LEICA

POCKET COMPANION

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AMPHOTO
New York, N. Y. 10010

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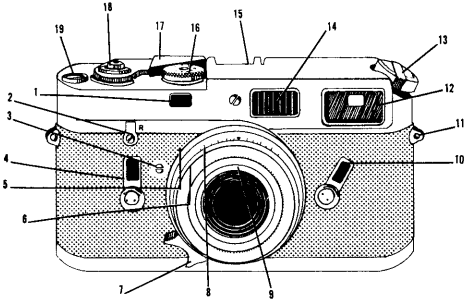
Chapter I

THE LEICA SYSTEM

1. The Camera

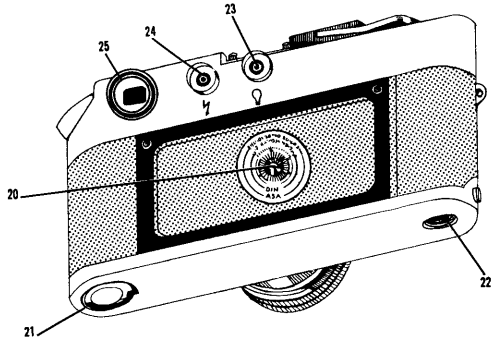
1.1 Current models

a) *Leica M4:* 35mm range-viewfinder camera. Single click-stop dial controls focal-plane shutter. Shutter speeds of 1 second to 1/1000 sec. plus "B" (bulb), may be set before or after winding shutter; intermediate speeds except between 1/8 sec. and 1/15 sec., and between 1/30 sec. and 1/60 sec. X-synch at 1/50 sec. Automatic flash synchronization. Film advance by new single-stroke rapid-wind lever. Exposure counter resets to "O" and rewind lever resets automatically to "Advance" when film is loaded into camera. Built-in self-timer with 5 to 10 seconds delay. Rangefinder-viewfinder shows bright, ¾ life-size image. Illuminated bright-line frames appear automatically when 35mm, 50mm, 90mm, or 135mm lens is mounted on camera. Automatic parallax compensation through ranges of all these lenses. Rangefinder may be used with all lenses from 21mm to 135mm. Camera features new speed loading system, simplifying and hastening loading process by many times; new canted rapid-rewind crank; and improved synch contacts. M4 may be used with Leica Motor Drive for rapid-sequence photography. Leica meters MR and MC couple to shutter-speed dial and adjust shutter ac-



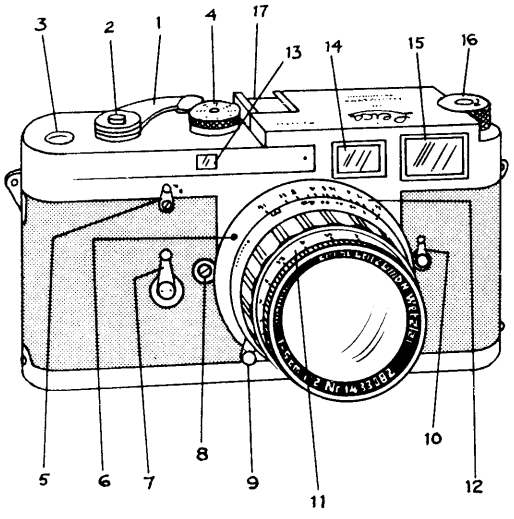
1-1.1a. FRONT VIEW OF LEICA M4

1 Rangefinder window
2 Reversing lever for rewinding the film
3 Button of bayonet lock
4 Delayed action release (self-timer)
5 Red dot on bayonet mount of lens
6 Distance scale (in meters and feet)
7 Lens focusing lever
8 Depth of field scale
9 Aperture ring
10 Selector lever for viewfinder
11 Eyelet for carrying strap
12 Viewfinder window
13 Canted rewind knob
14 Illuminating window for finder frames
15 Accessory shoe
16 Shutter speed dial
17 Film transport and shutter tensioning lever
18 Shutter release button
19 Film counter



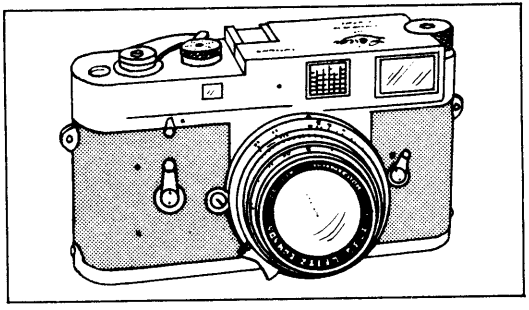
1-1.1a. BACK VIEW OF LEICA M4

20 Film indicator
21 Base plate locking key
22 Tripod bush
23 Flash socket for flashbulbs
24 Flash socket for electronic flash
25 Finder eyepiece



I-1.1a. FRONT VIEW OF LEICA M3

1 Film transport and shutter tensioning lever
2 Shutter release button
3 Film counter
4 Shutter speed dial
5 Reversing lever for rewinding the film
6 Red dot on bayonet mount of lens
7 Delayed action release (self-timer)
8 Button of bayonet lock
9 Lens focusing lever
10 Selector lever for viewfinder
11 Aperture scale of lens
12 Depth of field scale
13 Rangefinder window



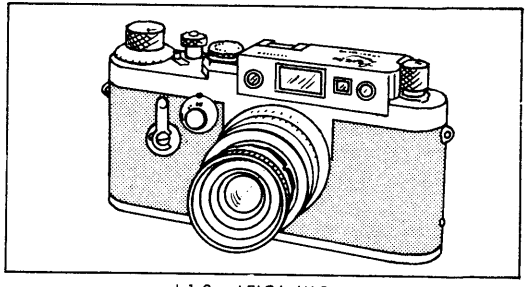
I-1.1b. LEICA M2

cording to reading. M4 takes all standard bayonet-mount Leica lenses and longer (65-560mm) Telyt lenses with reflex Visoflex systems.

b) *Leica M3:* Similar to M4, but without speed loading, rewind crank, or option for motor drive. Viewfinder image full life-size. Built-in frame finders for 50mm, 90mm, and 135mm lenses. In later models, frames can be "previewed." Automatic exposure counter; built-in self-timer. M3 takes full range of bayonet-mount lenses (requires Optical Viewing Unit for 35mm); screw mount lenses by means of an adaptor; Visoflex system.

c) *Leica M2:* Similar to M4 and M3. Viewfinder image ¾ life size. Frame finders for 35mm, 50mm, and 90mm lenses. Exposure counter reset manually. May be used with motor drive, Leicavit Rapid Winder attachment. M2X has no self-timer.

d) *Leica MP:* Similar to M2, but with built-in Leicavit Rapid Winder and no self-timer.



I-1.2a. LEICA IIIG

e) *Leica MD:* Specialty-purpose M-series body, for scientific, technical use. Has no rangefinder or viewfinder (to be used with Visoflex reflex housing and similar attachments), but may be used with all lenses. Shutter speeds of one second to 1/1000 sec.

1.2 Recent models

a) *Leica M1:* Similar to M3 and M2 minus rangefinder, self-timer and frame selector. Parallax-corrected viewfinder for 35mm and 50mm lenses. Used mainly for laboratory work; also as body for use with Visoflex II. Accepts bayonet-mounted lenses.

b) *Leica IIIg:* Shutter speeds in same geometric sequence as M3; include "time" and "bulb". Separate, adjacent windows for viewfinder and coupled rangefinder. Viewfinder has bright-line frames for 50mm and 90mm lenses. Parallax compensation for both fields throughout normal focusing. Automatic flash synchronization. Accepts screw-mounting Leica lenses and accessories.

c) *Leica Ig:* All basic features of IIIg but no rangefinder or viewfinder. Two accessory clips for accessory rangefinder and viewfinder.

d) *Leica IIIf:* First of the Leica cameras to have built-in flash synchronization controlled by selector dial at base of top shutter speed ring. Two different production series had different sets of shutter speeds. Mechanical specifications and operation similar to Leica IIIg except for smaller viewfinder, no bright-line field indicator and no automatic parallax compensation. Some early production did not have built-in self-timer.

e) *Leica IIf:* Same features as IIIf but no slow shutter speeds, no built-in self-timer; top speed 1/500.

f) *Leica If:* Same as IIf without rangefinder and viewfinder.

1.3 Earlier models (working back)

a) *Leica 72:* Single-frame (18 x 24mm image), up to 72 exposures. Physically similar to IIIb. Flash synch.

b) *Leica IIIc, IIc, Ic:* IIIc similar to IIIb, slightly longer body, other minor changes. IIc has 1/500 top speed, no slow speeds. Ic similar to IIc but no rangefinder.

c) *Leica IIIb:* Similar to IIIa but rangefinder and viewfinder windows closer.

d) *Leica IIIa:* Top shutter speed of 1/1000. Otherwise similar to III.

e) *Leica III (Model F):* First model series to have separate front dial for slow shutter speeds.

f) *Leica II (Model D):* First coupled rangefinder. Otherwise same as Leica E (Standard).

g) *Leica E (Standard):* Similar to Model C, but rewind knob pulls up.

h) *Leica C:* First to use interchangeable lenses.

i) *Leica I (A & B):* First models, fixed lenses; A with focal plane shutter; B with Compur shutter.

2. Lenses

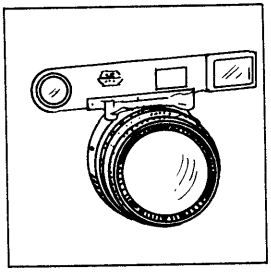
2.1 Choice of lenses

a) *Focal length:* From 21mm to 135mm for direct attachment to camera; to 560mm with Visoflex.

b) *Mounts:* Screw-mounts for all cameras before M-series. Bayonet-mounts for latter. Adapters for using screw-mounts with M-series.

c) *Wide-angle lenses:* 21mm Super Angulon *f*/3.4; 28mm Elmarit *f*/2.8; 35mm Summaron f/2.8, Summicron *f*/2, Summilux *f*/1.4. Special viewfinders needed except with M-series. M1, M2, and M4 have built-in 35mm frames, but for M3, 35mm lenses should be obtained in "RF" series, with Optical Viewing Unit. Use in situations calling for wide coverage of subject matter.

d) *Standard lenses:* 50mm Elmar *f*/2.8, Summicron *f*/2, Summilux *f*/1.4, Noctilux



I-2.1d. Focusing mount for dual range 50mm Summicron.

f/1.2. Elmar has collapsible mount. Summicron available in Dual Range model, with Optical Viewing Unit, for focusing down to 19 inches. New Noctilux features aspherical lens surfaces, high-refraction glass, near elimination of flare and coma. For general photography.

e) *Long-focus lenses:* Medium long-focus are 90mm Elmar *f*/4, 90mm Elmarit *f*/2.8, Tele-Elmarit *f*/2.8, 90mm Summicron *f*/2. Elmar *f*/4 available in rigid and collapsible (for M-series only) mounts. 90mm lenses produce image details almost twice diameter of 50mm lenses. 135mm Tele-Elmar *f*/4 and 135mm Elmarit *f*/2.8 produce images nearly three times diameter of 50mm lens. Long working distances useful for sports, wild life, and candid photography; also portraiture and small architectural details.

2.2 Visoflex system

a) *Uses:* Visoflex is reflex-focusing unit attached to camera, accepting lenses described below; shows ground glass image of subject.

Used in telephotography, extreme close-ups, macrophotography. Choice of image-erecting eye-level magnifier or simple magnifier used at waist-level.

b) *Visoflex I:* Deeper body makes it best suited for closest copy set-ups. For telephotography, use 125mm Hektor *f*/2.5, 135mm Elmar *f*/4 (both discontinued), 200mm Telyt *f*/4, 280mm Telyt *f*/4.8, and 400mm Telyt *f*/5, all in short mount. Lenses shorter than 125mm cannot be focused at infinity.

c) *Visoflex II:* More compact, adapted to smaller lenses; takes all or units of 65mm Elmar *f*/3.5; 90mm Elmar *f*/4; 90mm Elmarit *f*/2.8; 90mm Summicron *f*/2; 135mm Elmarit *f*/2.8; 135mm Tele-Elmar *f*/4. With adapter ring (#16,466), Visoflex I lenses can be used; with new Televit pistol-grip rapid-focusing device (#14,136) the largest and newest Leica lenses, the 400mm and 560mm Telyt *f*/5.6, may be attached. All lenses can be focused at infinity.

d) *Visoflex III:* For Leica-M bayonet mount only. Improvements include: (1) Three-way instant-return mirror control: rapid upswing for action photography, slow upswing for slow-speed technical photography, and lock-up for close-ups, macrophotography, etc. (2) Lever-operated lock for instant mounting or removal from camera, without removal of 4X eye-level magnifier. Accepts same lenses and accessories as Visoflex II.

3. Close-up Systems

3.1 Optical close-focusing

a) *Uses:* Optical close-focusing devices increase extension between lens and film to permit focusing closer than normal range while using the camera's built-in range-and-viewfinders. Accuracy in focusing and viewing is provided by optical elements in front of rangefinder and viewfinder windows. Automatic parallax correction.

