be taken with the sun over your shoulder. Direct reflections from sparkling water should be avoided when taking light readings.



Copy Work

When copying subjects which are in black and white or colour the following procedure is recommended as a guide and is subject to variation to suit materials and processing methods used. First divide the Weston Rating by five and set this value in the Weston Rating window. Then take a reading from a white card placed over the subject. Finally set the arrow position on the calculator dial at the light reading obtained and select the camera settings in the usual manner.

Filters

Filters have a multiplying factor in relation to the emulsion with which they are used and the exposure required must be increased accordingly. The easiest method of making this increase is to divide the filter factor into the Weston Rating of the emulsion and set the calculator dial on the meter with the resultant value. For example the filter factor using a certain film may be 2 and the Weston Rating 100. Dividing 100 by 2, the result, 50, is used to set the Weston Rating on the calculator dial.

The markings showing "whole stop" positions between the "normal" arrow and the "O" can also be used to correct for filters. By setting to "C" allowance is automatically made for

a filter with a factor of 2. If the dot between "C" and "O" is used, allowance is made for a factor of 4 and if the "O" is used, a factor of 8.

High Altitudes

At high altitudes there is considerable ultra-violet radiation present to which emulsions are sensitive. To eliminate this effect it is always good practice to use a haze filter. No exposure correction is necessary so use the meter in the normal manner.

Equipment Errors

Photographic equipment is sometimes subject to small errors, e.g. in shutter speeds and f/stops. Usually these errors cancel each other but it is possible for them to be additive, resulting in consistent over or under exposure. These errors can be compensated for by adjusting the listed Weston Ratings, lowering them if results are consistently under exposed and raising them if over exposed.

Weston Ratings

Different developers have an influence on the effective speed value of an emulsion. A note of this is made in the list of Weston Ratings.

The Invercone

INCIDENT LIGHT ATTACHMENT

For those who prefer the incident light method of exposure determination, i.e. measuring the light falling on the subject, the Weston Master III can readily be converted into an incident light meter by fitting the Invercone Attachment.

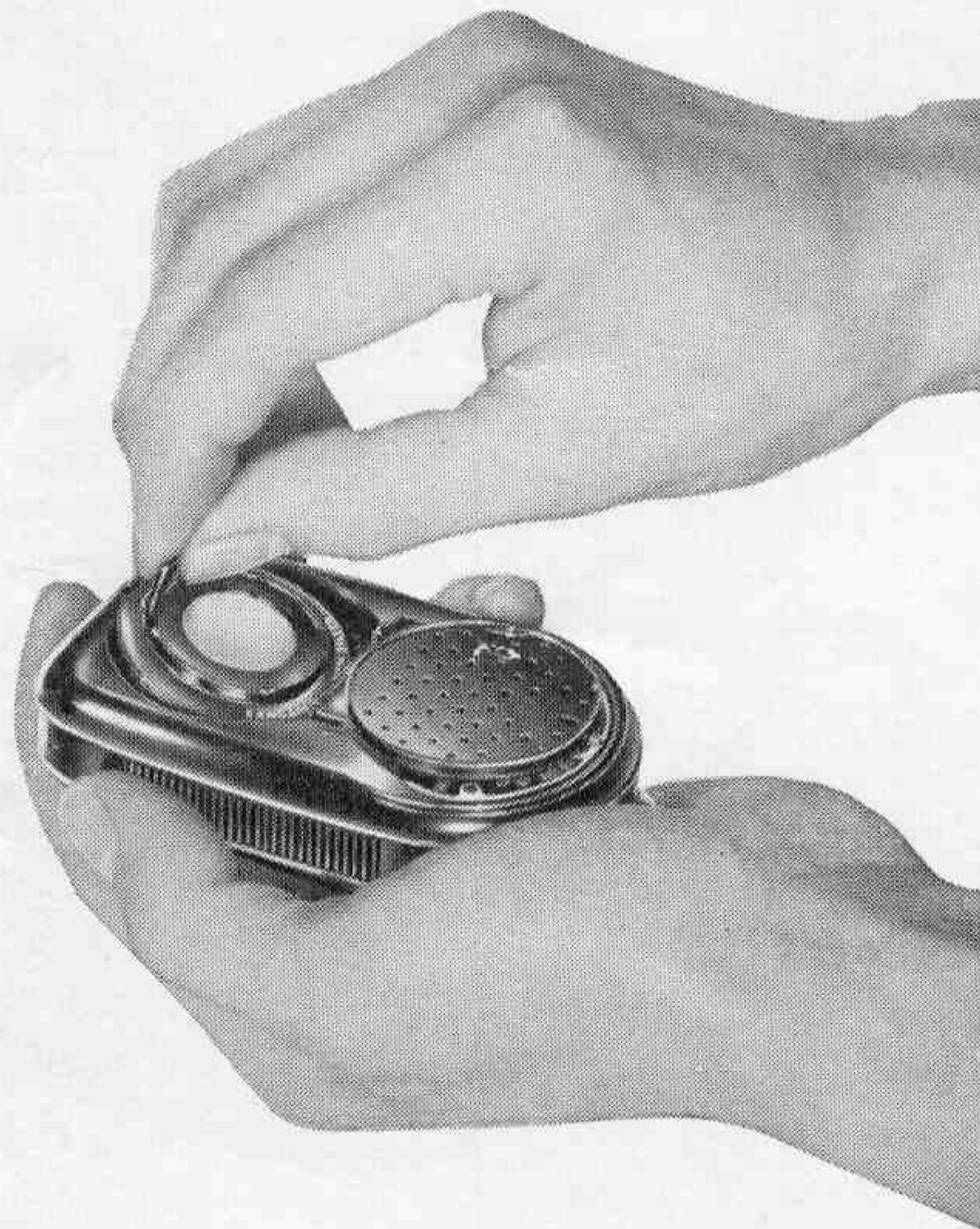
The Invercone attachment, consisting of two parts—an integrating cone and auxiliary multiplier, is easily fitted to the meter in the manner shown overleaf.



