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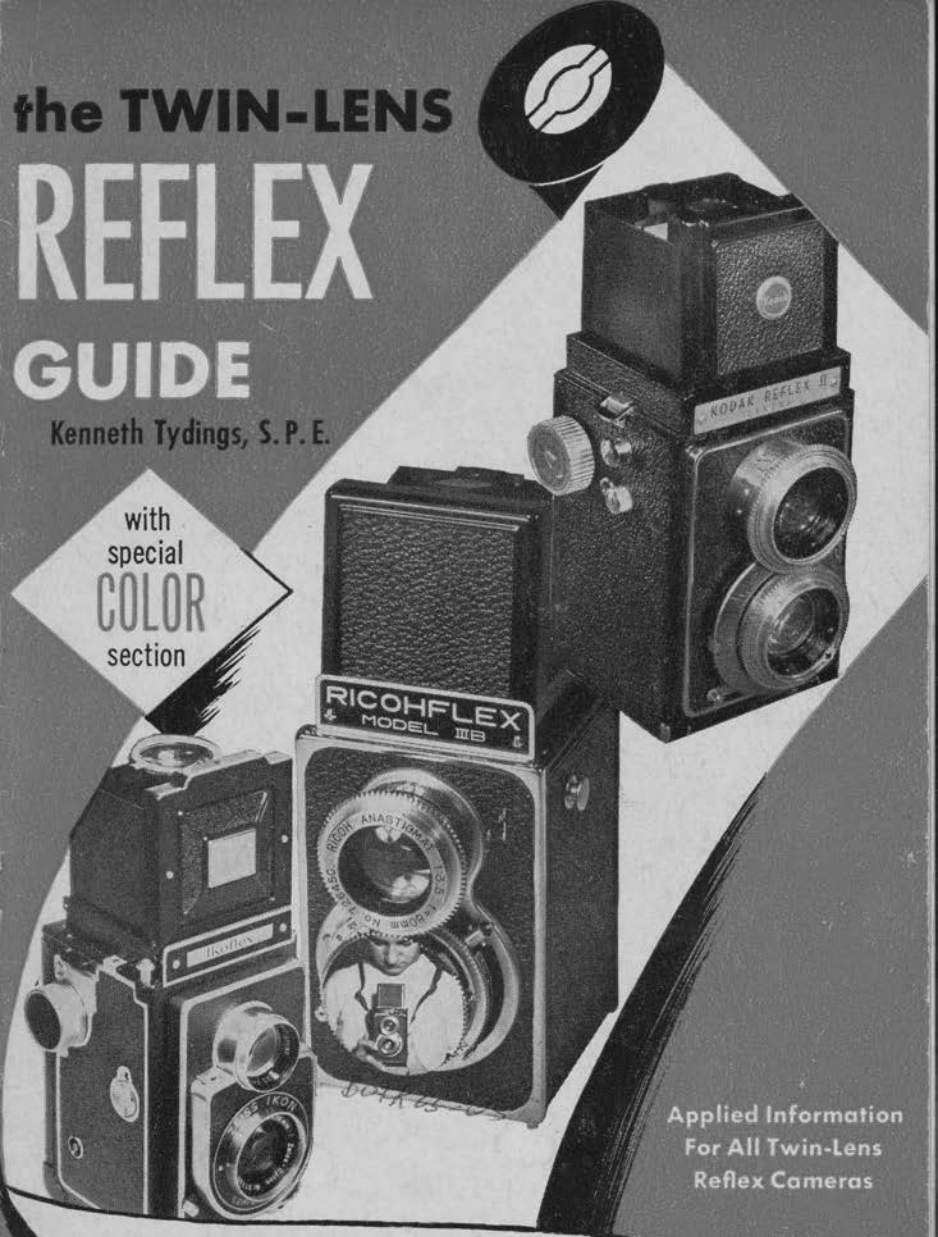
the TWIN-LENS REFLEX GUIDE

Kenneth Tydings, S. P. E.

with special COLOR section



Applied Information For All Twin-Lens Reflex Cameras

Ansco Reflex • Argoflex • Bolsey C
Contaflex • Flexeret • Ikoflex • Kenflex
Kodak Reflex • Penta Reflex • Reflecta • Ricohflex
Rolleicord • Rolleiflex • Uniflex

THE MODERN CAMERA GUIDE SERIES

1. Twin-lens Reflex Characteristics

Advantages of the Twin-lens Reflex

The efficient combination of adequate film size, portability, and maneuverability have made the 2¼-inch size twin-lens reflex the most popular camera for black-and-white film, while the smaller Bolsey C reflex has become a favorite for color. It is simple to prove by elementary arithmetic that an 8x10 enlargement (a standard comparison) requires only a four-time enlargement from a 2¼-inch negative, while an eight-time enlargement is the minimum enlargement required by the 35mm (1x1½ inch) size. Since 35mm color is usually projected, comparison of enlargement sizes is not so critical because we view our projected images from far distances. In addition to its greater suitability for use with enlargements, the 2¼-inch-square size may be printed as contact size for use as a wallet or handbag picture. The color transparency from the 35mm size may be made into color enlargements (Printon, etc.) for similar use. However, these are only incidental advantages. Other features that have made the twin-lens reflex camera the favorite of exhibitors, magazine photographers, and many amateurs are:

1. Standard 12-exposure roll for black and white, or color (Ansco color has nine exposures), to let you see your photographs quickly; a 20- or 36-exposure color magazine of 35mm film requires a longer waiting period because you may not expose the entire film at one time.
2. Direct focusing combined with instant viewfinding by means of a ground glass (an ideal focusing method).
3. The camera is small, easy to carry, and always ready for instant picture taking.
4. Uses a standard roll film (No. 120 or 620) available anywhere in the world.
5. Adaptable for 35mm film, Bantam size, or cut film.
6. The moderate enlargement required (4×) for an 8x10 picture minimizes the need of fine-grain development. A medium-grain developer is adequate, and also has the added advantage of producing the fullest emulsion speed.

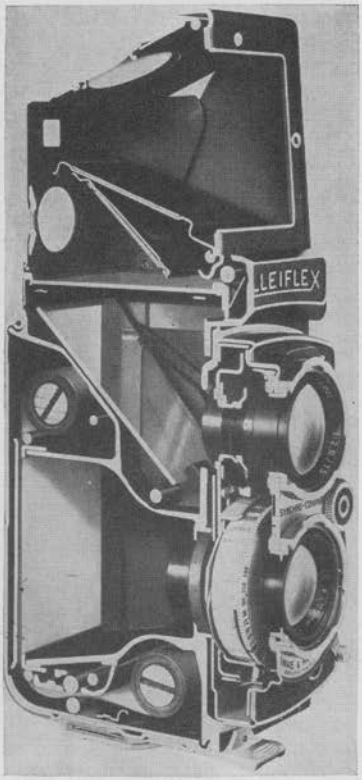
7. f/4.5, or faster, lenses are available. The viewing lens is faster than the taking lens, to permit easier focusing.