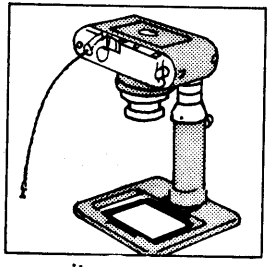
b) *M2, M3, M4:* Dual-range 50mm Summicron *f*/2 has close-up range, focusing to 19 inches; optical viewing unit is mounted on lens when it has been locked in closeup position. Leica Close-Focusing Device (#16,507), with optical components, serves same function with other 50mm Leica lenses, bayonet or screw; to 19 inches.

c) *Earlier Leica models:* Leica IIIg uses its own optical device (ADVOO) with finder attachment and supplementary lens, for all 50-mm lenses but Summarit and Summilux. To 20 inches, reproduction ratio 1:8. Leicas II to IIIf use three models: NOOKY for Elmar *f*/3.5; SOOKY for Elmar *f*/2.8 and Summicron *f*/2; NOKUM for screw-mount Hektor *f*/2.5 and Summar and Summitar *f*/2. Glass wedge comes between lens and rangefinder. To 17 inches, reproduction ratio 1:6.5.

3.2 Fixed-focus close-up units

a) *Universal copying stand:* For all Leicas, will photograph small areas in ratio 1:1, 1:1.5, 1:2 and 1:3. Mounting bracket on copying stand is adjustable in height. Furnished with 4 extension tubes, 3 field masks, 5X magnifier with ground glass housing to check focus. For any Leica 50mm lens (#16,511).

b) *Auxiliary reproduction units:* 4-legged devices used mainly for copying printed material or small objects. Extensible legs outline picture area and automatically hold camera at proper distance from subject. Easily taken apart for storage. Separate models for screw-mounting and bayonet-mounting lenses. For most 50mm lenses, extensible legs provide ratios of reproduction of 1:4, 1:6 and 1:9. Longest covers commercial letterheads adequately (#16,526).



1-3.2a. Universal copying stand for photographing small areas in four fixed ratios.

3.3 Variable-focus close-up units

a) *Focomat Ic copying stand:* With its carrying arm, provides rack-and-pinion fine adjustment for Leicas with Visoflex II or III, Bellows I or II. Column 32 inches high (#17,619; arm #17,624).

b) *Leica-Leicaflex copying stand:* New stand, accepts all Leicas with Visoflex II, M-series with Visoflex III, bellows. Column 31 inches high, baseboard 18″ x 19¾″; coarse and fine adjustment. Column swings for below-table copying (#16,707).

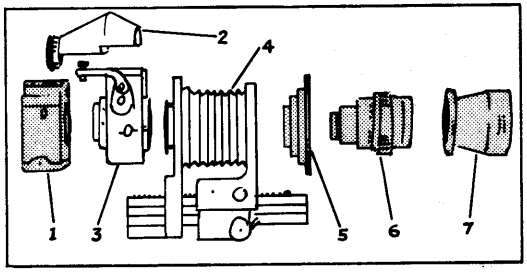
c) *Reprovit IIa:* Most sophisticated copying outfit, for M-series. Records both flat and solid objects at reproduction ratios of 1:19 to 1:1 with its own lens and illumination system. Consists of copy stand, focusing stage (bellows, rack-and-pinion adjustment), diaphragm lever, electromagnetic shutter release, electric interval timer, 4-lamp illuminator, 50mm Repro Focotar *f*/4.5 lens (#16,789).

3.4 Bellows Focusing Device I

Bellows Focusing Device I used with Visoflex I. Provides continuously variable extension between camera lens and focal plane. Can be used with any interchangeable Leica lens within a certain focusing range but is best used with 125mm or 135mm Hektor. Two scales on bed of bellows attachment show ratios of reproduction and exposure factors at various settings for both these lenses. Also with these lenses, unit provides continuous focus from infinity down to 1:1 image-object ratio (life-size).

3.5 Bellows Focusing Device II

Similar to Bellows Focusing Device I, but used with Visoflex II and III only. Lens units of Leica lenses from 65mm to 200mm give continuous focusing from infinity to 1.4:1 (except the 135mm Elmarit and 90mm Tele-Elmarit and Summicron, elements of which may be used in a limited focusing range for close-ups). For extreme close-ups, lenses of short focal length (35mm and 50mm) may be used within a limited range of focus. Two data scales: one gives reproduction ratios and corresponding exposure factors; the second gives actual bellows extension in millimeters.



1-3.5. Exploded view of Bellows Focusing Device II
1 Leica 2 Visoflex magnifier 3 Visoflex II or III body 4 Focusing Bellows II 5 Lens adapter ring for lens-head 6 Lens-head 7 Lens hood

4. Other Accessories

4.1 Focusing

a) *Focorapid:* Fast-focusing accessory for Visoflex II and III. Fits into palm so that side-mounted lever may be slid back and forth to follow focus, either freely or to preselected distance settings (2 adjustable stops). Accepts lens unit of 200mm Telyt *f*/4, and, with adapters, 135mm and 280mm lenses.

b) *Televit:* pistol-grip fast-focusing accessory for Visoflex II and III. Sliding tube freed by "trigger"; thumb wheel for fine focusing; shoulder stock for steadiness. Adjustable distance stops. Accepts lens heads of 280mm Telyt *f*/4.8 and 400mm Telyt *f*/5; accepts new 400mm and 560mm Telyt *f*/5.6 lenses.

4.2 Miscellaneous

a) *Motor drive:* For all M-series except M3. Allows rapid-sequence photography: automatic shutter firing and film advance. Variable speed (to 2½ frames/sec.), all shutter speeds. Predetermined number of exposures. M4, M2, M1, MP, and MD without motor must be modified by E. Leitz, Inc.

b) *Rapid winder:* For fast-action sequence pictures, special baseplate with trigger device for speedy film advance and shutter wind. Trigger used instead of camera-top lever or winding knob. Leicavit for Leica models M1 and M2 #14,008 and Leicavit for screw-mount Leica models with serial numbers above 400,000 #14,009. No rapid wind accessory necessary for M3, M4.

c) *Lens hoods:* Also called sunshades. Protect lens from direct rays of sun as well as from sky, other lights, and bright-reflecting surfaces. Special models for different lenses.

d) *Cable releases:* Use when exposures are made at slow speeds, in order not to jar camera. Remote control cable release (10 ft) available for screw-mounting Leica cameras.

e) *Table tripod:* For table-top photography of small objects.

f) *Correction lenses:* To correct eye defects, attached to camera, all models. Prescription needed. Correct for near- and far-sightedness and for astigmatism.

g) *Micro-Ibso:* Attachment for photomicrography. Replaces lens, attaches to Leica and tube of microscope. Has its own X-synch shutter and a 10X ocular, permitting simultaneous viewing and shooting. Image on film is ⅓X or ½X.

Chapter II

OPERATING THE CAMERA

NOTE: Sections 1 through 6 cover operation of M-series of Leica cameras. Section 7 covers operation of earlier models.

1. Camera Controls

1.1 Transport lever

Hold camera with both hands and with right thumb pull transport lever to right until it stops. This advances film and tensions shutter. Alternatively, work transport lever in two or more strokes. (NOTE: Early M3 cameras required at least two strokes.)

1.2 Release button

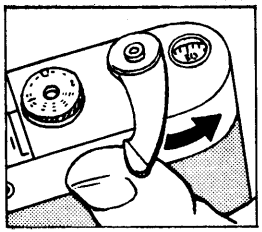
a) *Finger release:* Press finger down firmly but gently until click is heard. Never press sharply or picture may be blurred.

b) *Cable release:* Threaded hole in center of release button for screw-in cable release, used at slow shutter speeds or "time" exposure.

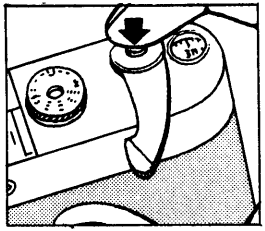
1.3 Shutter speed dial

a) *Duration of exposure:* Film will be exposed to light through operation of shutter. Numbers indicate fractions of second: 1,000 is 1/1000, 125 is 1/125, 4 is 1/4 and 1 is 1/1, which reduces to 1 full second. Red lightning flash symbol indicates 1/50 sec. for electronic flash. "B" indicates that shutter will remain open as long as release button is held down.

b) *Setting shutter speed:* Turn shutter speed dial before or after tensioning shutter until desired number or symbol (including intermediate speeds) appears opposite small index line.



II-1.1 Move lever as shown to advance film, cock shutter.



II-1.2. Shutter release button lies in center of lever.

1.4 Film counter

Each time transport lever is operated, number in film counter window is advanced. Stops at 40 and automatically returns to start when take-up spool is withdrawn.

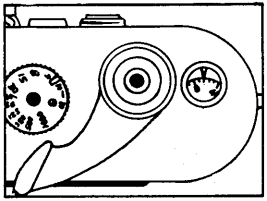
1.5 Iris diaphragm

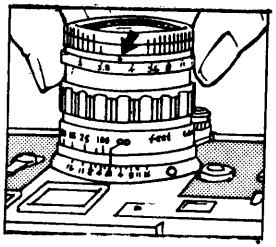
a) *Purpose:* Iris diaphragm regulates diameter of lens aperture. In poor light, lens aperture opened wider to admit more light. In bright light, smaller lens aperture used to limit amount of light passing through.

b) *Aperture scale:* Aperture numbers (1.4, 2, 2.8, 4, 5.6, 8, 11, 16, 22, 32) are called *f*/numbers; usually expressed as *f*/2.8 or *f*/11,

II-1.3. Shutter speed selector ring is to left of transport lever.

II-1.4. Frame counter is to right of transport lever.





11-1.5b. To open or close the iris diaphragm, turn f/stop scale so appropriate number is at dot.

etc. Length of scale of *f*/numbers varies with lens. Some lenses start with *f*/numbers not in the numerical sequence just given, such as 1.5, 2.5, 3.5, 4.5 and 5.

c) *Relationship of f/numbers:* Each f/number represents one-half or twice as much light transmission as adjacent number. Thus, *f*/4 admits half as much light as *f*/2.8 but twice as much light as *f*/5.6. Remember: higher *f*/number means smaller lens aperture and vice versa.

d) *Relationship to shutter speed dial:* One *f*/number corresponds to one shutter speed interval. Thus, *f*/8, 1/250 is equivalent of *f*/5.6, 1/500.

1.6 Viewfinder/rangefinder

a) *Combined viewing and focusing:* Everything visible within bright-line frame is recorded on film. As lens is focused, brilliant frame shifts. This is called parallax correction. In center of viewfinder is sharp rectangular section. As lens is focused, this section moves. To focus make this section concide with corresponding section of full viewfinder image.

b) *Automatic framing adjustment:* Frame for lens used becomes visible when that lens is placed on camera. M1 camera shows two frames simultaneously for 35mm and 50mm. M4 shows 35mm frame and 135mm corner marks simultaneously.

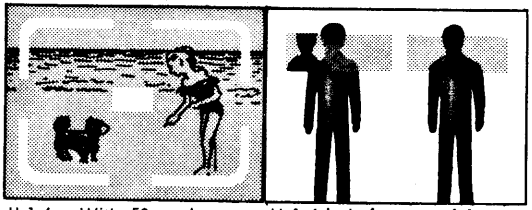
c) *Finder frame selector:* Moving small lever on front of camera shows area covered by lens. For example, with Leica M3, assuming that 50mm lens is fitted in camera, moving lever inwards will bring display of 90mm frame; moving lever outwards will bring display of 135mm field of view.

d) *Rangefinder focusing:* Turn lens mount so that infinity mark (∞) appears opposite distance indicator on base of lens. Point camera to vertical object a few yards away. Look through viewfinder. In center, side by side, you will see two images. This tells you lens is not correctly focused on object. Turn lens mount until images coincide. Subject is now in focus.

1.7 Depth of field scale

a) *Zone of sharpness:* Sharpest image point will be at exact distance (in plane parallel to film) on which lens is focused. Image sharpness falls off gradually in front of and behind that focused distance although it remains pictorially sharp for some depth. This acceptable zone of sharpness is also called "depth of field."

b) *Lens mount scale:* Limits of sharpness are marked off by lines on depth of field scale engraved on lens mount. Assume that lens aperture is set at *f*/4 and distance is set



II-1.6a. With 50mm lens in place, you see this in brilliant-frame viewfinder/rangefinder.

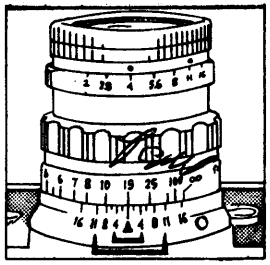
II-1.6d. Left, out-of-focus double image. Right, images coincide when lens is in focus.

at 15 ft. Depth of field then can be read as distance embraced by two *f*/4 markings—from about 12½ ft. to 20 ft. Now, assume a lens aperture of *f*/11, depth of field would be from about 9 to 40 ft.

c) *Optical depth-of-field indicator:* While focusing with rangefinder you can check whether subject in front of or behind point of focus will be acceptably sharp. Use special marks at top and bottom edges of rangefinder field. If separation of double outlines of subject does not exceed width of lower mark, at *f*/5.6, subject will be acceptably sharp. If double outlines do not exceed width of upper mark, subject will be within zone of sharpness at *f*/16. (NOTE: some early M3's did not have optical depth of field indicator.)

1.8 Delayed action release

Self-timer lever enables you to get into picture while built-in mechanism releases shutter. Camera must be mounted on tripod or other solid support. Pull down self-timer lever all the way for 10 sec. delay; half-way



II-1.7b. Triangle points to distance at which camera is focused. Inner brackets show closest point, outer brackets farthest point, of the zone of sharpness.