FITTING THE INVERCONE



1. Where illumination is relatively low, open the meter's baffle and slip the Invercone into place. The Auxiliary Multiplier is not used.



2. When illumination level requires use of the high light scale, open the baffle and insert the Auxiliary Multiplier.



3. Snap the Invercone into place over the Multiplier.

USING THE INVERCONE

The way in which the Incident Light Method is applied in a scene will depend on prevailing conditions as well as personal preference. Some photographers prefer the Incident Light Method when using reversal materials. Some recommended ways of using the Weston Master and Invercone for incident light measurements are given below.

Front or Flatly Lighted Scenes

In scenes such as these in which there are no dark or extensive shadow areas and where the lighting is from behind the camera at a low angle of elevation, direct the meter at the camera from the subject position. Note the meter reading and proceed as though a reflected light reading had been taken.

Side or Back Lighted Scenes

In any side or back lighted scene, or where the lighting is frontal and at a high angle of elevation, two incident light readings from the subject position are recommended; one with the meter pointed at the main light source and the other towards the camera. Having taken these two readings, the

arrow position on the calculator dial is set midway between the two light values, thus giving a balanced exposure between the extremes.

Substitute Readings

For outdoor scenes where it is impracticable to reach the subject, a substitute reading can be taken from the camera position so long as the conditions of illumination are the same as on the subject.

Lighting Contrast Control

A very useful check in the studio against too much lighting contrast, particularly for colour work, is to take two light readings, both being taken with the Invercone fitted and from the subject position. First take a maximum light source reading and then a camera direction reading. Set the arrow position on the exposure dial midway between the two light values obtained. For colour and most monochrome work these two readings should not be outside the limits indicated by the A and C positions (i.e. the illumination range should not normally exceed 4 to 1.)