8. The square format permits composition in any one of three pleasing patterns: square, vertical, or horizontal. This allows better picture composition.

9. The 3-inch lens of short focal length has a great depth of field and hyperfocal distance. The sharp image that is so produced, for most part or middle distances, lessens the need for continued critical focusing.

10. The 3-inch lens, used with 35mm or Bantam film, produces a semitelephoto effect. The perspective so produced is ideal for portraiture because the image has pleasing naturalness.

Unit-focusing Camera



Twin-lens Reflex Cutaway View

11. Wide-open focusing is possible at all times. The top-viewing lens is always at its brightest, clearest, and widest opening. This is in direct contrast to the single-lens reflex, which must be stopped down just before an exposure is made. The continuous wide-open effect also saves the momentary loss of time that occurs with a single-lens reflex, in which the mirror must be swung completely out of the way of the lens-to-film line. Because the momentary swing of the mirror blocks out the field of view, there is always an uncertainty as to the results of the shot.

12. The between-the-lens shutter used on all models is trouble-free, easily synchronized for any flashlamp or flashtube, and may be used with a solenoid (which releases the shutter electromagnetically at any distance from the camera).

13. Many twin-lens reflex cameras have automatic exposure stops to eliminate the need for constant reference to the red counting window.

14. This type of camera is easily adaptable for studio, portraiture, copying, medical, and scientific photography.

The Safe-Set Method

The Safe-Set Method has been developed by the author from experience in lecturing, writing, and teaching beginners to learn to use a camera expertly. It is founded on the two cornerstones of *standardization* and *presetting:*

1. Standardization is essential for the confidence that one feels when using one film, one developer, one flashlamp, etc., of known performance.

2. Presetting is the crux of the Safe-Set Method. Just as equipment must be standardized, so must the procedure of taking a picture. Such variables as shutter speed, aperture, focus, and effect can be preset and controlled with this method. You simply select your subject size, choose and set its co-ordinated distance, iris, and shutter settings, and at the peak of effect, snap the perfect picture.

Since outdoor lighting is usually uniform throughout a large area, the iris opening and shutter speed (standardized at 1/50 second) are never changed, once they have been set for the basic exposure permitted by the light available. The Safe-Set Chart is used to show what distances will be needed for the different body sizes.

However, this applies under the conditions mentioned and not when the iris opening and shutter speed are synchronized to flash.

How the Safe-Set Method Helps You

The use of the Safe-Set Method for taking pictures with all twin-lens reflex cameras is recommended because:

1. All troublesome camera variables are eliminated. Every picture-taking factor is preset. There are no last split-second fumbling delays to correct controls as the camera-to-subject distance changes.

2. Each frame is completely filled with the entire subject. All black-and-white negatives from a roll can be enlarged to a uniform size without any need for raising or lowering the enlarger after the initial enlargement ratio has been chosen and column height has been set.

3. All color exposures are so uniform that they project with equal quality and do not require different enlargement exposure times for Diaversal prints made to a uniform size.

4. Flash shots can be taken only with the Safe-Set Method because your exposure is directly related to the camera-to-subject distance. To get a perfect picture it is necessary to safe-set all controls and to keep your camera-to-subject distance constant by moving with the subject.

The Safe-Set Chart

The Safe-Set Chart is the heart of the method because it gives you at a glance any information you may need. It eliminates completely the necessity for calculating the aperture opening for flash pictures. For example, let us work out a chart for the use of SM or SF flashlamps with black-and-white film A.S.A. 50. (Data charts for other lamps and films will be found at the end of the book, page 125.) The chart should be written on adhesive tape or some similar material and pasted on the back of your reflector. For the purpose of this example, first check the following:

Lens	*Film, B&W*	*Shutter Speed*	*Flashlamp*
3-inch focal length	A.S.A. 50	1/25	SM, No. 5 or SF No. 25

Then, add four lines for the four most frequently used subject sizes. Each line is divided into focusing distance for that size and

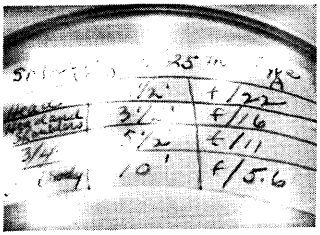
for the lens iris opening required with the flashlamp for that particular distance.

The completed chart will look like this:

Subject size	Distance	Iris (f/) opening
Full body		
Three-quarter body		
Head and shoulders		
Head		

When the chart has been pasted on your flash reflector, this is how it should be used for flash:

If a full-length picture of a number of people is desired, then we scan our chart for the full-body line. It tells us that for black-and-white film, with a shutter speed set for 1/25 (this speed synchronizes with all flashlamps and flashtubes), a full-body picture can be taken at 10 feet. So, we set our focusing scale at 10 feet. Never alter the focus setting; one turn of the knob changes the focus considerably. With the SM or SF lamps, lens opening for 10 feet is between f/8 and f/11; rotate your lens setting until it is opposite the index mark. Now, everything is safe-set. After you have checked the shutter to see that it is set, you merely walk toward the subject while looking into the ground glass. When your image is sharp, compose your picture, and release the shutter.



The Safe-Set Chart Printed on Adhesive Tape and Attached to Back of Flash Reflector

Using Safe-Set Outdoors

Presuming our light to be constant, let us start to set up for outdoor picture-taking. First, it is recommended that you use a daylight-type color film (the manufacturer processes it for you), so that you can defer darkroom work until you have had some picture-

taking experience. It will also eliminate the need for conversion filters (Chapter 7). At a later time you will learn how to use one type of color film for both indoors and outdoors by the use of such filters, but it is better to avoid them at the beginning.

Daylight color must be used outdoors in natural light because the film will reproduce true color only under the type of light for which it was made. Daylight film cannot be used indoors nor can indoor film (Type A) be used outdoors without a filter.