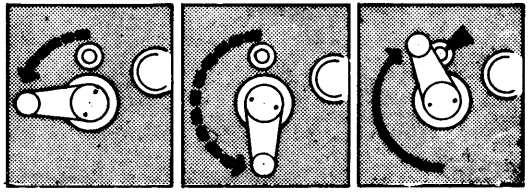
for 5 sec. delay. Intermediate positions for intermediate times. To make exposure, press small button directly above self-timer lever. Do not press shutter release button. (NOTE: early M2s did not have self-timer.)

2. Loading and Unloading Film

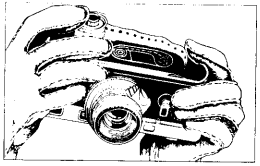
2.1 Opening camera

a) *Avoid strong light:* Never handle film in strong light. Outdoors, create shade by turning back to sun or by leaning forward.

b) *Check existing film load:* Before opening camera make sure film inside has been rewound into cassette. Pull out rewind knob and turn clockwise (direction of arrow). If



II-1.8. Left, about 5 second delay; center, about 10 second delay; right, point of release.



Loading M4

no resistance, open camera. Otherwise, first rewind film fully.

c) *Remove baseplate:* Turn key in baseplate in direction marked "open-auf." Lift off baseplate. Open hinged camera back. Place camera on table with open base upwards and lens toward you.

2.2 Inserting film in M4

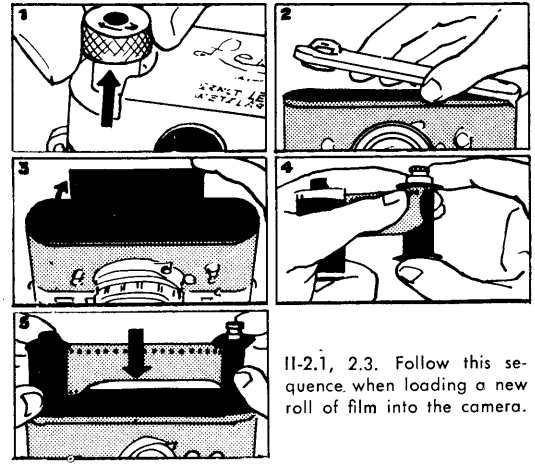
Speed loading system allows 1-step operation. Set cartridge into left-hand chamber, drawing out enough leader to reach right-hand chamber. Insert end of leader between 2 of 3 take-up prongs (there is no take-up spool). Press film down and close camera as in 2.3d.

2.3 Inserting film in other M models

a) *Attach film to spool:* Remove take-up spool. Hold film cassette in left hand and take-up spool in right, both with spool knobs pointing up. Push beginning of film under clamping spring of take-up spool as far as it will go. Perforated edge must be close to spool flange.

b) *Insert into camera:* Draw out enough film leader so cassette and take-up spool can fit their receptacles. Spool knobs should point upwards while film is inserted.

c) *Checking camera back:* Turn camera



II-2.1, 2.3. Follow this sequence when loading a new roll of film into the camera.

back toward you. Shiny side of film must be visible. Sprocket teeth should engage perforations. If not, pull transport lever slowly until perforations engage.

d) *Close camera:* Replace baseplate; locking key should be on top of film cassette. Turn key in direction of "close-zu."

2.4 Setting film indicators

a) *Film counter:* Advance film by alternately working advance lever and release shutter until film counter points to number 1. First exposure is now ready. If film is advancing properly, red dots on shaft of rewind knob rotate, rewind crank on M4 rotates backward.

b) *Film speed indicator:* Dial on back of

camera serves as reminder of kind of film in camera and its speed (exposure rating).

2.5 Removing film

a) *Rewind:* When last frame has been exposed, advance lever will not move further. To remove film, set rewind lever on front of camera to "R". (NOTE: Early M2s had a button which was held down during rewinding rather than a lever.) Pull out rewind knob (on M4, unfold rewind crank on canted dial) and turn clockwise (direction of arrow) until you feel resistance. Turn rewind knob one more time. Film will now be off take-up spool but short piece should protrude from cassette to prevent light leaks. Open camera (II-2.1) and remove cassette.

b) *Mark end of film:* Put an X or other mark on end of exposed film as reminder that it should not be used again.

c) *Partially exposed film:* To change film "in midstream," first note number in film counter. Assume this is 11. Remove film, as above, and mark next greater number on end of film—12. When reloading (II-2.2) advance to number 12. (One blank space will intervene in order to avoid overlapping of frames.) While advancing film, keep lens cap over lens to prevent film from being exposed second time.

2.6 Special Leitz cassettes

Preceding instructions based upon use of commercially available daylight cassettes. Special Leitz cassettes are absolutely light-tight, easily cleaned and never scratch film.

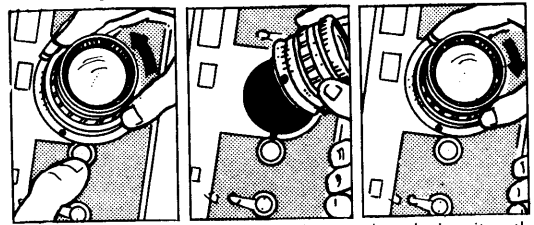
3. Interchanging Lenses

3.1 Removal of lens

Hold camera in left hand, pressing button of bayonet lock with thumb. Grip lens by focusing ring with right hand and turn counter-clockwise to release. Lenses fitted with infinity lock should be set at infinity during changing.

3.2 Insertion of lens

Match red dot on lens mount opposite red dot on camera body. Turn lens clockwise until bayonet lock clicks into place.



II-3.1, 3.2. When removing one lens and replacing it with another, twist lens in directions indicated. Be sure to align red dots for correct fit.

4. Using Exposure Meter

4.1 Mounting Leicameters MR, MC (M-series)

a) *Before mounting:* Set camera shutter speed dial to "B". Turn knurled ring of meter in direction of arrow until index line of knurled ring faces index mark of meter housing. Push knurled ring up against spring pressure, and turn in direction of arrow until triangular pointer on top of meter points to one of figures from 4 to 120 sec.

b) *Mounting:* Slide meter into accessory

clip. Turn knurled ring back until it drops and clicks into shutter speed dial of camera.

c) *Removal:* Turn knurled knob into position "B" by turning counterclockwise. Then push knob up and turn until triangular mark (▲) points to one of figures between 4 and 120 sec. Meter may now be withdrawn.

4.2 Setting film rating

Set dial for film speed rating. ASA ratings are divided between two windows from 6 ASA to 1000 ASA. Rotate inner dial to left or right until engraved line at edge of film rating window appears opposite rating for your film. (Same applies to DIN ratings, used for German films.)

4.3 Operating the meters

Hold camera with meter pointed toward subject (on MR, press needle-release button for 2 seconds). Needle will swing across scale. Rotate knurled knob until chosen *f*/number (on outer dial of meter) appears opposite indicator needle in channel of meter. Black triangle automatically shows shutter speed which is also automatically on the camera's speed dial. Alternative method: select shutter speed in advance, then find required *f*/number opposite indicator needle. For exposures longer than 1 sec., using "B" setting, MR disengages automatically from shutter-speed dial; MC is disengaged from shutter-speed dial by lifting knurled ring. To make flash exposures without removing meter, set red index dot between 1/30 and 1/60 to appear opposite black triangle.

4.4 Measuring ranges

For strong outdoor lighting, use measuring range #1. Turn sensitivity selector to black dot and use black aperture members. For dim light outdoors or for indoor lighting, turn sensitivity selector to red dot and use red aperture numbers. Shutter speed is shown by *black* triangle.

4.5 MR battery

MR is cadmium sulfide (CdS) version of MC. Takes Mallory PX-13 mercury battery. To check condition, push battery-test button on front of meter toward light window; needle should align with white dot on scale. To replace battery, turn shutter-speed dial to 4 sec., open battery cover, remove old battery, and insert new battery, "+" side up.

4.6 Booster cell for MC

Accessory booster cell element increases meter's light sensitivity about 6 times and permits precise measurements even in extremely weak light. Slide into contact slots at sides of honeycomb window. Use red aperture numbers. Find shutter settings opposite small square □. Then reset black triangle to shutter speed shown by □. NOTE: If needle is in upper four channels, do not use meter with booster cell.

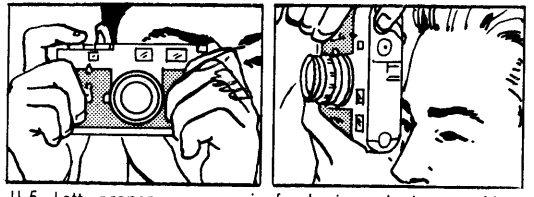
4.7 Meter adjustment

Adjusting screw for realignment of indicator needle is on bottom of exposure meter. To adjust, cover honeycomb window completely with opaque material; turn screw until indicator needle points to "0" marking.

5. Taking Pictures

Hold camera in right hand. Left hand supports camera while turning focusing lever

or lens mount. Hold index finger over shutter release button with thumb against transport lever. When shooting, hold camera with both hands, pressing it firmly but comfortably against cheek and forehead. Hold arms close against sides of body. Legs slightly apart, one forward. 1/30 sec. ordinarily considered slowest hand-held shutter speed. Safer to expose at shutter speeds of 1/60 sec. and above. At shutter speeds of 1/15 sec. and slower (1/30 sec. if you're tired), rest elbows or camera itself on solid support. Highly portable, lightweight tripods usually lack stability.



II-5. Left, proper camera grip for horizontal picture taking; right, proper grip for vertical picture taking.

6. Flash Equipment

6.1 Bulb flash units for Leica

a) *CEYOO flash unit:* Accepts bayonet and screw-base lamps. Folding reflector detaches for compact storage; adjusts to center different bulbs. Adequate for wide-angle lenses. Mounts on accessory clip or base of camera, with accessory ankle bracket CTOOM. Test lamp included. Uses 22½-volt battery. Connecting cords for "f," "g" and M series.

b) *Independent flash units:* Any flash unit having Continental-type (P-C) connector can be used with "f", "g" and "M" Leicas with suitable connecting cords (COONS or MICOO). M4 has standard PC contact.

c) *Maintenance:* Do not leave bulb in flash socket except immediately before actual firing of unit. Bulb in socket will drain battery.

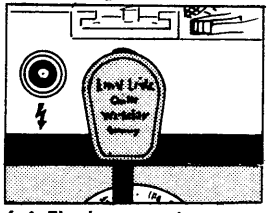
6.2 Electronic flash units

Most portable electronic flash units emit short burst (about 1/1000 sec.) of light of great brilliance. Braun Hobby Electronic Flash units available in variety of models using disposable batteries and rechargeable batteries. Flash heads of Pocket Pak models fit into accessory clip, while power packs fit into coat pocket. Other Braun Hobby models have flash head mounted to base plate bracket at side of camera, with power pack slung over shoulder. The Braun F20 is a complete unit—power pack and flash tube—which is small enough to fit accessory clip on top of camera. Independent electronic flash units can also be used with Leica with suitable connecting cords.

6.3 Synchronizing

For M-series, flash plug at end of connecting cord fits into either of two flash outlets on back of camera. Turn plug to lock in place. *Left hand outlet,* marked by symbol of lightning bolt, is for electronic flash and type F flash bulbs. *Right hand outlet,* marked by an electric bulb symbol, is for type M or FP bulbs. Both outlets can be used simultaneously, if desired. Synchronization automatically adjusted when shutter speed selected. With f and g series, single outlet for con-

necting all flash types. *With f series,* selector under shutter dial must be set for type of lamp and shutter speed. *With g series,* synchronization adjusted automatically when shutter speed is selected.



II-6.3. Outlets for synchronizing flash to Leica M3, M2. Left, outlet for electronic flash and Type F bulbs. Plug in right hand socket indicates use of Type M bulbs.

6.4 Flash extensions

For better control of lighting use flash off camera. Flash attached to 5 ft. extension cord (#15,543 for CEYOO flash) or to 6 ft. cord. End of extension cord plugged into camera.

6.5 Multiple flash

a) *Parallel circuit:* Fire two or more flash units in parallel by connecting them to each other with extension cords, as above. This gives flexibility of studio lighting; especially valuable for flash fill-in. Use multiple flash plug (#15,544 for CEYOO).

b) *Series circuit:* For series circuit with CEYOO only, preferred by some photographers, use one or more series inserts and series flash plugs #15,516, #15,517. Each kit includes CEYOO unit complete, series insert, series flash plug and 5 ft. extension cord.

c) *Remote electronic flash:* Photoelectric Cell FZ-1 for remote firing of all Braun Hobby units and most others. Connect to flash unit through 40cm cord. When flash attached to camera is fired, photocell picks up light from flash and triggers remote unit for instantaneously synchronized exposure.

7. Operating Earlier Leica Cameras

NOTE: While there are minor differences in operation of successive Leica models, essential similarities have been maintained since earliest models. Important differences in operation of earlier models, especially f and g series, will be described below in same sequence as above.