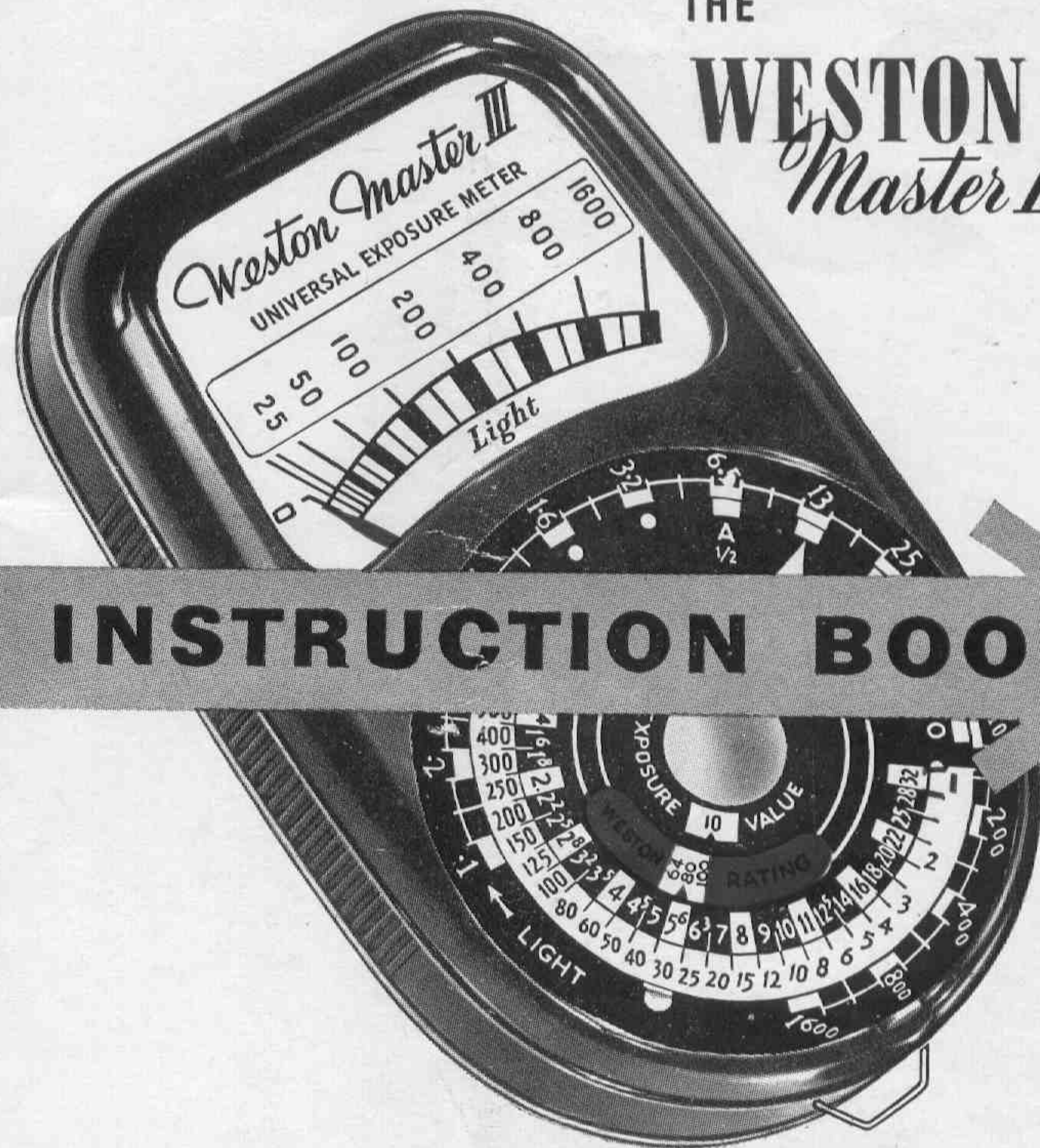
CARE OF YOUR EXPOSURE METER

1. Your "Master" meter is rugged and well made but like a fine watch, which it resembles in many ways, it should be treated with all reasonable care.
2. 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 small screw on the back of the meter below the cell until the pointer rests on zero. Tilt the meter at an angle of about 45° when making the adjustment. Zero adjustment, however, is only very occasionally necessary and should be made with great care.
3. Do not leave the photo-cell exposed to strong sunlight for long periods. This treatment is harmful. Keep the meter in its case or box when not in use.
4. Do not drop the meter, otherwise its jewelled bearings may suffer.
5. Do not overheat the meter by leaving it on a hot radiator, etc. Normal temperature or even abnormal summer temperatures will not harm the meter.
6. Your "Master" meter is moisture proof but not waterproof, so do not immerse it in water.

**ADDITIONAL COPIES OF THIS INSTRUCTION BOOK
ONE SHILLING EACH**



THE
WESTON
Master III



INSTRUCTION BOOK