COMPARISON OF TWIN-LENS REFLEX CAMERAS

R – Revolving Focus F – Fixed Focus
U – Unit Focus Lo – Lower Lens Focus Only

Camera	Film Size	35 mm Conversion	Bantam Conversion	Widest Opening	Focusing	Flash Synch.	Exposure Counter	Double Exposure Prevention	Fastest Speed	Slowest Speed	Slip-on Filter Size	Delayed Action	Parallax Correction
Ansco Reflex	120	–	✓	f/3.5	R	✓	✓	✓	1/400	1	33	–	–
Argus 40	620	–	✓	f/8	F	✓	–	✓	1/30	1/30	30	–	–
Argus 75	620	–	✓	f/4.5	Lo	✓	–	✓	1/200	1/10	28.5	–	–
Argus EF	620	–	✓	f/4.5	R	✓	–	–	1/200	1/10	31.5	–	✓
Bioflex I (Kenflex)	120	–	✓	f/3.5	R	✓	–	–	1/200	1/10	36	–	–
Bioflex II	120	–	✓	f/3.5	R	✓	–	–	1/400	1	36	–	–
Bolsey C	35 mm	–		f/3.2	U	✓	✓	✓	1/200	1/10	24	–	✓
Brownie Synch. Reflex	127	–	–	f/4.5	Lo	✓	–	✓	1/30	1/30	25.5	–	–
Ciroflex B	120	–	✓	f/3.5	U	–	–	–	1/200	1/10	31.5	–	✓
Ciroflex C	120	–	✓	f/3.5	U	–	–	–	1/400	1	31.5	–	✓
Ciroflex D	120	–	✓	f/3.5	U	✓	–	–	1/200	1/10	31.5	–	✓
Ciroflex E	120	–	✓	f/3.5	U	✓	–	–	1/400	1	31.5	–	✓
Ciroflex F	120	–	✓	f/3.2	U	✓	–	–	1/400	1	33	–	✓
Flexaret	120	–	✓	f/3.5	U	✓	–	–	1/300	1	28.5	✓	–
Ikoflex Ia	120	–	✓	f/3.5	U	✓	✓	–	1/500	1	37	✓	✓
Ikoflex IIa	120	–	✓	f/3.5	U	✓	✓	–	1/500	1	37	✓	
Kodak Reflex I	620	–	✓	f/3.5	R	–	–	–	1/200	1	38		
Kodak Reflex II	620	–	✓	f/3.5	R	✓	✓	✓	1/400	1	38	✓	✓
Penta Reflex	120	–	✓	f/3.5	U	✓	–	–	1/300	1	28.5	✓	–
Ricohflex	120	–	✓	f/3.5	R	✓	–	–	1/200	1/10	36	–	–
Rolleicord III	120	–	✓	f/3.5	U	✓	✓	–	1/500	1	28.5	–	✓
Rolleiflex f/3.5	120	–	✓	f/3.5	U	✓	✓	✓	1/500	1	28.5	✓	✓
Rolleiflex f/2.8	120	–	✓	f/2.8	U	✓	✓	✓	1/500	1	28.5	✓	✓
Uniflex	120	–	✓	f/4.5	U	✓	–	–	1/200	1/10	28.5	–	–

Proceed as follows:

1. Load the camera with film following the instruction booklet that came with the camera or by having the camera store salesman assist you.

2. Set your distance scale at 30 feet for distance areas, or 12 feet for medium close-ups if you want to take action shots.

3. For color film, set your aperture indicator to the space between 8 and 5.6 (f/6.3). For an A.S.A.50 black-and-white film, set the indicator between 11 and 16. Set your shutter speed at 50. Cameras that have double-action shutters must first be cocked before they can be released. Single-action shutters, such as those in the Argoflex and the Bolsey C, do not require cocking because the releasing motion simultaneously cocks the shutter for the release.

4. If the blue-lamp flash is to be used for an outdoor fill-in light, then use a basic setting of 1/25 at f/9.

5. Hold the camera correctly and firmly at waist level.

6. Keep your eyes focused on the ground glass and look *at* it, not *through* it. You will see your subject on it (but much smaller than it actually is), and as much as you see of it, to that extent will you get it in your final picture. If your nearest subject is kept 15 feet away for the 30-foot setting, and between 9 and 15 feet for the 12-foot distance, the picture will be sharp. *Note:* The top viewing lens is wide open so that it does *not* always show the full area of sharpness. Because of this, the ground glass should be used only for composing when large area settings are used.

7. When using color film, it is best to wait for that kind of day when colors will be most brilliant. Colors will photograph best on a clear, sunny day. If the sky is dull and overcast, your final pictures will also be dull and overcast. You will find that the camera controls described here are correct for a bright day. For other lighting conditions, which can produce interesting effects but require greater care in making the exposure, consult an exposure chart or use an exposure meter.

Outdoor Subjects of Definite Size

The setting for pictures of subjects having a definite area, such as a full body, head and shoulders, or groups, is different than the usual 30- or 12-foot setting used for landscapes. The chart on page 109 shows the various field sizes for these distances.

Using Safe-Set Indoors

If the weather is so poor that there is little light available, or if your picture is to be taken indoors, you can become totally independent of outdoor light through the use of indoor color film and an accessory flash unit. With flash, you must remember that the synchronization of the flash and shutter takes place only at certain speeds because the duration of the light flash is so brief. The 1/25-second shutter speed is a standardized safe choice for all cameras because it will synchronize with all lamps. Even though the shutter speed is 1/25, the brief duration of the flash (1/200 second with SM or SF lamps) will stop the action because the picture is taken only as long as the light is on.

Procedure for Flash Pictures

To use your camera for flash, follow this simple procedure:

1. Refer to the Safe-Set Chart and check your film and equipment adjustments.
2. From the chart preselect the subject size and subject distance.
3. Set your distance scale.
4. Choose the aperture for this distance from the chart, and set your camera lens iris to it.
5. Now approach your subject to the approximate distance that has been set and then look at it on your ground glass. If the image is not sharp, move back and forth until it is. Do not touch the focusing lever. If you do, you will find that you have turned your scale a considerable distance, even with a half- or quarter-turn of the control. It is far more accurate and easier to move the safe-set camera to the point of accurate focus than to try to get the image in focus by turning the focusing controls.

Note: Even if you are a few inches in front of, or behind, your actual distance setting, the image will still be sharp because the depth of field adequately compensates for a slight variation in distance. (See Chapter 4.)

When you are satisfied that the image is in sharp focus, compose your picture, wait for the peak of action or expression, and then squeeze the release. A click of the shutter and the flash of a lamp tells you that the flash picture has been taken.