7.1 Camera controls

a) *Transport knob:* Instead of thumb-operated transport lever, earlier models use knurled winding knob, performing identical functions of advancing film and setting shutter.

b) *Release button:* Of different design, performing identical function; requires special cable release.

c) *Shutter speed dial:* Separate dials for fast and slow shutter speeds. Fast shutter speeds of g series identical with M-series; other models had variations in fast shutter speeds. To change top shutter speeds, *lift* dial; set speed dial only after shutter has been wound. Intermediate speeds cannot be set. When set at "B", shutter stays open as long as release button is held down. To use slow speeds, first set fast speed dial at its slowest speed. When set at "T", shutter opens when released and remains open until slow speed dial is turned counter-clockwise. Slow speed dial can be set for intermediate speeds. When not used, slow speed dial should be set

at its fastest shutter speed.

d) *Film counter:* Counter is disc at base of winding knob. Must be set manually for each new spool of film. After film is loaded, film should be advanced and shutter released two times. Then counter should be set at "0". Now, film may be used for actual exposures.

e) *Iris diaphragm:* No difference.

f) *Viewfinder/rangefinder:* Seperate viewfinder and rangefinder windows. g series has bright-line frame in viewfinder, with parallax correction throughout full focusing range; also, frame markings for 90mm lenses. Otherwise, auxiliary viewfinders must be used.

g) *Depth of field scale:* No difference.

h) *Flash synchronization:* Built into f series and g series only. g series has automatic synchronization at proper shutter speeds. f series requires setting of synchro-selector dial under shutter speed dial.

i) *Delayed action release:* Built into models IIIf and IIIg only.

7.2 Loading and unloading film

Very little difference. After inserting film into camera, lift up rewind knob and turn gently until slack in film has been picked up.

7.3 Interchanging lenses

All models before M-series used screw-mounting lenses.

7.4 Exposure meter

No Leica cameras before M2, 3 will accept coupled exposure meter. Any model will accept independent exposure meter sliding into accessory clip.

Chapter **IV**

FILMS AND FILTERS

1. Black-and-white Film

1.1 Film characteristics

a) *Film speed:* Faster films more sensitive to light; require less exposure under identical conditions than slower films. Slower films usually have finest grain and sharpest image contours. Faster films usually are grainier, lose contrast.

b) *Graininess:* Smoothness or coarseness of tonal areas of film when enlarged or projected. Fine-grain film smoother texture than coarse-grain film. Fineness of grain helps preserve image details.

c) *Contour sharpness (acutance):* Refers to sharpness of tonal separation between dark and light objects. Sharpest is knife-edge separation. In poorest, tonal areas soften into each other. Good contour sharpness heightens effect of image sharpness apart from fineness of grain.

d) *Film contrast:* Contrast refers to range of difference between least dense and most dense (or dark) areas. Contrasty film jumps from light to dark in very few steps. Film of low contrast has shorter tonal scale with softer gradation. Films are popularly characterized by their speed, grain structure, acutance, contour sharpness, and gradation (tonal range). Usually, the faster the film, the more grain, and the less acutance and tonal range.

1.2 Slow films

For biggest enlargements, sharpest image contours, finest grain. Ample sensitivity for vast majority of pictures in daylight. Tendency toward being contrasty; poor with contrasty subjects but good for subjects of little contrast.

Name of Film	ASA Exposure Index
Adox KB-14	20
Afga Isopan-IFF	25
Kodak Panatomic-X	32

1.3 Medium films

Best all-around films. Excellent grain. Very good contour sharpness. Best tonal scales. For practically all daylight subjects, flash and some indoor lighting.

Name of Film	ASA Exposure Index
Adox KB-17	40
Agfa Isopan-IF	40
Ilford Pan-F	50

1.4 High-speed films

For wide variety of conditions, leaning toward adverse lighting. Best "available light" films; reasonably fine grain, good image contrast.

Name of Film	ASA Exposure Index
Adox KB-21	100
Agfa-Isopan-ISS	100
Ilford FP-3	125
Kodak Plus-X Pan	125
Perutz Peromnia-21	100

1.5 Ultra-high speed films

Unusually sensitive, for adverse lighting, such as dusk outdoors, indoor lighting without flash, street illumination. Grainy, relatively low contrast.

Name of Film	ASA Exposure Index
Agfa Isopan Ultra	200
Agfa Isopan Record	800
Ansco Super Hypan	500
Ilford HP-3	400
Ilford HPS	800
Kodak Tri-X Pan	400

1.6 Special films

a) *Copying films:* For copying line materials. Very contrasty. Not recommended for

other purposes. Generally available is Kodak High Contrast Copy Film, ASA 64.

b) *Direct positive films:* For positive projection transparencies when developed according to manufacturer's instructions. One such is Kodak Direct Positive Panchromatic, ASA exposure index 80.

c) *Infrared films:* Used when important to cut through haze, when nighttime effects desired during daylight exposure and for special medical and scientific purposes. Infrared filter required. NOTE: After finding distance through rangefinder or physical measurement, use "R" on lens mount as pointer to desired distance.

2. Black-and-white Filters

2.1 Filter factors

Filters reduce the amount of light transmitted, therefore making it necessary to increase the amount of exposure. This increase is expressed as a factor. Thus, a filter with a factor of 2 means that double the normal exposure is required. For example, if the normal exposure without filter would have been 1/60, with the filter use 1/30. Alternatively, if the aperture without the filter would have been f/8, use f/5.6. These compensations are necessary for the retention of proper contrast and tone value. Variations in color of lighting and color sensitivity of film may require different filter factors. Accordingly, read the film instructions carefully and modify as appropriate.

2.2 Purposes of B-W filters

a) *General:* Colored filters hold back complementary colors. Thus, green filter holds back red light, making red objects darker and green objects lighter in final print. Red filter holds back green so that red objects come out lighter, green objects darker. Ultra-violet and neutral density filters have special purposes, as explained below. Certain additional filters are described below, for they have specialized uses.

b) *Yellow:* Darken blue sky, bring out clouds, other light objects against blue sky. Snow: reduce excessive blue sky reflection. Reduce haziness of distant scenes.

c) *Orange:* Similar to yellow, but more pronounced effects. Darkens green foliage; lightens autumn foliage. Subdues freckles. Simulates night effects, daytime, with slight underexposure and overprinting.

d) *Red:* Extreme contrasts; similar but more pronounced in effect to orange filter. "Washes out" lips and skin tones in pictures of people. Variable factor; bracketed exposures recommended.

e) *Green:* Preferred for outdoor portraiture when darkened sky desired; doesn't lighten lips. Lightens green foliage. Other uses similar to yellow filter.

f) *Blue:* Copying, to darken faded or yellowed handwriting. Washes out blue sky completely.

g) *Infrared (with IR film):* Haze penetration, most effective. Document photography. Medical photography. Simulated night effects made during daytime.

h) *Ultra-violet:* reduces haziness caused by excessive scattering of ultra-violet light. Landscapes, seascapes, high altitudes.

i) *Neutral density:* Reduces the amount of light transmitted without in any way altering color balances. Particularly important for color films.

j) *Polarizing:* Reduces or eliminates reflections from water, glass, or other polished surfaces. Also used in color photography.

3. Color Films

3.1 Color film characteristics

a) *Reversal films:* Developed as transparencies for direct or projected viewing. Balanced for specific types of lighting, including daylight, tungsten (artificial light) and clear flash. These different types of lighting should not be mixed in same scene. NOTE: Blue flash bulb and electronic flash considered same as daylight. If film intended for one type of light is to be used with another, conversion filter must be used over lens.

b) *Negative color films:* Can be used with different types of light. (Balancing filters used when enlargements are made.) Although you can mix lighting sources on same film, *you cannot mix lighting sources in any one exposure.* Whenever possible, advisable to adhere to one lighting source throughout to minimize error when processing color prints.

3.2 Daylight reversal films

a) *Low speed:* Exceptionally fine grain.

Name of Film	Daylight Exposure Index	Tungsten Exposure Index (with conversion filter)
Dynachrome 25	25	12
Kodachrome II	25	12

b) *Medium speed:* Generally fine grain with variations in tonal qualities. Kodachrome offers finest grain, but photographer should choose film whose tonal properties please him most.

Name of Film	Daylight Exposure Index	Tungsten Exposure Index (with conversion filter)
Agfachrome CT-18	50	—
Anscochrome D/50	50	20
Dynachrome 64	64	—
Ektachrome X	64	12
Kodachrome X	64	25

c) *High speed films:* For action as well as for uncertain daylight conditions.

Anscochrome D/100	100	50
Anscochrome D/200	200	100
High Speed Ektachrome	160	—

3.3 Tungsten reversal films

For use with artificial light, tungsten-type, as indicated:

Name of Film	Daylight Exposure Index (with conversion filter)	Tungsten Exposure Index
Agfachrome CK20	40[1]	80[4]
Anscochrome T/100	64[1]	100[4]
Kodachrome II Type A	25[2]	40[3]
High Speed Ektachrome Type B	80[1]	125[4]

[1] With Wratten filter 85B
[2] With Wratten filter 85
[3] With 3400° K lighting; for 3200° K, use 82A
[4] Requires 3200° K lighting; for 3400° K, use 81A

3.4 Negative color films

Agfa Negative CN-17	40	32
Kodacolor-X	80	20[1]

[1] With filter 80A, at 3200° K. With photoflood (3400° K.) use filter 80B.

4. Color Film Filters

4.1 Conversion filters

a) *85B:* Use with Anscochrome T/100, Agfachrome CK 20, and Type B Ektachrome in daylight.

b) *85 (Type A):* Use with Kodachrome II Type A when shooting outdoors in daylight.

c) *80A (PF, Photoflood):* Use with Kodachrome, Ektachrome or Anscochrome Daylight to take pictures with photofloods.

4.2 Correction filters

a) *81A (Skylight):* With daylight color films, absorbs excessive blue found at high altitudes and at seashore. Reduces blueness of open shade and adds general warmth to transparencies.

b) *81C (Flash):* Use with Type A Kodachrome II when using clear flash bulbs.

c) *82A (Type FP):* Use with Type A Kodachrome II when using 3200° K. studio lamps.

4.3 Polarizing filters

No effect on color tones. Only means of darkening blue sky when using color films. With color films as well as black-and-white films, reduces reflections from surfaces of water, windows, furniture and other non-metallic objects. Available in two mounts: (1) engraved mount with reference numbers for setting polarization plane and (2) swing-out rotating mount which lets you see exact polarizing effect of filter in front of lens.

4.4 Neutral density filters

See 2.2i, this chapter.

Chapter V

A-Z HOW-TO-DO-IT

Reference notes

1. Unnumbered references are to alphabetical items in this chapter. Sometimes these appear as direct references in text as, for example, "See Bounce Flash." Some reference may be part of reading matter as, for example, "Bounce flash gives best exposure latitude, etc." In either case, you would look up "Bounce Flash" in alphabetical sequence of this chapter.

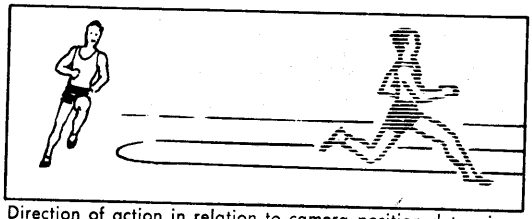
2. Numbered references refer to other chapters. For example II-6.3c means that the reference is in chapter II, subchapter 6, section .3, paragraph c.

Accidents

Photos are very important as evidence, to determine responsibility. Objective is to show condition of vehicles and injured parties so as to point up cause and effect as well as responsibility. Suggested pictures:

1. Condition of car(s) from front, side and rear, as necessary. Condition of objects struck and relationship to vehicle(s). Close-up inside vehicle, if personal damage, when appropriate, using 6 ft. setting. Close-ups of victim and debris if hit-and-run.

2. Tire skid marks, start to finish, holding camera as high as possible. Over-all view of entire scene, from top of building if possible.



Direction of action in relation to camera position determines shutter's ability to stop motion.

3. Road markers, dividers, signals, pavement conditions and intersections in relation to paths of vehicles and point of impact. Views from each driver's approach to point of impact, progressively.

4. Use flash at dusk or night or for interior of cars. Use flash extension. (See *Off-Camera Flash.*)

Action, see also Sports

1. When photographing moving objects, some blur can be tolerated to show mood of action but stationary background must be clear, no movement.

2. Swinging movements can be captured at slow shutter speeds, say 1/60, if shutter is released at peak of action. For example, ball thrown into air and hovering at top before it descends; pause moment before child in swing begins to descend; basketball player at peak of jump.

3. Rapidly moving objects, across camera line of view, can be "frozen" if you *pan* with action in same direction. For example, racing car or fast runner, have camera at eye and pivot rapidly with motion of object as it crosses field of view, making sure you have object fully in viewfinder at height of your own swing.

4. With telephoto lenses, use minimum "stopping" speeds twice those given here.

Subject at 25 feet	To or away from camera	45° to camera	Across view
Walking	1/30	1/60	1/125
Play, swimming, sports, games	1/60	1/125	1/250
Vehicles at 20 mph	1/125	1/250	1/500
Vehicles at 40 mph	1/250	1/500	1/1000
Vehicles at 60 mph and above, races	1/500	1/1000	1/1000 and pan

Against the light, see Backlighting

Airplanes

1. Hold camera close to window but not touching. Don't shoot against sun even if lens is shaded because window will not be clear. Use pillow for support and shock absorption.

