

# Aerial Photographs

**REFLECTED  
LIGHT**

Point meter at  
ground



**INCIDENT  
LIGHT**

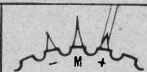
Point meter at  
sun



# Portraits

**REFLECTED  
LIGHT**

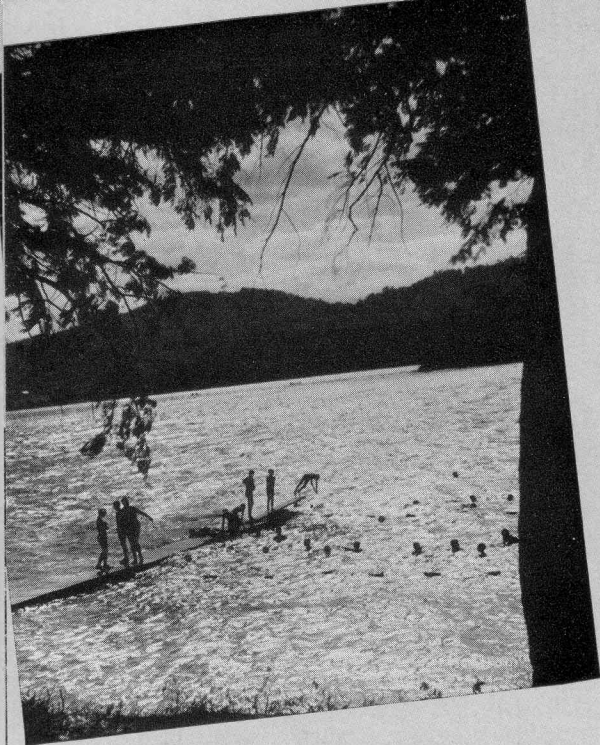
Take close-up reading  
on face



**INCIDENT  
LIGHT**

Point meter at  
camera

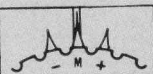




## *Silhouettes*

**REFLECTED  
LIGHT**

Point meter at  
scene



**REFLECTED  
LIGHT**

Take reading on palm  
of your hand or off  
subject's face



**INCIDENT  
LIGHT**

Point meter at  
camera





## *Inaccessible Subjects*

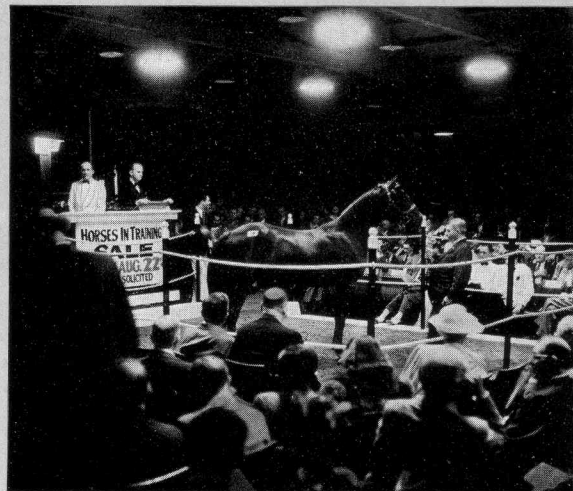
**REFLECTED  
LIGHT**

Take reading off palm of hand	
Point meter at scene	

**INCIDENT  
LIGHT**

Point meter at sun	
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## *Dark Backgrounds*



**REFLECTED  
LIGHT**

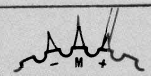
Point meter at scene	
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## Light Backgrounds

**REFLECTED  
LIGHT**

Point meter at  
subject



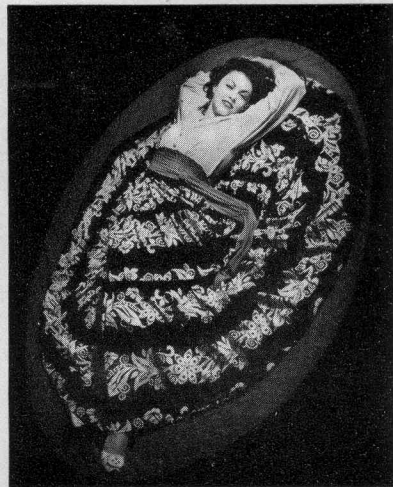
**INCIDENT  
LIGHT**

Point meter at  
camera



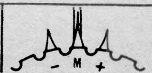
32

## Copy Shots



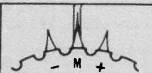
**REFLECTED  
LIGHT**

Take reading on white  
card held in copy  
position†



**INCIDENT  
LIGHT**

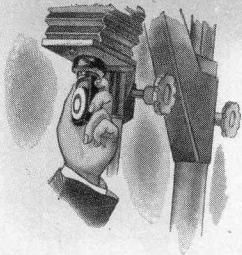
Point meter at  
camera



33

†Use T\* exposure index or divide T exposure index by five.