After taking your picture, wind the film immediately to the next frame only if you are going to take another picture. Otherwise, the

film may lose its rigidity and buckle. Buckled film produces an out-of-focus image in spots because it is not flat on the focal plane of sharp focus.

The less expensive cameras have a red window for use as an exposure indicator; the more advanced have automatic exposure counters; while the most advanced (Automatic Rolleiflex) winds the film and sets the shutter at the same time. When the entire roll has been taken, continue winding your film until you hear the paper backing flap in the take-up spool chamber. *Note:* 35mm film must be rewound into its original cartridge. (The Richoflex is an exception.)

6. After opening the back, remove the film by pulling out the knob that holds the take-up spool. Keep a firm grip on the paper backing and bend the paper end under so that the adhesive label may be wrapped around the roll to seal the spool.

7. Mail your film to a processing center after carefully addressing the shipping tag and checking the amount of your postage. The returned, processed color transparencies or prints may be viewed, enlarged, or projected.

The Key to SAFE Pictures

The instructions given for using the Safe-Set Method are simple, and they will produce a picture each time. The time to remember all the picture-taking factors is *before* the exposure is made. As an aid to memorizing these important points so that you can check them, recall the word **SAFE** before you take a picture: **S**–shutter; **A**–aperture; **F**–focus; **E**–exposure.

Your camera is a flexible instrument, capable of many changes for use under varying light, shutter speed, and distance conditions. For outdoor shots, the only judgment required is the choice of a bright, sunny day, preselection of your distance and/or your subject size, and retention of the subject within the permissible distances from your camera. Learn to safe-set your camera controls for either indoors or outdoors, and you can be sure of fine results.

Note: Shutter speed is 1/50 for a No. 5 or No. 25 lamp.

When taking indoor pictures, the Safe-Set Method practically takes the picture for you.

Chapter 2 (S, A, F, E) will show you how to change the simple settings of the Safe-Set Method to meet all possible conditions or requirements.

2. The Safe-Set Method Applied

S: THE SHUTTER

How the Camera Shutter Works

The flow of light through the lens of your camera is controlled by the shutter and the iris diaphragm, just as the regulating knob on the water faucet controls the size and duration of the flow of water through the faucet. The iris diaphragm controls the "size" of the stream of light, while the shutter controls the length of time the light is permitted to strike the film. Exposure is a product of the two—iris diaphragm and shutter control.

When the shutter is opened, light that is entering through the lens will reach the film. If the shutter remains open a long time, more light will enter through the lens than if the shutter had remained open for only a short time.

The volume of light available determines whether it is necessary to leave the shutter open for a long or for a short time. When the volume of light is very low, you may be required to leave the shutter open for as long as an hour or more (time exposure). If a large amount of light is available, on the other hand, a sports or action shot may be taken in as little as 1/500 second to stop the fast motion of your subject.

Shutter Speed BUTKUS.US

From the motion chart, you can choose the correct shutter speed. You will find later that, if a choice of speeds is permissible, the slower speeds will allow the use of a narrow iris opening, which realizes a gain in over-all sharpness, while a faster speed requires a wider opening, which will produce a shallow depth of field. The correct choice of iris opening, which depends on your shutter-speed selection, may often be an important point in making or breaking the effect of a picture. As an example, landscapes usually require a narrow opening to produce an over-all sharpness; therefore a slow shutter speed is used. A portrait, on the other hand, may require an out-of-focus background; therefore the wide opening needed requires a rapid speed

setting. Action pictures naturally require the fastest speed of your twin-lens reflex to stop the motion—1/500 second.

SHUTTER SPEEDS FOR MOVING SUBJECTS

SUBJECT AT 25 FEET	LINE OF MOTION ↑↓	↖↘	↔
Walking at 5 miles per hour	1/50	1/100	1/150
Children playing	1/100	1/200	1/300
Street activity	1/100	1/200	1/300
Swimmers, skaters	1/100	1/200	1/300
Vehicles at 20 m.p.h.	1/200	1/400	*1/500
Football, running	1/200	1/400	*1/500
Vehicles at 40 m.p.h.	1/400	1/500	*1/500
Tennis	*1/500	1/500	*1/500
Horse race	*1/500	*1/500	*1/500
Airplanes	*1/500	*1/500	*1/500

N.B. *When your subject is at 50 ft., multiply all speeds by* 2(1/100x2 = 1/50).
For 100 ft. subject distances, multiply all speeds by 4 (1/100 x 4 = 1/25).
**PAN to stop motion.*

Shutter-speed Rule for Beginners

Still (inanimate) subjects may be taken with the slowest speed available, ½ or 1 second, or even *B* or *T*, to secure the greatest amount of subject sharpness by stopping down the lens (i.e., using a narrower iris diaphragm opening).

Living (animate) subjects require a fast shutter speed of at least 1/50 second. To be on the safe side, sports or action pictures should be taken at the fastest speed that your shutter has to be certain that the action is stopped. Standardize all fast shots at 1/200 Alphax, 1/300(SV), 1/400 Rapax, or 1/500 (Compur).

If an exact shutter speed must be determined for a subject in motion in order to use the smallest opening possible, you can remember what speed to use by knowing the meaning of the series of numbers, 25, 5, 25. This basic number group means that, for a subject 25 feet away, moving at 5 miles per hour, with a line of motion directly toward or directly away from the camera, the shutter speed

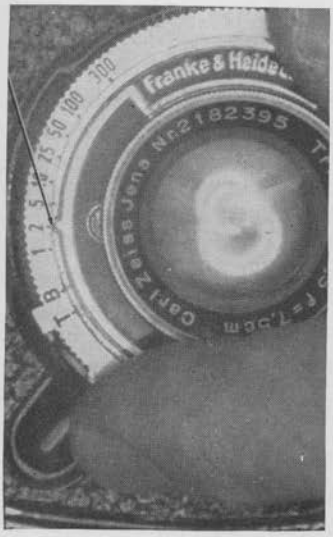
need be only 1/25 second to stop its motion without a blur. A 45-degree line of motion requires a double shutter speed of 1/50 second, while a 90-degree line of motion requires a triple speed, or 1/75 second. If a subject's speed is increased to 10 miles per hour, then all numbers are doubled in proportion: 1/50, 1/100, 1/150, etc. If, on the other hand, the subject distance is increased to 50 feet, all speed numbers may be halved. With a 100-foot distance the numbers are divided by 4, so that a subject moving at 20 miles per hour, 100 feet away, with a line of motion toward a camera still requires a 1/25-second shutter speed. The decrease in exposure time is due to the faster speed of your subject.