2. For ground pictures, wait until plane gets at least 2,000 ft. altitude in order to minimize ground movement. Exposure readings of ground may be deceptively high because of abundance of light at high altitudes. Cut indicated exposure in half.

3. In black-and-white photography, use colored filters for best cloud effects as well as to reduce excessive blue light radiation. With color film, use ultra-violet or skylight filter.

4. Interesting interior pictures easily made with high speed films. Cockpit pictures may be taken with slow films at 1/125 and *f*/4.

Animals, see Pets, Zoo

Antiques

1. Existing light usually best for soft rendition of details, texture and condition. Use reflectors (see below) to fill in dark areas.

2. Use off-camera flash for side lighting of textured, engraved or figured surfaces but handkerchief or white tissue over flash unit should be used to soften lighting. If this is done, open lens one *f*/stop.

3. Try bounce-flash off opposing *wall.*

Architecture, see Buildings

Available Light Exposure

See *Exposure Meter Hints.* Key factor is amount of shadow detail. Following table is general guide. Shorter exposures can be used if exposure rating is increased and certain developers are used as recommended by manufacturers. Finer-grained results may be achieved when high speed film is uprated, as compared to regular use of ultra high speed film. Chart is based on aperture of *f*/2.8.

Babies

1. At hospital, hold flash and camera close to glass wall, at angle.

AVAILABLE LIGHT EXPOSURE TABLE

Subject	Plus-X	Tri-X
Home interiors, bright artificial light	15[1]	30
Home interiors, daylight	60	125
Television pictures	15[1]	30
Brightly lighted offices, daylight	125	250
Offices, bright artificial light	30-60	60-125
Museums, exhibitions, etc.	30	60
Spotlighted areas	60	125
Brightly lighted areas at night	15[1]	30

[1] Use firm support.

2. In bath, camera with flash attached will pick up reflections of tile or tub directly opposite. Close-ups will trim background. Off-camera flash held to side will move reflections out of view.

3. Generally, avoid trying to pose babies. Set up situations beforehand in which behavior can be anticipated. *You* adjust to baby's behavior. Bounce flash gives best exposure latitude for baby moving on floor.

Backgrounds (Objects)

1. Change viewpoint or move subject to eliminate distracting or competing objects. For example, tree or other vertical object or line shouldn't be directly in back of head. Also, eliminate distracting colors, reflections, bright objects, especially when using flash.

Eliminate unwanted or distracting background by changing camera angle.

2. Use lower picture-taking position to eliminate unwanted housetops, trees, cars.

3. Throw background out of focus by getting closer to subject, by setting sharpness zone closer, or by using wider lens openings.

4. Bring out details of natural backgrounds or environments when they add to story value of picture or provide mood. Move sharpness zone away toward background. Use smaller apertures.

Backgrounds (Tone and Shadows)

1. Sky tones can be rendered darker with black-and-white films through use of filters. For color film, polarizing filter will darken sky.

2. Tone or color of background should be in contrast to subject. For black-and-white photography, contrast should first be with hair, second with clothing: dark against light. For color film, seek backgrounds whose colors are complementary to those of subjects, although contrasts should be appropriate to subjects.

3. Mood created by colored backgrounds: warmth through browns and reds; coolness through blues and grays.

4. Keep light objects away from colored backgrounds for they may reflect tints back on objects.

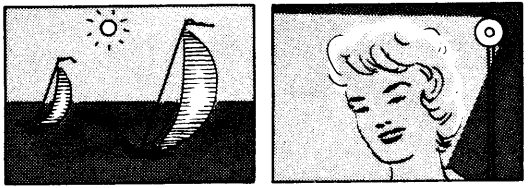
5. With flash, relative tones of subjects and background controlled by distance of subject from background. If subject close to background, both about same tonally. If subject brought away from background and exposed correctly, background darker.

6. Shadows on background eliminated or moved away from head by using off-camera flash, high and to side.

Backlighting

1. Source of light in front of camera, illuminating subject from its rear. Most dramatic when sun low and directly in back of subject, usually woman with bouffant hair. Light spills around edges, creating radiant effect. Position of sun governs uniformity of light spillage around edges.

2. Translucent objects become strikingly luminous as with flowers, boat sails. Front of



Backlighting makes translucent objects luminous, left; creates halo effect around people's heads, right.

opaque object comes out very dark; effect of silhouette.

3. Shield camera from direct rays of sun if not completely obscured by subject. Use hand, tree shade, archway, doorway, etc.

4. If exposure aims to bring out detail or natural tones in front of object, rear-lighted areas will be overexposed or "burned up." Compromise may be to take exposure readings of brightest and darkest and then average. See also: *Reflectors, Fill-in Flash;* particularly important with color.

Banquets

Use fast or ultra-fast films; see *Available Light Exposure.* For greatest coverage in depth, focus at point ⅓ in from nearest to furthest. Use telephoto lens for individual "close-ups."

Beach, see also Seascapes

1. Avoid portraits made with direct sunlight; use supplementary fill-in from reflectors or flash.

2. For general beach scenes, without people, seek objects in foreground to relieve monotony — even debris, blades of grass, footprints. Umbrellas do well, especially if brightly colored.

3. Sand texture and sand construction projects require side-lighting.

4. Keep camera in case. Store away when not in use. Sea spray is corrosive; sand may invade mechanism. (See *Appendix C, Care of Camera and Film.)*

Birds

Best taken with telephoto lens. Set camera beforehand, on tripod, in focus on places birds will visit: bird baths, feeding stations, nests. Use long cable release so you may be away from camera.

Bird's-eye Views

High vantage point needed for extended ground views, such as harbors, old city areas, accident scenes, land plots. Side or ¾ lighting best; shadows bring out detail. Frontal lighting satisfactory but avoid sunlight toward camera, unless shaded. Exposure meter tilted downward when taking reading.

Boats, Pictures from

1. Horizon level low; to raise, stand and point camera downward slightly.

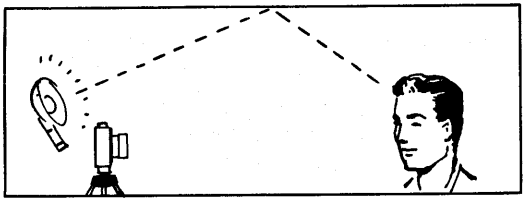
2. Light changes direction with turns of boat; changes exposure. Watch that light does not enter camera. Exposure for occupants should be based on close readings.

3. Pictures of occupants should show part of boat; for example, stern of motorboat with water trail.

4. Don't get too close to racing boats. Good subjects for telephoto lenses. Don't create hazards for boat occupants or for other boats. Be careful of water spray on camera.

Bounce Flash

1. Flash unit detached from camera, connected with extension cord to camera (see *Off-Camera Flash)* and pointed to wall or ceiling. Subject illuminated by soft, reflected



Distance scale on camera must be set for distance from flash to ceiling to subject when you use bounce flash.

light, more evenly distributed. See *Light Fall-off*. Shadows fall away from surface point from which light is reflected. If color film is used, walls and ceilings must be neutral and light. Colored walls and drapes will tint subject.

2. Exposure based on distance of lamp to reflecting surface *plus distance of subject from reflecting surface*. (Distance of camera from subject does not matter.) Usual rule-of-thumb for rooms of average size and average or middle tone is to compute distance from lamp to point of reflection and from there to subject. Compute exposure from guide numbers or use computing table. Then open lens aperture two *f*/stops. Dark or dull rooms, or very large ones, require that you open up still more.

Buildings

1. Problem is to get sufficient coverage of tall or wide buildings because of insufficient room in which to back off. Tilting camera upward will give perspective distortion. For full width coverage, use wide-angle lens. Compromise with standard lens is to take picture from angle, off center.

2. Side lighting best to bring out textural details, figures, ornamentation, brickwork. Hazy bright best; renders good shadows but shows details of shadows. Shadowless lighting poor.

3. Flood-lit buildings, intensity of light varies; use meter close up.

4. Foreground objects usually provide depth, balance, additional interest. Closer they are, bigger they appear in relation to building. Trees, arches provide framing for buildings. (See *Framing.)*

Campfire, see Firelight, etc.

Carnivals and Festivals, see also Parades and Pageants

1. Opportunity to take colorful pictures; costumes, floats, decor, unusual foods on display, religious rituals. Ideal for color or slow black-and-white film in good lighting; high speed or ultra-high speed films when lighting is uncertain or when night pictures are to be taken. (See *Night Photography.*)

2. Set camera for zone focusing, when covering moving objects. Anticipate when they will come within zone of sharpness.

3. Change standpoint to get variety of backgrounds. Be alert for the right combinations of costumes and backgrounds. (See *Backgrounds*, above).

4. Use flash to fill in shadows or for non-illuminated objects at night.

Cats and Kittens, see Pets

Children, see also Babies

1. Children should be absorbed in their own activities. Get your own children accustomed to presence of camera. If children freeze or become resistant, give up effort. Don't force.

2. With very small children, short span of attention is problem. Create distractions which may hold attention, including ticking or whirring objects, pets, toys, other children. Don't try to hold attention too long. Limit area of play to pre-set zone of sharp focus. Simplify background.

3. For small children, considerable working latitude needed. Flash simplest indoors, bounce flash for greater exposure latitude. Also, use faster films for existing light pictures when lighting good. Outdoors, hazy or cloudy bright light best.

4. Stoop down to level of small children; don't just point camera down.

Circus, see also Parades and Pageants

1. "Big Top" shots are indoors; use available light techniques, high speed color or black-and-white films. Exposure meter readings difficult because of distance from subjects and non-uniform lighting. Ideal for telephoto lens.

2. Get ring-side seats, if possible, for pictures of clowns, equestrian acts and vaudeville performers. Also, take audience pictures. Flash o.k. if you're close. Sideshows, animal cages, good for close-ups, especially with flash. Don't photograph wild animals with flash unless given permission.

Clouds

Black-and-white film registers blues excessively, thus reducing contrast between sky and clouds. To correct, use orange or green filter, increasing exposure by filter factor. Orange gives deeper correction. With color films, use polarizing filter.

Coins, Medals and Other Raised Surfaces

Use copying stand for pictures of coins, medals. With outdoor or existing light, use small mirror as side light reflector to create shadow effects. For small objects, use contrasting background material.

Composition, see also Backgrounds, Foregrounds, Framing

1. Good composition aims at bringing out subject matter in an interesting or pleasing manner; draws attention to significance.

2. Limit picture to one main subject or theme. Avoid competition from unrelated objects—usually by moving closer or changing camera position.

3. Where single subject of main interest does not entirely fill frame, it must fit in harmoniously with other details of picture. Usually, main item of interest should be placed where eye will be drawn to it. For example: (a) main item of interest is usually a little above center and to left, with secondary interest a little below center to right; (b) converging lines lead to interest center;

(c) surrounding objects provide a natural framing of main area, tying it together.

4. Avoid things which distract from main area of interest. Don't crowd too much into picture. Don't let vivid color masses intrude.

5. Subject matter often governs selection of vertical or horizontal format. Generally, horizontal format more restful and stable. Vertical format more dynamic and active.

Desk Portraits

1. Avoid photographing subject with window light in background or with desk lamps in view. Close window blinds if in field of view.

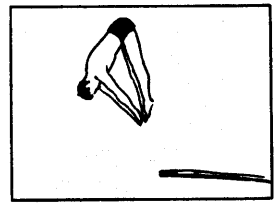
2. When a subject is illuminated by window light, get between window and subject for most even exposure. Also, use reflectors. (See *Reflectors, Window Lighting.)*

Details

Where individual objects are of main interest and background secondary, get close enough to frame object rather fully within viewfinder. Details come up better, texture rendered more clearly. Larger masses and less extraneous detail are easier on eye.

Divers, Swimming

Catch action at peak of dive. Choose camera position that gets best background, consistent with direction of sun which should be behind camera or to side. With sky as background, use filters for black-and-white films. (See *Clouds.)*



Shoot a peak moment of action to make sure you stop it.

Dogs, see Pets

Exposure, see Available Light Exposure; Backlighting, Front Lighting; Outdoor Lighting Chart; Overhead Light.

Exposure Meter Hints

1. Meter "totalizes" all tonal values within field of view. Fine for middle tones but lighter and darker areas come out excessively so. If either lighter or darker areas are of greater importance, exposure should be for that which is to be emphasized.

2. Changes in meter-selected shutter speed may be made to achieve specific effects desired. Thus, in color photography, one might want to subdue the vivid in favor of lighter, pastel tones, by using slower shutter speed (longer exposure). Also, a single object might be picked out for selective exposure, regardless of other objects in field of view.

3. For metering inaccessible objects, use substitutes. For faces and other flesh tones, use hand as substitute, making shutter-speed adjustments up or down to correspond with differences in tonal value of hand and selected object. Take readings of objects with similar

attire or other light-reflecting characteristics. For middle tones, take reading from hand, then double exposure.

4. Also for inaccessible objects, use gray card (back of this Companion) to take reading of middle tones. Hold in same path of light as subject in relation to camera. Hold about 6 inches away from camera. Shadow on card to be avoided but not too important at this distance. Adjust exposure for brightness range of subject. Thus, double exposure for dark object, half the indicated exposure if objects are very much lighter than middle tone.

5. For selective readings of single areas or objects, hold meter close, in direct path of camera position. Be careful not to throw shadow on subject.