## Darkroom Use and LIGHT MEASUREMENTS



When using your meter under these conditions, unlock the meter pointer.

Exposures required for printing and enlarging can be determined from comparative readings made with your meter. In contact printing, the light transmitted by the negative is measured by holding the meter against the negative.

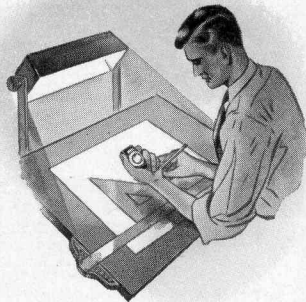
For enlargements, the light transmitted by the negative through the enlarger lens is measured by holding the meter close to the lens. Additional information relevant to this subject is given in the G-E Photo Data Book.

Your meter may be used to determine proper illumination in the home, office, and shop. Recommended footcandles of light required for various activities are listed below:

ACTIVITIES	RECOMMENDED FOOTCANDLES
Factory	
Rough work	10
Fine work	50-100
Stores	15-20
Offices	30-50
Drafting Rooms	30-50
Schools	20-50
Home	
Sewing	50-60
Reading	25-35

(See *Technical Data*, page 43 and 44, for approximate scale equivalents.)

When measuring light, hold the meter at the place on which your eyes are normally focused, with the incident-light attachment held parallel to work and pointed toward the light source.



## Design Features

The exposure-meter case is molded from fiber-impregnated plastic, capable of withstanding high shock. Ridges along the sides insure a nonslip grip of the meter.

The lens is made of specially formed plastic. Its angle of acceptance corresponds to the angle of view of the average movie or still camera.

A light-reducing shutter, mounted directly behind the plastic lens, is mechanically coupled to the *f*-stop dial. It is automatically opened or closed when you preset your meter.

A HIGH (bright light) range selection closes the shutter, reducing the incoming beam of light to a low-intensity level for high-accuracy measurements. A LOW (medium or dim light) range selection opens the shutter, allowing an unobstructed beam of light to be focused upon the photovoltaic cell, assuring maximum sensitivity.

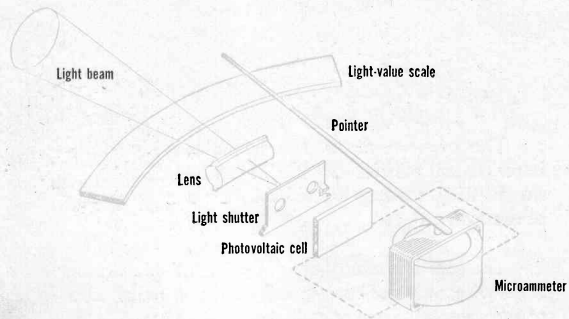
This photoelectric cell directly transforms light energy into measurable electric power. A current of approximately 150-millionths of an ampere is being

Case

Lens

Light  
Shutter

Photovol-  
taic Cell



produced by the light cell when the meter pointer is at full-scale position.

The sensitivity of the cell to light of different colors is comparable to that of the average panchromatic film.

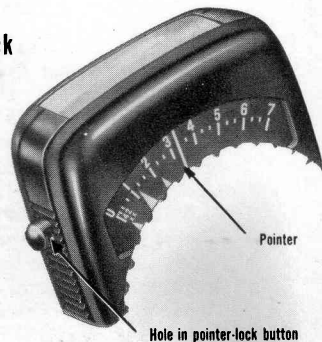
### Microammeter

The microammeter operates quite similarly to a small electric motor, except that its rotating element is not required to make more than an approximate one-quarter turn. The meter pointer is attached to this element and moves across the light scale in exact proportion to the film's response, assuring uniformly accurate readings throughout the range of the meter.

### Pointer Lock

The pointer lock allows your meter to remember what it has read. For normal usage, the button is pressed to free the pointer, and released to accurately fix it at the measured light value.