Write the computed numbers on a piece of adhesive tape or similar material and paste it on your camera case for ready reference.

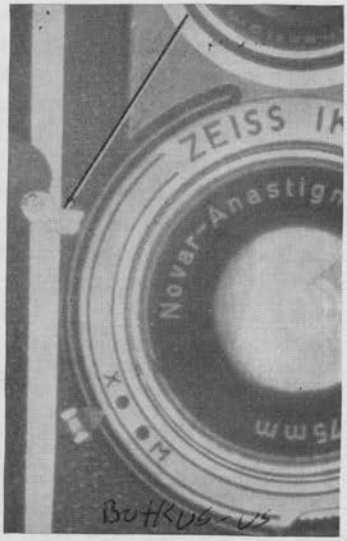
Supplementary Techniques

Panning

If your highest shutter speed is still too slow to stop the motion of a rapidly moving object from a set position, then you will have to



Setting the Shutter Speed



Cocking the Shutter

"pan" your camera to stop the subject's motion. *Panning* means that you swing or move the camera in the line and direction of movement. This is generally done by swinging your camera in an arc as the subject moves past you in space. When you snap your shutter under these conditions, the subject will be in sharp focus, but the background will be blurred. While this is not always the best photographic technique for over-all sharpness, the resulting sharp subject, which is the essential purpose of the picture, fully justifies the compromise.

Hand-held Exposures

The 1/50-second setting, or faster, is the slowest speed recommended for a hand-held exposure. All slower speeds should be taken with the camera on a tripod.

We magnify our pictures by enlargement, projection, or in a special viewer in order to see them clearly because the film size is small. Unless the camera is held firmly, body vibration or tremor will be transmitted to it, and when magnified, will show on the picture as an over-all blur. At speeds slower than 1/50 second the camera may be hand-held only after special training; but after such training, even 1/10-second speed can be used.

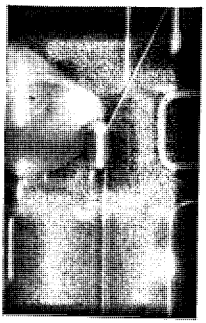
To limit the possibility of blurring the picture with a hand-held camera, brace yourself in this fashion:

Place your feet so that your toes are approximately 4 inches apart, your heels about 6 inches apart. Hold your camera firmly. Take a deep breath and exhale. Shortly after the exhalation, you will find that you are at your steadiest. At this point release the shutter with a smooth, uniform motion.

While this method will yield good pictures even at 1/10-second speed, it is far safer to use a tripod so that camera movement will be minimized at speeds slower than 1/50. If no tripod is available, you can steady the camera on a tree, an automobile, a wall, a fence, etc.

Camera-steady Control

Practice releasing, or cocking and releasing, the shutter a number of times. Some release levers depress more than others before the shutter is activated. Practice to get the experience with your particular twin-lens reflex camera so that you will get the pressure for the depth of release just right. Correct releasing pressure is important for action pictures and baby portraits that require split-second timing to capture the once-in-a-lifetime expression or action.



Releasing the Shutter

The best place to practice releasing the shutter is in front of a large mirror. Stand fairly close and look through the viewfinder as you release the shutter. Any slight movement that you notice would have occurred had you actually taken a picture. Jerking the camera release would have produced an unsharp picture had there been film in the camera. Practice, therefore, until you see that the camera remains rock-steady during the exposure.

Eliminating Vibration

Cable Release. Another important aid for minimizing camera movement is a cable release. It is useful if your camera is on a tripod. Should your finger press against the release too strongly, the vibration would be transmitted to the camera through your hand. With a cable release, however, your hand is free and clear of the camera, and the pressure and the vibration cannot reach it. We recommend a long cloth-covered cable release for best results. It should be loosely looped. If it is stretched taut, the releasing action may still be transmitted to the camera.

Delayed-action Self-timer. If a cable release is not available and you are fearful of vibration in releasing the shutter, then you can use a self-timer to release the shutter. Rolleis and similar cameras have integral (built-in standardized), delayed-action self-timers, while the less expensive models may have a removable type that can be added whenever necessary. The removable type must be designed precisely and adjusted carefully, otherwise your shutter can be broken.

The cable release or delayed-action self-timer is mandatory when taking macro- or micro-close-ups.

In use, you will find that once the delayed-action mechanism is set and released, there is about a 15-second delay before the camera shutter is released. Within this time tripod vibration will usually cease so that your pictures will be sharp.

Delayed Action for Flash. This 15-second delay also provides sufficient time for getting yourself into a picture. You safe-set your camera, release the self-timer, and get into the picture before the flash goes off.

If you will look into your picture album you will be surprised to

find so few pictures of yourself because you have usually taken pictures of others. With a self-timer, your family groups or friendship circles will be complete since you will be included.

Special Types of Shutters

Between-the-lens Shutter

The shutter speeds of a typical synchroshutter are *T*, *B*, 1, 2, 5, 10, 25, 50, 100, 250, and 500. These numbers refer to fractions of a second. The 50 means 1/50; the 2 means 1/2; etc. *T* (time) requires two clicks of your release. The first opens the shutter and keeps it open, while the second closes the shutter. The *B* (bulb) setting will keep the shutter open only as long as there is pressure on the release. Use the *B* setting for 2- to 5-second exposures. *T* is used for longer periods of time.

If your shutter has only a *B* setting, you can get a *T* effect with a special locking cable release. This type is built with a set screw or automatic clamping disk to hold the plunger in place so that the shutter leaves will remain open even at the *B* setting.

It is best to set your shutter speed directly opposite the engraved numbers.

In double-action shutters, the shutter is cocked as the first action by moving the cocking lever until it clicks. Now, you are ready for the exposure. The second action releases the shutter.

Caution: The 1/500-second speed setting must be made *before* your shutter is cocked. Do not attempt to move your speed dial to 1/500 second after the shutter is cocked. To do so is to invite trouble. It is better to lose a frame by releasing the shutter, winding to a new frame, and then resetting the shutter for 1/500-second speed.

Speeds other than 1/500 may be changed, but it is best to plan your shot beforehand and leave the speed setting alone after the shutter has been cocked. Remember, one exposure costs approximately four cents while a broken gear may cost many dollars to repair.

In single-action shutters (Alphax, etc.) one-lever motion cocks and releases the shutter simultaneously. The speed range is usually 1/10 to 1/200 second.