6. Exposure meter tends to give settings that will produce middle tones. Reading of dark area will tend to give settings that will lighten that area. Similarly, reading of light area will yield settings that should render the light area darker in final picture. As general rule, change settings *made with exposure meter* so that lighter objects are exposed more while dull or dark objects are exposed less. To expose selectively for shadows, take meter reading and cut in half. For highlights, take close-up reading and double indicated exposure.

7. In scenes and landscapes where there is excessive sky, tilt camera so that hardly any sky shows in viewfinder. Take reading and then hold camera in normal viewing position for picture.

8. Light and dark subjects together, when given average (or compromise) exposure, lights will be overexposed — thin, washed out and watery in color pictures—while darks will look even darker than normal. If exposure is made for light objects, very little of dark image will be recorded on film. Generally not good subject. Whenever possible, concentrate on either light *or* dark, excluding the other. Another selective approach, especially with black-and-white film, is to make compromise exposure between *average* and either light or dark area, whichever is to be favored.

9. Ground and adjacent surfaces reflect light on objects, influencing their exposure values. Light surroundings (snow, light sand, light-colored buildings) may decrease exposure by as much as one half *f*/stop as compared to average surroundings. Dark surroundings, which do not reflect additional light onto subject, may require up to twice as much exposure.

Exposure Without Meter

1. Simple formula will cover most situations. Assume average subject, bright sunlight; set shutter at speed *closest* to ASA rating and set lens at *f*/16. For example, ASA 100 would be set at 1/125 and *f*/16.

2. For other shutter speeds, multiply by factor in following table:

Subjects	Bright sun Beach, snow	Bright Sun	Hazy Sun	Cloudy Bright	Open Shade, Dull
Light	¼	½	1	2	4
Average	½	1	2	4	8
Dark	1	2	4	8	16

3. If shutter speed less than 1/30, use bigger lens opening (smaller *f*/number). one stop larger for each halving of shutter speed. Thus, dark subject, open shade, multiply 1/125 by 16, gives 1/8 approximately. Change to 1/30 (halved twice, to 1/15, 1/30); use *f*/8. If set at 1/60, use *f*/5.6.

Fill-in Flash

1. Supplementary light used to fill in deep shadows, usually caused by side-lighting or backlighting. Flash can be mounted on camera in normal manner or used off camera.

2. With FP bulbs, first determine daylight exposure for sunlit area. Then divide flash-to-subject distance into flash guide number of shutter speed being used with given film, adjusted for outdoors, to find *f*/stop. For less fill-in, move back; for brighter fill-in, move forward.

3. With other flash bulbs or electronic flash, set shutter at 1/60 or slower. Set *f*/number as required for sunlit area. Then proceed as in foregoing paragraph.

Firelight, Fireside, Campfire

Set camera on tripod. Set shutter at 1/15 or slower, depending on brightness of room lighting, if indoors. Flash used as fill-in. Slow shutter speed allows fire to register in spite of flash.

Fireworks

Shutter must be held open long enough for bursts of light to create their interesting patterns. Set shutter at B. Hold in hand for "single," or use tripod. For multiple bursts, keep shutter open but cover lens between bursts. Exposure not critical. Burst of fireworks makes own exposure. With moderate speed color film, set lens at *f*/5.6 or *f*/8.

Flash, see Bounce Flash; Fill-in Flash; Flash Exposure (II-7.4); Light Fall-off; Multiple Flash; Off-Camera Flash; Portraits, Flash.

Flowers

1. Focus carefully, for slight errors could put flowers out of focus.

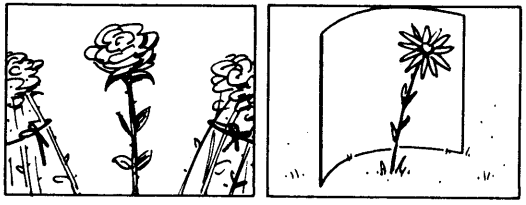
2. While exposure can be hand-held, tripod gives best framing and distance control; long cable release allows freedom to adjust flowers and backgrounds.

3. Hazy bright or cloudy bright light excellent for delicate rendition; softens vivid colors. Translucent flowers can be photographed against sun, with camera very close. Low angle uses sky as clear background.

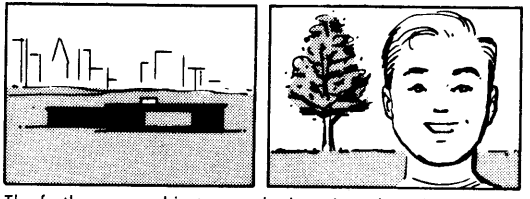
4. Backgrounds of opaque paper, cardboard used to eliminate competing flowers and vegetation. Light blue simulates sky. Other colors, black, or off-white for suitable contrasts.

5. Isolate individual flowers by tying back others with string, wire, garden "twist'ems," rubber bands. Cut and transplant, *if your own.* Use body, coat or cardboard to make windbreak.

6. Use small mirror for spot-lighting, side-lighting, etc. (See *Reflectors.)* Spray droplets for special effects. Try pressurized plastic spray.



Tie back surrounding flowers to get at flower you want (left); use reflector board to throw highlight on it.



The farther away objects are, the less clear their details, left. The closer a foreground object is, the larger it seems in relation to background objects, right.

Fluorescent Lighting

Single fixture, whether bar light or circline, produces diffused illumination with soft-edged shadows. Multiple fixtures, as in stores and industrial establishments, may produce shadowless illumination, similar to cloudy bright day. See *Light Fall-off*. Quality of light *approximates* daylight but is bluer. Ideal for candid picture-taking and for industrial equipment. Use horizontal format for general scenes; for close-ups use verticals or horizontals.

Foliage

Green foliage: to lighten, use green filter; to darken, use orange filter. Autumn foliage (little green, many reds and browns): to lighten, use orange filter; to darken, use green filter.

Foregrounds

1. Clearer details of foreground objects contribute to psychological sharpness of over-all scene. Also, lend feeling of depth. Foreground objects include fixed things of nature, people, animals, buildings, monuments, water reflections, strong-colored objects.

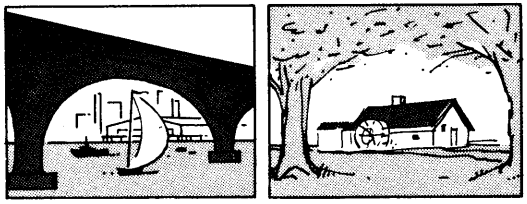
2. Closeness to foreground objects renders them bigger in proportion to other scene details. Higher viewpoint gives deeper coverage of foreground scenes; subordinates background.

Fountains

Slower exposures (use filters, if necessary) give moving water chance to register. At night, illuminated fountains require time exposures, using tripod. Slow films, about 4 sec. High speed black-and-white or color films, about 1-2 sec.

Framing, see also Composition, Foregrounds

Certain objects tie other picture details together; give feeling of depth. Media of framing include arches, windows, bridges, trees, building overhangs, etc. Even humans and animals in some cases.



Frames often tie diverse elements into a picture (left) or focus attention on the subject matter (right).

Front Lighting

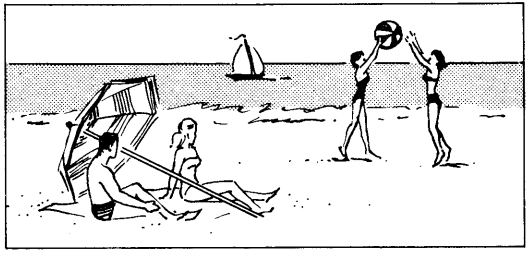
Front lighting mid-morning and mid-afternoon best for color because of even illumination. High sun casts downward shadow. Avoid full-face portraits as subjects will squint. If surface texture must be rendered, wait for side-lighting. For same reason, front lighting not best for landscapes where detail needed. Best for smooth tonal masses where full color saturation desired.

Gardens, see also Flowers

Close-in flowers emphasized by low angle. Eye-level shot gives deeper coverage. Throw backgrounds out of focus if they distract. Concentrate on homogeneous colors and hues. Avoid effect of patchwork quilt. For over-all garden shots find interesting views that utilize fences, paths, fountains, other garden structures.

Groups

Take pictures of people in mutual interaction, not posing for camera, especially if



doing something together. Groups in depth, focus at point ⅓ in from nearest to furthest.

Groups, Flash

1. Small groups, place subjects or find position that places them at equal distances from flash.

2. Large groups, subjects can be arranged in double or triple row because of more even depth of illumination at greater working distances.

3. Dispersed groups, back away from subjects for flash illumination to be more even. Avoid objects or individuals too close to camera. Take picture holding camera high, pointing to most distant subject. Alternative is to use extension cord (see *Off-Camera Flash)* with camera at any position while flash is held high pointing to most distant subject.

Indirect Torch Lighting

One or more bulbs in one or more lamp reflectors throwing light upward. More uniform light reflected from ceiling in diffused pattern. Effect of cloudy bright outdoor light-

ing. Similar to bounce-flash. Objects closer to ceiling receive more illumination. See *Light Fall-off*.

Industrial Interiors

1. Observe military security regulations, if applicable.

2. Stop lens down for greatest depth, if lighting permits.

3. Use available light techniques, high speed or ultra-high speed films.

4. Use bounce flash or off-camera flash to avoid harsh shadows in back of equipment. To "paint" with light, set camera on tripod, shutter at Time. Make several "open" flash exposures (off camera), filling in dark or distant areas.

Landscapes, see also Foliage, Foregrounds, Framing, Mountains, Sunsets

1. Side-lighting best to show shadowed texture of landscape details, especially trees, shrubbery, small objects. During summer, best hours are before 11 A.M., and after 3 P.M. During winter, poorer light, best hours between 11 and 3.

2. Distant scenes come out hazy. With black-and-white films, use orange or yellow filters to cut haze unless hazy effect specifically desired.

3. To darken blue sky, black-and-white film, use orange filter or yellow for less pronounced effect; color films, use polarizing filter.

4. Give preference to scenes in which specific items of interest in background are distinguishable, giving proportion to whole, but not so large as to be distractions. Foreground should have an interest element, large enough or colorful enough to attract attention and lead from front to back.

5. High viewpoint emphasizes foreground, showing it in greater depth. Low viewpoint emphasizes rising prominences of background.

Light Fall-off

1. Intensity of light from flash or incandescent lamp diminishes with increased distance away from light source. Exposure must be for distance of most important object, for anything closer will come out too light and anything further will come out too dark (unless supplementary lighting is used).

2. To anticipate effects, use "inverse square" rule. Intensity of light (and amount of exposure required) varies inversely with square of distance from source of light. Thus, object 5 ft. away has square of 25 while object 7 ft. away has square of 49. Since 49 divides into 25 approximately ½, object 5 ft. away receives twice as much exposure as object 7 ft. away. The further away the subjects are from light source, the less will be the differences in illumination. Thus, between 10 and 12 ft., ratio is 100:144 as compared to 25:49.

3. Where great depth of even exposure is needed, pictures should be taken at greater distances between flash and subject, to take advantage of more even illumination at greater distances. Use telephoto lens for bigger image. Where background objects are

specifically desired to be darker, pictures would be taken closer to main subject.

4. Same principle of light fall-off applies to light coming from ceiling, directly or indirectly. Illumination loses intensity as it approaches floor. Except for close-ups, better to use camera in horizontal format.

Lighting, see Available Light Exposure; Front Lighting; Fluorescent Lighting; Indirect Torch Lighting; Overhead Lighting; Side Lighting; Window Lighting.

Markets

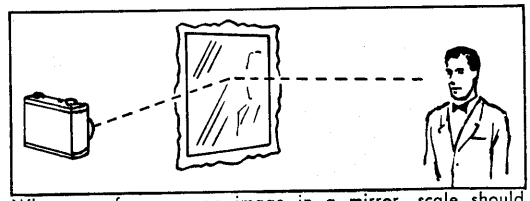
1. Best lighting is hazy bright, cloudy bright. Bright sunlight casts hard shadows, especially when stalls or stands are canopied or when both sides of street or passageway are lined with stands.

2. When part of scene is deeply shadowed, use flash for fill-in. Otherwise expose for main area of interest, increasing shutter speed about 50% for highlight, decreasing it about 25% to favor shadows.

Mirror Pictures

1. Interesting reflections with mirror as frame. Weird reflections in distortion mirrors at amusement arcades. Also, highly polished surfaces such as eyeglasses, hub caps. Focusing distance is total from camera to mirror surface to subject.

2. Exposure based on original subject. With flash, distance is total from flash unit to image point on mirror to subject, with factor for light loss.



When you focus on an image in a mirror, scale should measure the distance from camera to mirror to subject.

Monuments and Statues

Hazy bright sunlight best for rendition of texture, light direction 45%, early morning or after mid-afternoon. Low shooting angle gets away from commonplace, eliminates unwanted backgrounds. Take close-ups and details as well as full-length picture.

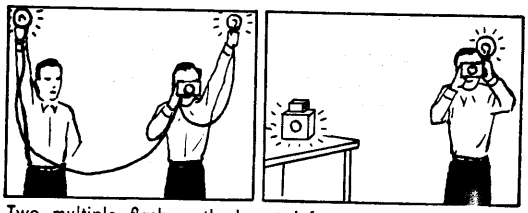
Moonlight

Time exposures with tripod and cable release. Full moon exposure about 3 min. with high speed films. Shadows will be softened due to movement of moon. Pictures of moon itself and its water reflections about 2 sec. with high speed films.