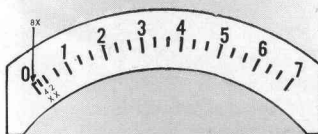
This meter has been modified to incorporate an improved type of pointer lock. Meters with this new type of lock do not have the small hole in push button as is shown on the preceding pages.



### Light-value Scale

The light-value scale has major divisions from 0 to 7. Each unit is the equivalent of a full *f*-stop. Normally it will not be necessary to read this scale since the light values are synchronized with the *f*-stop dial.

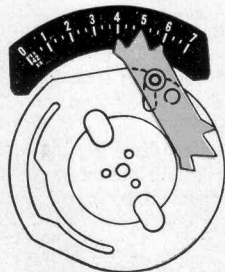
Very dim lighting conditions accompanied by ex-



treme contrast may give exceptionally low meter readings. The LOW trident, however, cannot be moved down scale beyond the first small division to the left of the number one. To evaluate readings which appear lower on the scale, first, move the trident as far down scale as it will go. The multipliers 2 $\times$ , 4 $\times$ , or 8 $\times$  associated with the pointer position should then be used. The shutter time should be increased by multiplying the time by this factor; or the aperture setting may be increased 1, 2, or 3 *f*-stops, respectively. Dividing the film-exposure-index number by the  $\times$  factor will give similar results.

For light measurements the instrument readings may be converted into fundamental light units by referring to the tables on pages 43 and 44.

### Trident Analyzer



Light values are interpreted and transferred into accurate exposures by means of the trident analyzer. This exclusive feature of the G-E meter is also a convenient means of analyzing scenes. It enables the user quickly to evaluate the subject for high-lights and shadows.

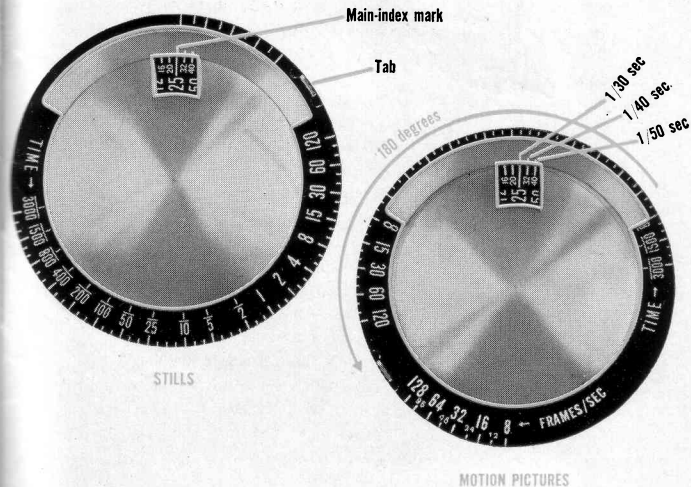
The trident analyzer has three tines (or teeth) each of which has a specific use. The use of the trident has been previously described on page

12, and sample settings are also shown with each of the illustrations appearing in this book.

Two tridents are coupled to the mechanism of the meter, but only one is in view at a time. Setting the relative light range on the *f*-stop dial will automatically select the proper trident. Shifting illumination ranges from LOW to HIGH causes the trident opposite LOW to go off the high end of the scale and to go out of sight. Simultaneously a second trident appears midway on the scale opposite HIGH.

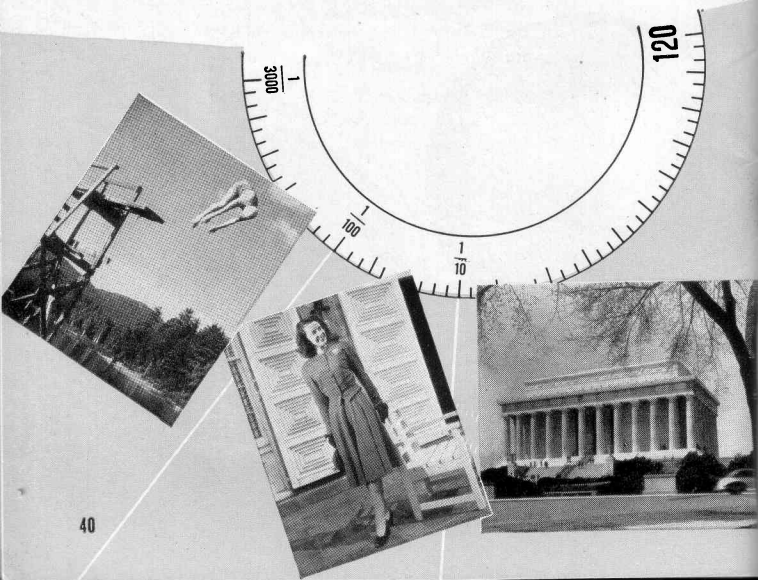
### Film-exposure Index

Your meter has a complete range of standard film-exposure indexes for both still-camera and motion-