Flash-synchronized Shutters

Typical flash-synchronized shutters are the Rapax, Synchro-Alphax, Prontor SV, Compur X, or M-X. While they vary in top

shutter speeds, all flash-synchronized shutters perform equally well.

Safe-Set Constant Shutter Speed. Although the shutter speed remains constant, the iris opening varies, according to the light conditions, as follows:

1/100	sunny day	f/11
1/100	bright day	f/8
1/100	cloudy day	f/5.6
1/100	dull day	f/4

A large range of shutter speeds, while important for highly specialized work, is not needed by the beginner. This was proved when a survey of salon prize winners showed that the average speed setting had been 1/100 second. With this fact in mind, the beginner can see that speeds up to 1/100 second will suffice for most of his pictures.

A: THE APERTURE (IRIS)

What the Aperture Does

When a faucet is opened, water flows through it for any desired time. A narrow faucet opening lets a small amount of water come through, while a large opening permits a greater volume to flow. The relationship of the diameter of the faucet is similar photographically to the size of the lens opening.

In order to know the relationship of the opening for the purpose of calculating an exposure, a number is assigned to various diameters. This number is derived by dividing the diameter of the opening into the distance required to form an infinity image. If the lens forms an infinity image when it is 2 inches distant from the film, and the opening is ½-inch wide, the lens will be marked f/4 for that diameter. If the opening is 1-inch wide, then 2/1=f/2. A small number indicates a wide opening, whereas a high number indicates a narrow opening. The wider the opening, the greater amount of light that is admitted at a given interval of time.

Conversely, the narrower the opening, the smaller the volume of light that can reach the film within the time that the shutter remains open. For completely equal exposures, you can have either a large opening and a fast shutter speed or a narrow opening with a slow shutter speed. Each combination has different advantages. A wide opening permits short exposures, such as is necessary for action pic-

Full-stop marking	Relative light increase, if only the iris is widened	
f/1	1	These are full stop openings with a 100% difference in light transmission between two adjoining stops. If the indicator is moved approximately half way between the two markings, the iris is opened ½ stop and the difference in light transmission is increased 50%. Half way between f/5.6 and f/8 produces f/6.3, between f/8 and f/11 is f/9.
f/1.4	2	
f/2	4	
f/2.3	8	
f/4	16	
f/5.6	32	
f/8	64	
f/11	128	
f/16	256	
Half-stop openings		
f/3.5	1	These specific numbers produce a difference in light transmission of 50% from one mark to another.
f/4	1½	
f/4.5	2	
f/5.6	3	
f/6.3	4½	
f/8	6	
f/9	9	
f/11	12	
f/12.5	18	
f/16	24	
f/18	36	
f/22	48	

N.B. *Everything being equal, if the shutter speed is changed from* 1/100 *to* 1/200, *the iris must be widened one stop.*
If the shutter speed is changed from 1/100 *to* 1/50, *the iris is narrowed one stop.*
If the shutter speed is changed from 1/100 *to* 1/75, *the shutter is narrowed by* ½ *stop.*
If the shutter is narrowed from f/8 *to* f/16, *the shutter speed is lengthened four times so that* 1/100 *will be re-set to* 1/25.

tures or where a slow-emulsion film speed requires large amounts of light for an exposure. With a wide opening, the subject will usually be sharp within a limited front-to-back distance. A narrow opening, on the other hand, will produce subject sharpness in far deeper areas of the picture.

When a sharp image is desirable, but not always possible, compromise by getting what you can, with at least your main subject absolutely sharp.

The iris diaphragm of a lens regulates the size of the opening for admitting light to the film. The iris is similar in many ways to the iris of the human eye. If you look into a mirror and bring a light close to your eyes, you will see that the iris opening narrows. As the light is moved away, the iris widens. You duplicate this narrowing and widening with the diaphragm of your lens by moving the iris-

opening indicator from the higher to the lower number. If you will look through the back of your camera and then through the lens, you will see the similarity as you narrow and widen your lens opening.

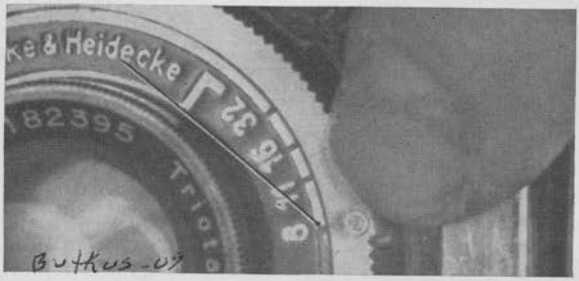
The numerals f/2.8, f/4, f/5.6, f/8, etc., represent a 100% difference in light admittance; f/4 to f/5.6 represents a 100% reduction; f/5.6 widened to f/4 represents a 100% increase.

Remember: The narrower the opening of your lens, the greater will be the depth of field. Narrow stops give great depth of field. Wide stops yield very shallow areas of sharpness.

The Safe-Set Constant Iris Opening

It is possible to safe-set your iris opening and keep it at a constant size for all lighting by varying the shutter speed to compensate for the difference in exposure that would be needed when changing from dim to bright light. A constant iris setting is necessary if your depth of field must be uniform. Otherwise, widening or narrowing the opening changes the depth of field. To use the iris Safe-Set Method, e.g., for an average subject (Class 2 of the exposure chart on page 30), the opening is set for:

f/11	sunny day	1/100
f/11	bright "	1/50
f/11	cloudy "	1/25
f/11	dull "	1/10



Setting the Iris

Using Lens of Short Focal Length

An inherent quality of a 3-inch lens of short focal length is its remarkably large depth-of-field area of sharpness for the negative size, even when the iris is wide open. This short lens at f/4 has the

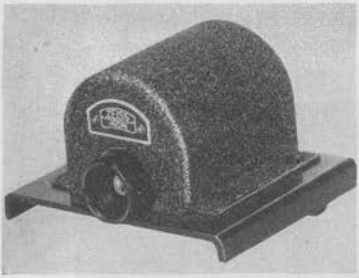
same depth of field as a 6-inch lens at f/8, or a 12-inch lens at f/16. When your light is constant, this knowledge is very valuable. With a 3-inch lens set at f/4, you will be able to get a picture that has adequate depth under certain set minimum lighting conditions. Since a lens of longer focal length would require an opening of f/16 for the same depth, your picture would be either hopelessly underexposed or you couldn't take a picture at all because the exposure would have to be 16 times that at f/4. The depth of field possible with a lens of short focal length at a wide opening is often the critical all-important difference between a bad and a good picture.