Mountains, see also Landscapes

1. Sunlit days best, before mid-morning and after mid-afternoon. Black-and-white films use orange or green filter for distant mountains, to cut effect of haze. Do not use orange filter at higher altitudes. It will turn sky areas black.

2. Use vertical format for individual mountains to cover slope to peak unless wider aspect of pictorial interest. Use horizontal format for broader range.



Two multiple flash methods: at left, an assistant holds a second flash unit; at right, using a slave unit.

3. Proportion of mountain established by recognition of known man-made objects such as house or village. Low camera angle emphasizes slope; higher, intermediate angle gives full scope to mountain.

Multiple Flash

More than one flash synchronized to camera. Small, portable slave units most convenient; photocells must face main flash. Purpose is to fill in dark shadow areas or achieve more even illumination. Compute exposure for main source, using additional units for fill-in. No adjustment in exposure made unless two or more lamps are used as main source of light. If two lamps used as main source, multiply guide numbers by 1.4; three bulbs, multiply by 1:7; four bulbs, multiply by 2.

Museums and Exhibits

1. Check regulations concerning tripods, flash, picture-taking hours.

2. Close-ups of objects in cases would require off-camera flash. Camera close to glass, preferably, at different angle from flash. Clean glass front if finger-marked.

3. Photograph dioramas provided you can get firm support for camera on tripod while taking slow existing light exposure. If other visitors cross path and pause in camera view, cover lens but do not touch it.

4. Paintings hung above eye-level best taken with telephoto lens to have longer perspective angle, minimize keystone distortion. Paintings seldom hung flat; adjust camera angle accordingly. Use off-camera flash to avoid hot-spot reflections. Also, take detail close-ups. Expose for highlights.

5. Take interesting candid pictures of other visitors. Use high speed or ultra high speed films.

Narrow Streets, see Markets

Night Clubs, see also Stage

1. Permission to use flash may be required, although some tourist attractions invite flash. Otherwise, available light techniques required.

2. Due to confined central area, lights ordinarily are overhead. Colored spots cut down light. Use high speed or ultra high speed films. White-lighted subjects can be exposed at *f*/2.8 with speeds ranging from 1/30 (slow film) to 1/125 (high speed color).

3. For moving subjects, pre-set distance scale, usually at 10 to 12 feet, then wait for subject to come within range.

Night Photography

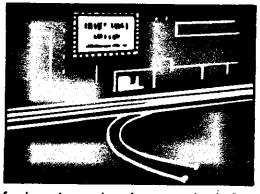
1. Extended scenes characterized by pools of light diminishing in intensity. Within each illuminated area, uniform lighting achieved by close-up picture-taking. Overhead lights cast shadows downward; light from store windows throws shadows outward. Use high speed or ultra high speed films.

2. Flash pictures taken in open have black backgrounds, unless close to buildings or objects. Hence, dark hair or hats will blend into blackness. Avoid having bright objects or lights in background unless they have informational value.

3. For long exposures, use tripod and cable release. When people or cars cross path, cover lens without touching camera. Pedestrians won't show, however, unless they pause. Interesting patterns of light, if desired, from moving vehicles, illuminated amusement rides, display signs. Over-all street scenes with medium color films about ½ sec.

4. Rain at night gives extra reflection upward onto subject on well-lit streets.

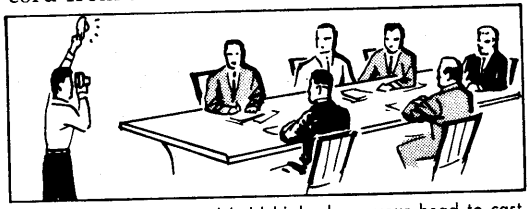
5. Flood-lighted buildings, about 1/30 to 1/60 at *f*/2 with high speed films.



At night outdoors, dark hair fades into background (left). Night pictures often contain little more than patterns of light (right).

Off-Camera Flash

Varied effects, particularly in portraiture, when flash held at distance from camera, using extension cords. For one extension, typical position for flash portrait is high and to left of photographer, pointing down to subject, with camera facing directly toward subject. (Exposure computed for distance of lamp to subject, not camera to subject). Flash unit can also be mounted on tripod. Obtain extension cord from dealer.



Use flash off camera and held high above your head to cast light more evenly over a fairly large group.

Office Interiors, see also Desk Portraits

1. Modern offices usually have soft, overhead, fluorescent illumination. With Kodak Plus-X Pan, instantaneous exposures of about 1/50 or 1/100 sec. possible but use exposure meter or personal standard based on previous experience.

2. Lighting may be mixed, from windows as well as from artificial sources. Daylight and fluorescent are reasonably compatible, with color films, but don't mix incandescent and daylight. If flash used with negative color, to supplement fluorescent or daylight, use blue flash bulbs.

3. Take pictures in horizontal aspect, other than close-ups, because light falls off toward floor.

Outdoor Lighting, see accompanying chart

Overhead Light

1. Light at midday is strongest, coldest. Casts shadows downward, noticeable in harsh shadows in eye sockets, under nose, under chin and below hat brim. Skin wrinkles emphasized. Poor light for most subjects, especially portraits and landscapes. In portraiture, fill in shadows; see *Reflectors, Fill-in Flash.*

2. Indoor overhead lighting with single point light source, similar effects. Try to take picture of subject away from direct overhead position, light shining frontally on face. Light diminishes in intensity away from source. (See *Light Fall-off.*)

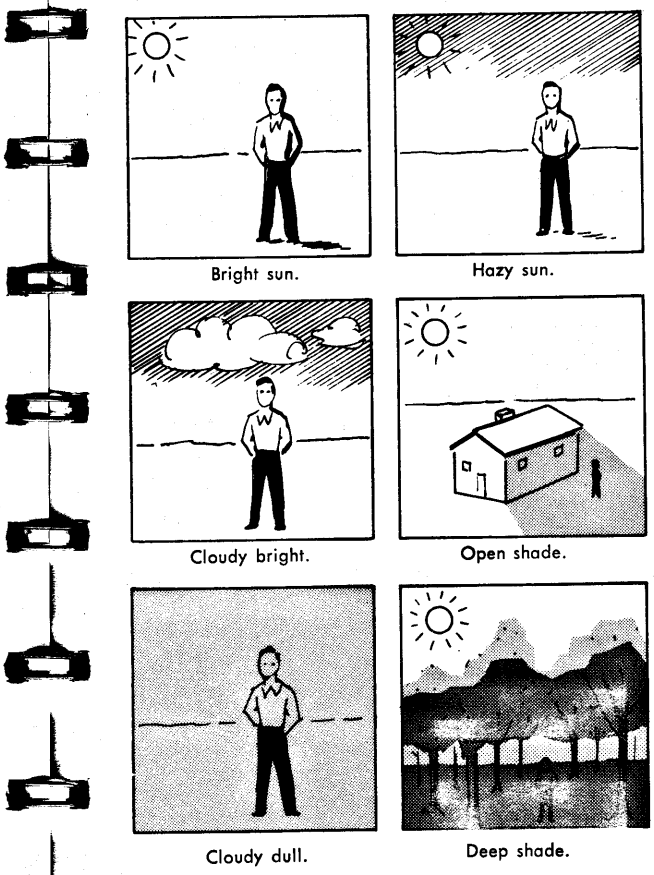
Parades and Pageants

Moving objects should be photographed at 45° angle, to minimize action-movement. (See *Action.*) Set camera for zone focusing. Be alert to side actions, children at curb lines, vendors. Use telephoto lenses.

Parties

1. Make picture story of event. Photograph advance preparations, décor, food, costumes, arriving guests, gifts being received and opened, special events and incidents, guests departing, "mop-up."

2. Take general scenes to show total party area, guests and tables. Take close-ups of individuals in animated poses, groups of 2 or 3.



	Shadow Pattern	Pictorial Quality	Film and Exposure
Bright sun beach, snow	Same as bright sun, but ground reflects light up, filling in harsh shadows.	Brilliant, snappy, excellent for color.	Slow, medium films, high shutter speeds, small lens openings. Half exposure of ordinary bright sun.
Bright sun	Sharp, dark shadows. Bluish shadows in open shade.	Highlights and details burn out. Bright blue sky. Poor for portraits.	Slow, medium films. Use fill-in flash, reflectors for portraits. Landscapes, sun off to side. Medium color, 1/125 at f/5.6.
Hazy sun	Thin overcast softens shadows. Good shadow details.	Best for portraits, especially ¾, colorful costumes, architecture, street scenes.	Medium or high speed, depending on action needs. Medium color 1/60 at f/5.6.
Cloudy bright	No shadows but not dull.	Excellent for detail rendition. Both sides of streets, marketplaces. Good portraits. Poor landscapes.	Light deceptive. Use meter. Medium color 1/60, f/4. Use Skylight filter. B/W film, use high speed.
Open shade	No direct shadows. Diffuse downward direction of skylight.	Bluish light from open blue sky. Some snap to diffuse light.	Medium and high speed films. UV or Skylight filter with color. Medium color 1/50-1/60, f/2.8.
Cloudy dull	No shadows.	Flat, no pictorial depth.	Same as open shade.
Rain	No shadows.	Mood pictures. Flat, dull.	Fast black-and-white, color film.

The effects of frontlighting (left) and sidelighting (right).

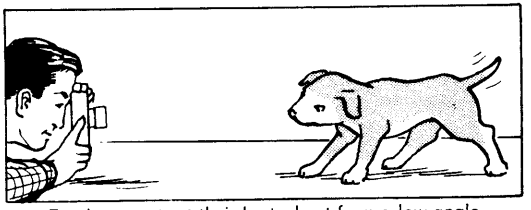
3. Use flash. Bounce lighting for greater depth of coverage; off-camera flash to put light where wanted.

Pets

1. Low viewpoint — at their level — needed to photograph cats and dogs. Difficulty of controlling movement suggests working at distance for frisky animals. Greater distance permits higher viewpoint for camera. Simplify backgrounds.

2. Learn animal habits and interest. Use tempting distractions or diversions: food, balls, bone, yarn, old glove. Learn effects of eating full meal on behavior. Stretching, yawning, sleeping, cleaning self, eating, drink-

Overhead light casts deep shadows under eyebrows, nose and chin.



To picture pets at their best, shoot from a low angle.

ing, playing with children. Attract birds to perch on end of finger.

3. Close-up focusing on eyes, nose or whiskers. Dark animals require about ½ *f*/stop less than meter indicates. Light animals, increase about ½ *f*/stop.

Picture Stories, see Stories, Picture

Portraits, Flash

1. Fill frame. Get big details, skin texture with large image on film. Use telephoto lens preferably. Otherwise shoot close with ¾ view of subject.

2. Avoid distractions in background. Shoot or place subject so that distracting background details are out of viewfinder range. Avoid: lights, shiny objects in direct line with camera, other people in background.

3. More interesting light and shadow effect, with better modeling of face, can be obtained with flash extension. See *Off-Camera Flash.*

Portraits, Informal, see also
Desk Portraits, Window Lighting

1. Snapshots, avoid firing-squad poses, with figure facing full forward. Turn figure to ¾ with face full forward. Give hands something to do. Subject in car, next to window, rather than standing in front of car. Near statues, monuments or buildings, turn body sideways to object of interest, face to camera. Also, seat subject, possibly consulting guide book, etc.

2. Outdoors, hazy or cloudy bright lighting best. Bright sunlight provokes squinting. Use lower viewpoint to avoid distracting or confusing backgrounds. Use filters with black-and-white to darken sky, if desired. Don't shoot downward from higher viewpoint as body will be foreshortened. Use reflectors or fill-in flash to fill shadows.

3. For greatest impact, take pictures so that head fills most of picture area, focus set forward so that background blurs out.

Portraits, Formal

1. Portrait "sitting" induces stiffish effect, apparent in picture. Relaxed, smiling adult looks younger, more natural. Try to divert subject's mind away from self.

2. "Photogenic" women tend to photograph well from different viewpoints, with varied lighting. They have small features, high cheek bones, firm jaw and chin, hollow cheeks.

3. Avoid distortions in apparent size of parts of face or figure. Thus, one hand closer will appear larger than other. Also, when full-face portraits are taken close up, front features (such as nose) are emphasized unduly. Place objects (such as hands) in same distance plane. Head turned ¾ shows less distortion.

4. Use lighting and shooting angles to modify prominent facial features. To de-emphasize roundness, throw shadows on side of face. To avoid emphasizing long faces, prominent noses, don't create downward shadows; to de-emphasize noses, shoot head-on. Full-face lighting desirable for thin-faced subjects.

5. With single light, preferred position is above subject at 45° angle and to side. This leaves one side dark, which can be filled in somewhat with reflector or with second lamp. Lamp at camera is flat shadowless lighting. As lamp is raised, shadows appear and deepen under nose and chin, then in eye sockets.

6. Two-lamp set-up uses main light as basis for exposure; second as fill-in or modeling source, to give roundness and depth to face. Fill-in must be placed so it does not create secondary criss-crossing shadows.

7. Three-lamp set-up provides one additional light source (or more) to control tone of background (see *Backgrounds*) and to eliminate shadows. Subject should be away from background.