picture films. These index numbers are in accordance with American Standard Z38.2.1 for evaluating photographic film and may be obtained from all film manufacturers or from the G-E Film Value Leaflet (GED-744) packed with your meter.

**Color filters** may be used by dividing the film-exposure index by the filter factor. For example, if the listed film-exposure index is 100, and the filter factor 2, then the film-exposure index should be set at 50.



## f-stop Dial

Diaphragm settings are marked on the *f*-stop (outer) dial. *f*-stop divisions have been spaced around the outside edge of this dial. These can be used advantageously when analyzing or scanning.

Aligning the trident indicator with the meter pointer automatically positions the *f*-stop dial. Accurate combinations of *f*-stops on the outer dial and shutter speeds on the inner dial are then arranged opposite each other. In order to select the most desirable combination it is necessary to decide whether a fast or slow shutter speed is required to stop the action and, correspondingly, what depth of field is most desirable. The examples shown on page 40 suggest the portion of the dials from which the exposures were taken for several typical subjects.

Conversion of *f*-stops to U.S. stops are as follows:

<i>f</i>	4	4.5	5	5.6	6.3	8	11	16	22	32
U.S.	1	1.4	1.6	2	2.5	4	8	16	32	64

Intermediate *f*-stops are given in the *Technical Data* section, page 44.

## Shutter-speed Dial

Exposure time in seconds, and frames per second are scaled on the shutter-speed (inner) dial.

Intermediate shutter speeds, not evaluated on the dial, are given in the *Technical Data* section, page 44.



## Incident-light Attachment\*



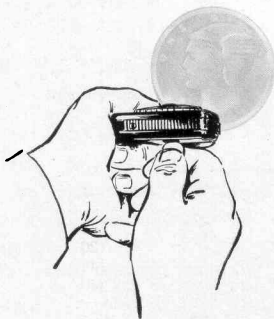
Incident-light measurements can be made by simply slipping the incident-light attachment over the cell end of your meter. The attachment and exposure meter have been carefully calibrated and should be used together only for measuring incident light. When the meter and attachment are used in combination, the dial readings are direct and do not require correction.

## Zero-set Adjustment

If your meter receives normal use and care, no special adjustments will be required. From time to time, however, the zero position may be checked.

To do this, hold your meter horizontally and cover the lens with your hand so that no light is admitted to the photovoltaic cell. Press the pointer-lock button and observe whether the meter pointer is directly over the zero-scale mark.

Correct any deviations from an absolute zero setting by turning the zero-set adjustment slightly left or right until the meter pointer is directly over the zero position.



\*Available at photographic dealers as a separate accessory.

# Technical Data

Scale length, each range . . . 60 deg  
Scale distribution (logarithmic) . . . 10 deg per *f*-stop  
Ratio between HIGH and LOW trident readings . . . 16 to 1

**Scale**

The exposure required to photograph an average subject is given by the formulas—

**Calibration Formulas**

$$\text{Incident Light} \\ T = \frac{CA^2}{IS}$$

$$\text{Reflected Light} \\ T = \frac{KA^2}{BS}$$

**T** = Exposure time in seconds

**A** = Relative aperture or *f*-number of lens

**S** = Film-exposure index

**B** = Scene brightness, reflected light, in candles per square foot

**I** = Incident light in footcandles

**K** = 1.35; ASA calibration constant, reflected light

**C** = 20; ASA calibration constant, incident light

**Calibration Data**

**Incident light** • The light falling upon an object is called incident light. This illumination is measured by using the incident-light attachment with the meter.