Now you have learned two of the four SAFE rules—to set your shutter and to control the variable opening (iris) on your lens. F and E are next.

F: FOCUS

Sharpness Depends on Good Focusing

Focusing is the process of ensuring the maximum amount of image sharpness. The correct subject-to-camera distance may be esti-



(Top) Prismatic Focuser, (Bottom) Focusing Scale and Depth-of-Field Scale

Focuser on Ikonflex

mated in a number of ways, such as using your ground glass (when precise focus is needed for portraiture or for flash), using a Focus Spot photo-optical device (Kalart) for press work, or by simply estimating the distance for use with the hyperfocal distance or depth-of-field effect. To make an accurate estimate, take advantage of either the depth-of-field or hyperfocal-scale settings. These latter terms will be described later in greater detail. Read this focusing information carefully. A sharp focus is a necessary basis for a good picture.

Because your camera lens of either 3- or 3⅓-inch focal length has a great depth of field, your images will be sharp from infinity to most middle distances without requiring any further critical focusing. Because your top viewing lens has a wide aperture, it will show less of your subject in focus than if the iris were stopped smaller. You must remember this when the hyperfocal or depth-of-field scale is used, because your taking lens is stopped down, even though the top viewing lens is open. The aperture difference between the top and bottom lenses must be remembered for another reason: background objects viewed through the viewing lens may appear fuzzy, but will photograph sharply due to the narrower stop used.

Twin-lens Reflex Systems

The focusing systems of twin-lens reflex cameras can be divided into two classes.

1. *Unit Focusing.* Both top-viewing and bottom-taking lenses are mounted on a single moving lensboard. The complete unit that holds both lenses moves backward and forward as the image is focused.

2. *Front-cell Co-ordinated Helicle Focusing.* Both top and bottom lenses are mounted in a nonmoving lensboard and they are focused together by turning one of the geared lensfronts. The helicle mounts are so co-ordinated that when one is turned the other rotates as well. The optical method is such that only the front elements of the top and bottom lenses turn on each other.

The Argoflex 45 has a rotating taking lens, which focuses by turning the front element; but the top lens does not focus, serving only for its viewfinder effect.

The least expensive twin-lens reflex types are essentially fixed-focus box cameras. No adjustments are available for distance. For best results, the fixed-focus box camera types (Argoflex 75) must be

placed at least 10 feet from the subject, but closer focusing distances are possible with supplementary portrait lenses.

Focusing Procedures

To get sharp pictures you must know the proper method of focusing for the kind of picture you want to take; that is, focusing for action shots, distance shots, portraits, etc. Be sure of the method unless you want to take hit-or-miss pictures.

Hyperfocal Distance (for Quick) Focusing

If you must guess your distance because there is little time to focus, or because your field is so great that it is inadvisable to focus at any one particular spot, then it is a good idea to know something about the hyperfocal distance and the depth of field. To say that your lens of short focal length has a great depth of field means that very large areas will be sharp even though your focus is not based on one specific object. In this case, the areas of focus are dependent upon the lens opening and the distance setting. The further away the distance is set, the greater the depth of field. The narrower the opening, the greater the depth of field.

If your lens is set at infinity and the opening is f/4, the point of nearest acceptable focus will be 63 feet to infinity. At f/8, the near point will be 31 feet. Then a curious relationship occurs if we set our focus exactly at 63 feet at f/4, or at 31 feet at f/8. You will discover

HYPER-FOCAL DISTANCE TABLE

Aperture	*Focus Setting*	*Area of Sharpness*
f/2.8	136′	63′ to ∞
f/4	63′	31 1/2′ to ∞
f/8	31 1/2′	15 3/4′ to ∞
f/16	15 3/4′	7 7/8′ to ∞
f/32	7 7/8′	3 9/10′ to ∞

Converting Your Meter Scale To Feet

METER	FEET	TOTAL INCHES
0.8M	2 2/3′	32″
0.9M	2 11/12′	35″
1.0M	3 1/3′	39″
1.1M	3 1/2′	43″
1.3M	4 1/3′	52″
1.5M	4 5/6′	58″
1.7M	5 2/3′	67″
2.0M	6 1/2′	78″
2.5M	8 1/6′	98″
3.0M	9 5/6′	--
4.0M	13′	--
6.0M	19 2/3′	--
10.0M	39 1/3′	--
20.0M	78 2/3′	--

ROLLEIFLEX — ROLLEI DEPTH OF FIELD TABLE — ROLLEICORD

7.5 CM — 3 INCHES

Calculated for circle of confusion of .003". Figures in the inf. column are hyperfocal distances for indicated diaphragm opening. If lens is focused on hyperfocal distance, all objects from half that distance to infinity will be rendered sufficiently sharp.