8. Lens settings used to manipulate zone of sharpness, especially to throw background out of focus. Common method is to use wider lens apertures. Second method is to adjust distance setting (so zone of sharpness terminates at front of subject).

Reflections, see Mirror Pictures, Water Reflections, Wet Streets

Reflectors

1. To fill in shadows, especially when light is from other side, any light reflecting surface can be used, even white blouse or shirt.

2. Best materials are lustrous but not highly mirrored. Latter too directional, may create hot spots. Crumpled aluminum foil pasted to cardboard does well, held at moderate distance.

3. Dull-surfaced materials need to be held closer; brighter surfaces further, to spread reflected light. In emergency, use newspaper pages, large handkerchiefs. Indoors, use pillow case. Piece of beaded screen excellent; roll up when not in use.

4. Gold-foil surface, crumpled, gives warm light to offset blue sky light.

Seascapes, see also Beach

Water photographs best under diffused sun. Sun should not be too high. Use filter with black-and-white films to cut excessive blue/ultra-violet light. For deeper correction to get darker sky, green or orange filter, with black-and-white films. High viewpoint to show greater water area.

Sky, see Clouds

Snapshots, see Portraits

Snow

To get texture of snow, sun should be low, before 11 A.M. and after 3 P.M. High blue reflection from ground cuts exposure in half.

With black-and-white film use green or orange filters.

Sports, see also Action

1. Amateur sports best for photography; best opportunity to get close to field, court or arena.

2. For groups and for fullest view of play area, take pictures from high viewpoint. For individual players, get low.

3. Take position in which you're most likely to find action; stay there with distance preset, until action comes your way. Goal posts good for football, soccer. 1st base, baseball. In basketball, behind basket.

4. Anticipate actions and begin shutter squeeze a moment before, to avoid lag between perception of action and moment of exposure. Examples: throwing of punch in boxing, kicking ball in football, batting ball in baseball, etc. Learn strategies of game to anticipate action sequences.

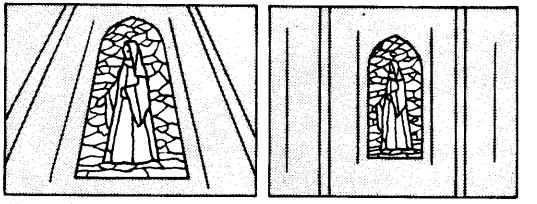
5. Catch action peaks for best action-stopping, as at top of high jump, basketball jump.

6. Indoor sports, when well-illuminated, use high speed or ultra high speed films; for color use high speed tungsten.

7. Ideal subjects for telephoto lenses.

Stage, see also Night Clubs

1. Available light exposure with high speed or ultra high speed films. Spot lighting best at about *f*/4, 1/125-1/250. Tungsten or negative color can be used, bright lighting. Legitimate theatres may prohibit picture-taking. Amateur theatricals usually o.k. for flash, but audience may be annoyed.



When shooting up, vertical lines tend to converge. Back away. Image may be smaller but lines will be straight

2. Best to attend two shows, one for planning. For best view, sit about 6 rows back. Telephoto lenses are excellent.

3. Colored floods or spots require longer exposure. For slow exposure, lean forearms against seat in front, using it as prop. Monopod also feasible.

Stained Glass

1. Light from outside illuminates colored glass but inside area surrounding it comes out black. Best effect is to use blue flash as fill-in, exposing for glass itself with daylight color film.

2. Take exposure readings close up. Diffuse daylight gives better color saturation than direct sun.

3. When windows are high, pictures taken close have perspective distortion called "keystoning." Pictures through telephoto lens would correct substantially because of lower angle.

Statues, see Monuments

Store Interiors, see Industrial Interiors

Stories, Picture, see also
Appendix A, Ideas for Pictures

1. Typical story sequence has beginning, middle and end. Plan it beforehand. Know what is to happen. Make it happen.

2. Possibilities limitless: chronological sequence of events. Varied aspects of one event or subject; all about a place, thing, personality, problem. Shoot a how-to-do-it. Typical day in life of family. Game.

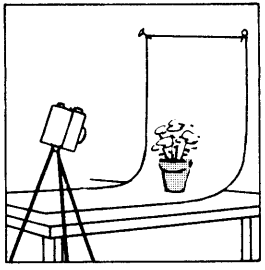
3. Get high spots: key events, personalities, interactions, moods, dramatic situations, tensions, conflicts, side actions, behind-the-scenes actions.

4. Get variety and change of pace in picture-making. Take long shots, close-ups, horizontals, verticals. Get coherence and relatedness through including elements of previous pictures. Show over-all scenes and then individual aspects.

Sunsets

1. Exposure is for sky rather than for foreground which comes out dark and silhouetted. Unlike other picture-taking, camera pointed directly toward sun. While black-and-white can be impressive, most striking results with color. Flat areas best since high objects cover low sun. Water reflections most dramatic but horizon line should be well below center.

2. Exposure not critical. Slight underexposure best for deeper, warmer tones. For safety, take three exposures: best guess, ¼ of that



Use long lengths of plain or colored paper to give you a simple background.

and then 4 times best guess. Typical exposure with medium speed color film is 1/60 at *f*/5.6.

3. Telephoto lens increases size of sun.

Table-top Pictures

1. Use small table-top tripod or collapsible one at table level. Camera viewpoint ordinarily must be low. Use longer lenses to avoid foreshortening effects. Simplify background with paper curving from table top upward. Be careful not to get in path of light.

2. Props are abundant: toys, models, complete sets. Simulate snow with sugar, baking soda, salt. Water simulated with crumpled cellophane. Light up background to make silhouette effects. For sun effects, use flash light (not flash bulb!).

Teenagers

Girls on telephone, playing records, primping and pinning hair. Clothing at different stages of development. Boys with cars, amateur radio, outdoor sports, sporty clothes.

TV Screen

High speed film, shoot about 1/30 sec. Faster shutter speeds not desirable. Point camera head-on, not at angle. Fast action scenes not recommended. If action, catch peak.

Water Reflections

1. Recognizable reflections best in still or smooth-surfaced water. Sunlight before 10 or 11 and after 3. Front-lighting gives water better color. Disturbed water shows broken patterns, water caps, accentuated by side or back lighting. High viewpoint shows deeper water area.

2. Take pictures of recognizable objects, partly above and below water surface. Interesting surface reflections make good pictures. Use telephoto lens.

3. Front-lit objects about twice as bright as water reflections. Compromise or expose selectively.

Weddings, see also Stories, Picture

1. Treat as a picture-sequence story: bridal showers, gown-shopping and fitting, bride's rehearsals, bachelor dinner, events in bride's home before leaving for ceremony, departure for ceremony, assembly and march of bridal procession, actual ceremony, reception at church, departure from church, rice-throwing, home reception, banquet, cake-cutting, festivities and dancing, leaving for honeymoon.

2. Get permission from clergyman for pictures of ceremony. No flash during ceremony. High speed film, *f*/2.8, 1/30-1/60. Use ultra high speed, if needed. Overshoot; use film plentifully. Use flash most other shots unless very good light.

Wet Streets

1. Pools of water in street make interesting mirrored reflections of buildings, monuments, trees, particularly at night with brightly illuminated objects. Exposure about twice actual object. Thin film of water gives jagged reflections of lights; expose for main objects.

2. Day pictures, expose for main objects or reflections. If for both, increase compromise exposure about ½ *f*/stop. In hazy daylight, wet streets provide highlights and depth. With high speed films expose 1/15 at *f*/2.8.

3. City lights reflected on streets, in color, 1/60 at *f*/2.8 with medium speed color film; 1/250 at *f*/2.8 with high speed color film.

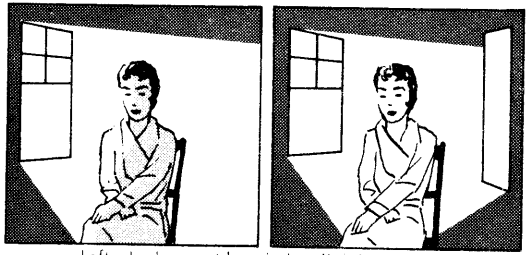
Window Displays

1. Get close to window, at angle, to avoid reflections from streets, while photographing window interior. If necessary, use polarizing filter at about 30° angle.

2. Night pictures, use Kodak Plus-X Pan or Tri-X or equivalent; use Agfacolor in bright lighting.

Window Lighting

1. Daylight streams through window either as direct beam of sunlight or as diffuse reflection of outdoor lighting or both. Objects illuminated by beam of sunlight exposed as though outdoors. Reflected light tends to fall off in intensity as it proceeds across room away from window. Reflected light entering room more bluish than sunlight.



Left, shadow cast by window lighting.
Right, eliminating shadow with reflector board.

2. In portraiture, half-moon effect results when subject has one side of face turned toward window. Interior side of face comes out black. Partial correction is to take ¾-view of face. For full face lighting, take picture while standing next to edge of window.

Zoo

1. Pictures through glass cages, indoors, require high speed or ultra high speed films. Outdoors, hold camera close to bars, but permission of zoo guards should be obtained. Beware savage, clawed animals. They are captive, not tame. Telephoto lenses ideal for zoo pictures, backgrounds simulating natural habitats. Wire mesh disappears out of focus when camera held close but allow for exposure loss.

2. Use exposure tables or use substitute exposure reading. (See *Exposure Meter Hints.*) Side lighting 45° best. Expose fully for dark-haired animals.

3. Don't whistle at animals. Watch for their own interactions with other animals in cage.

APPENDIX

A. Ideas for Pictures

1. Antique fair
2. Antique Auto Parade
3. Art shows
4. Awards
5. Barbecue
6. Barn dance
7. Beauty queen
8. Boat regatta
9. Camping
10. Carnival
11. Celebrities
12. Ceremonial dance
13. Concerts, outdoor
14. Confirmations
15. Contests
16. Costume displays
17. County fair
18. Crowds
19. Designs and patterns
20. Dog shows
21. Easter parade
22. Exhibits
23. Farm life
24. Fashion shows
25. Flower shows
26. Folk festivals
27. Haircuts, children's
28. Harvest festivals
29. Horse races
30. Horse shows
31. Indian celebrations
32. Motorcycle races
33. Night games
34. Old things
35. People at work
36. Pet shops
37. Picnics
38. Playgrounds
39. Retirement ceremonies
40. Rodeo
41. School events
42. Science fair
43. Signs
44. Soap box derby
45. Sports car races
46. Square dances
47. Water ballet

Look for the different, strange, unusual, exotic. Don't overlook the familiar as seen from new angles or in new dress. Seek the reverse of the ordinary.

B. Travel Suggestions

1. Camera and Equipment

a) Check camera and accessories for condition. Expose a couple of film loads and develop before departing, to check out condition of old camera, procedures of new camera.

b) Carry lots of film, flash bulbs, spare flash battery, lens cleaning tissue.

c) Check off film and accessory list.

d) Register camera at customs before departure.

e) Mail film home for processing if on extended trip.

2. Preplan Picture Program

a) Read *recent* guidebooks. Visit public library.

b) Ask travel agent for assistance in referring to tour departments of foreign countries, local chambers of commerce in U. S.

3. Local Coverage

a) Avoid postcard views; can buy them cheaper. Best shots off regular tourist routes. Get out on foot, side areas and roads. Rent bicycle or car.

b) Cover "old city" areas, town centers, transportation depots, harbors, architecture, statues, museums, historic centers, churches.

c) Public amusement centers, parks, beaches, gardens, zoo, festivals, pageants, fairs.

d) Local industry and shops, marketplaces, street stalls, outdoor cafes, neon signs, shop signs and windows.

e) Local color: natives in costume, children, street vendors, animals, local primitive transport, native crafts, personalities.

f) Night pictures of illuminated fountains, statues, buildings.

g) Close-ups of interesting details.

4. Cautions

a) Don't take pictures near military installations. Don't take pictures inside restricted public buildings, including many museums.

b) Don't take pictures inside courtrooms.

c) Don't photograph natives or other local inhabitants if they seem unfriendly or unwilling to have their pictures taken.

C. Care of Camera and Film

1. Carrying Camera and Film

a) Use sturdy leather case to protect camera against bumps and falls.

b) Never carry camera in pocket without protective case or dust will enter. As alternative, wrap in small plastic food bag.

c) Carry film in coat pocket or purse in original can or plastic bags. Don't carry in trouser pocket against body heat.

2. Sand, Water and Spray

a) Wipe sea water off immediately for it can corrode camera.

b) If camera falls in sea water, remove film and soak camera in several changes of clear water. After camera has been flushed or soaked in fresh water, it should be dried in moderately warm oven and *rushed to repair.* (Be sure to dry thoroughly, because some of the high-carbon steel components rust in a few hours!)

c) Sand in camera will jam works and make grinding sound. Stop working camera. Send to repair with conspicuous label: SAND IN CAMERA.

d) Don't open camera on beach when windy.

3. Hot Weather

a) Don't store film in glove compartments, rear deck of car, trunk. If necessary, put under car seat.

b) Keep camera out of prolonged exposure to sun.

4. Cold Weather

a) Keep moist skin from contact with metal, if freezing weather.

b) Adjust camera gradually to indoor temperature if used outdoors and very cold. Otherwise, camera and film may "sweat."

5. Cleaning

a) Use soft lens brush, lens cleaner or lens tissue to clean lens window.

b) Remove internal dust with rubber ear syringe.