Scale Point	LOW Range (ft-c)	HIGH Range (ft-c)
• (SMALL DOT)	6	96
4 ×	12	192
2 ×	24	384
7 deg	48	768
1	60	960
2	120	1900
3	240	3800
4	480	7600
5	960	15000
6	1900	30000
7	3800	61000

**Reflected Light** • Reflected light can be expressed in terms of the brightness of the reflecting surface. The brightness of a surface is expressed in footlamberts or in candles per sq ft (c/sq ft) which is equal to  $\pi$  footlamberts. The brightness (footlamberts) of a perfectly diffusing surface is equal to the illumination (ft-c), multiplied by the reflectance of the surface. The reflectance of a surface is the fraction of the incident light which is reflected in a given direction.

Scale Point	LOW Range		HIGH Range	
	c/sq ft	ft-L	c/sq ft	ft-L
• (SMALL DOT)	.4	1.26	6.4	20
4×	.8	2.52	12.8	40
2×	1.6	5.03	25.6	80
7 deg	3.17	10	50	160
1	4	12.5	64	200
2	8	25	128	400
3	16	50	256	800
4	32	100	512	1600
5	64	200	1024	3200
6	128	400	2048	6400
7	256	800	4100	12800

Angle of incidence for 50 per cent cut off:

LOW trident	horizontal	± 38 deg
	vertical—up	+ 16 deg
	vertical—down	- 22 deg
HIGH trident	horizontal	± 30 deg
	vertical	± 17 deg

Reflectance of equivalent gray card... 20 per cent

## Care and Handling

Your exposure meter is a precision instrument. It should receive the same careful handling and treatment that are given to an expensive camera or any fine precision instrument. Your meter has been assembled with watchmaker's skill and should not, under any circumstances, be tampered with or taken apart.

Several general precautions must always be observed.

### EXTREME TEMPERATURES

Your meter should not be subjected to extreme heat. Temperatures in excess of normal atmospheric conditions (130F) may be injurious to the photovoltaic cell.

Due to its hermetically sealed construction, the cell is not affected by low temperatures and is resistant to moisture.

### CARE OF LENS

Avoid scratching the lens, or allowing dust to accumulate on its surface, which will hinder the transmission of light.

### CARRYING THE METER

Although your G-E exposure meter will withstand normal shock and handling, be particularly careful not to drop or bang it. A neck cord is provided with each meter. Your meter may be conveniently carried in the G-E everready leather case.

## Mailing Instructions for Repairs

If your exposure meter becomes damaged and fails to operate, return it to your photographic dealer.

If not convenient to return to the dealer, it should be mailed directly to the General Electric Company—40 Federal St., West Lynn 3, Mass., or (West of Rocky Mountains) to 361 Bryant St., San Francisco 6, Calif. If a resident of Canada send to Canadian General Electric Company, Ltd., 212 King St., West, Toronto, Canada.

When returning an exposure meter for repairs, attach an identification tag bearing the sender's name, address, and the instrument's serial number.

To avoid further damage during shipment, carefully pack the meter in a stiff, sturdy box; make sure that sufficient padding is around the instrument to absorb the shock of handling.



## Photo Data Service

General Electric has made available for your use its Photo Data Service Bureau and Sensitometric Laboratory.

The purpose of this Bureau and Laboratory is to offer assistance in solving your problems dealing with exposure, lighting, and the use of the G-E meter in the darkroom.

Address all correspondence relevant to these subjects to:

**GENERAL ELECTRIC COMPANY**

Photo Data Service Bureau

*Meter and Instrument Division*

40 Federal St., West Lynn 3, Mass.

## Your Exposure Meter

*For Quality Control*

Lord Kelvin, a British scientist who pioneered in scientific measurements, once said, "When you can measure what you are speaking about, and, express it in numbers, you know something about it."

The Type PR-1 G-E exposure meter has been designed specifically to help photographers accurately measure the quantities which are essential for making high-quality pictures. Any picture can be lost by underexposure or degraded by overexposure. By using the G-E exposure meter, even the inexperienced picture taker can obtain good results.

Frequently pictures cannot be retaken to catch the particular mood of loved ones, friends and pets. Neither are the pleasant memories of vacations commensurate with poorly preserved pictures. He who has mastered the simple technique of using a good exposure meter has the greater assurance of picture success.

In many instances, uniform exposures which are within the printable latitude of photographic emulsion, particularly color film, will often result in a savings of more than the price of film.

It can truly be said that your G-E exposure meter is the ideal companion for your camera.

*Photographs in this book by*

GEORGE BURNS

GLEN ANDERSON

ALLEN STIMSON