	inf.	60'	30'	20'	15'	12'	10'	8'	7'	6'	5'	4'	3½'	3'	2⅔'
f: 3.5	71' 5" to inf.	32' 7½" to 375' 4"	21' 2" to 51' 9"	15' 7½" to 27' 9"	12' 5" to 19'	10' 3" to 14' 5"	8' 9¼" to 11' 7½"	7' 2½" to 9'	6' 4½" to 7' 9"	5' 6½" to 6' 6¾"	4' 8" to 5' 4½"	3' 9½" to 4' 2⅜"	3' 4" to 3' 8"	2' 10½" to 3' 1⅝"	2' 6¾" to 2' 9¼"
4	62' 6" to inf.	30' 7½" to 1500'	20' 3" to 57' 9"	15' 2" to 29' 5"	12' 1" to 19' 8½"	10' 1" to 14' 10"	8' 7½" to 11' 10½"	7' 1" to 9' 2"	6' 3½" to 7' 10½"	5' 5¼" to 6' 7½"	4' 6" to 5' 5¼"	3' 9⅛" to 4' 3¼"	3' 3½" to 3' 8½"	2' 10¼" to 3' 1¾"	2' 6½" to 2' 9½"
5.6	44' 7" to inf.	25' 6⅝" to inf.	17' 11" to 91' 8"	13' 9½" to 36' 3"	11' 2½" to 22' 7"	9' 5½" to 16' 5"	8' 2" to 12' 11"	6' 9½" to 9' 9"	6' ½" to 8' 3½"	5' 3½" to 6' 11¼"	4' 6" to 5' 7½"	3' 8" to 4' 4¾"	3' 3" to 3' 9½"	2' 9¾" to 3' 2⅛"	2' 6½" to 2' 10"
8	31' 3" to inf.	20' 6½" to inf.	15' 3½" to 750'	12' ½" to 55' 6"	10' 1½" to 28' 10"	8' 8" to 19' 6"	7' 7" to 14' 8½"	6' 4½" to 10' 9"	5' 8½" to 9'	5' ½" to 7' 5"	4' 3¾" to 5' 11½"	3' 6½" to 4' 7"	3' 1¾" to 3' 11½"	2' 8⅞" to 3' 3¾"	2' 5¼" to 2' 11"
11	22' 9" to inf.	16' 3" to inf.	12' 11" to inf.	10' 7½" to 165' 6"	9' ½" to 44'	7' 10½" to 25' 4"	6' 11½" to 17' 10"	5' 11" to 12' 4"	5' 4½" to 10' 1½"	4' 9" to 8' 1¾"	4' 1¼" to 6' 5"	3' 4¾" to 4' 10⅛"	3' 1⅛" to 4' 1½"	2' 7⅜" to 3' 5½"	2' 5" to 3' 1¼"
16	15' 7½" to inf.	12' 4¾" to inf.	10' 3½" to inf.	−8' 9½" to inf.	7' 7¾" to 375'	6' 9½" to 51' 8"	6' 1½" to 27' 9"	5' 3½" to 16' 4½"	4' 10" to 12' 8"	4' 4" to 9' 9"	3' 9½" to 7' 4½"	3' 2¼" to 5' 4½"	2' 10½" to 4' 8"	2' 6¼" to 3' 8½"	2' 3½" to 3' 2½"
22	11' 5" to inf.	9' 6½" to inf.	8' 3½" to inf.	7' 3" to inf.	6' 5¾" to inf.	5' 10½" to inf.	5' 4" to 80' 6"	4' 8½" to 26' 9"	4' 4" to 18' 1½"	3' 11¼" to 12' 8"	3' 5⅝" to 6' 2"	2' 11½" to 4' 2"	2' 8" to 5' ⅔"	2' 4½" to 4' 4⅜"	2' 2" to 3' 6"

If negative is to be greatly enlarged, use next smaller diaphragm opening.

that everything will be in sharp focus from 31 feet to infinity for the former, and from 15½ feet to infinity for the latter. If you assemble all the near-focusing points at infinity for the different f/ openings and list them, the result is known as the hyperfocal distance scale. This scale is most useful outdoors because light conditions permit narrow openings and make the hyperfocal distance settings operable. Set at f/16 and for 15½ feet, everything from 8 feet to infinity will be in focus.

Taking an outdoor picture is really quite simple because you merely set your distance for 15½ feet and as long as your subject remains 8 feet away, or farther, everything will be sharp. Once the focus is set, the distance scale setting must not be moved because everything will be sharp between the distances mentioned.

The ground glass should be used for composition *only*, not for focusing, because of the wide-open top lens. Disregard the ground-glass image. We know, from the chart, that definite areas are in focus. You can even use an auxiliary viewfinder or sportsfinder when working with hyperfocal distance or depth-of-field settings. Results will be accurate because you are not dependent on the ground glass for focus.

Infinity Setting

If greater sharpness is desired at infinity, use the infinity setting rather than the hyperfocal distance number. However, an infinity setting will generally produce an unsharp foreground. Since this is undesirable in most pictures, you can crop the foreground during enlargement or mask it out with masking tape on a color slide.

Using the Depth-of-Field Scale and Table

The depth-of-field table shows the area of sharpness when your focusing scale is set at any distance and used with the various f/ openings. The depth-of-field scale is valuable particularly for pictures where a definite amount of front-to-back sharpness is wanted, e.g., in a room. If everything must be sharp in a room from 6 to 30 feet, the depth-of-field table engraved around the lens mount or focusing knob tells you that your focus should be set at 10 feet and your iris narrowed to a little less than f/16. Now everything will be in acceptable focus well within the 6- to 30-foot limitations. To make the exposure, take your light reading and then find the exposure time needed for the preselected opening. When the depth-of-field scale is used in

this way, everything is safe-set except the exposure time. When this is worked out, the exposure can be made with complete assurance that it will result in a perfect picture.

Learning to Use the Ground-glass Viewer

When an image must be at razor-sharp focus (this generally occurs at shorter distances), the ground glass must be used. A ground glass is a piece of glass with one translucent (partially transparent) side. This translucency, which is essential for distance measurement, is formed by grinding the glass with fine sand, or by chemically etching only the side that will face the camera lens. The translucent side has the interesting property of making the aerial image produced by a lens visible. When the visible image is focused on the ground glass, it will be sharp if the subject is in focus and unsharp if it is out of focus. The beginner can see this clearly by placing a newspaper or other printed material that has great contrast on a wall and then standing with the camera approximately 4 feet from the print. Look at the ground glass. If the print is clear on the ground glass, your subject (the printing) is in focus. If the printed material is fuzzy, then make your focusing adjustments until the printed matter appears sharp.

The Art of Precision Focusing

Many beginners have difficulty registering the image on the ground-glass viewer (or screen). This may be caused by glare, dim light, or poor eyesight. Obviously, to be able to register correctly, you must know your camera well before taking pictures, and you must also know how to correct for such handicaps.

Get Your Camera Ready

Here are some hints for you, if you have any of the difficulties mentioned in the preceding paragraph.

1. Do not add gadgets to, or take away anything from, the camera's focusing system. Whatever comes from the factory is the best within the price range of the camera. As soon as your focusing screen is removed and replaced with a field lens, the original factory accuracy may be lost. Do not tinker. Let a qualified mechanic (the manufacturer's own, preferably) do the necessary adjustments if a repair must be made.

2. If your eyesight is poor, have your mechanic apply a drop of mineral oil or petroleum jelly to a ¾-inch circle in the center of the ground side of your ground glass. The circle must be small; otherwise the light-stopping effect of the entire lens would be removed and no focusing would be possible because you would be looking through the lens rather than at the thoroughly engineered ground-glass screen.

3. Field lenses should be avoided for use on cameras that do not have them as an integral part of the original factory design (Kodak Reflex and the new Ikoflex have it built in). When they are used as attachments, they change the focusing position of your ground glass because of their magnifying effect or their physical position under the glass. If you *must* try one, have a competent mechanic fit it for you. It is far better to spend the money for an installing fee than to have unsharp pictures because of faulty assembly techniques.

4. Large magnifying glasses are built in, or may be placed on, the ground glass to produce a larger visual image. The magnifying lens should not be too strong, otherwise you will have difficulty in differentiating your subject image from the coarseness of the glass.

5. Use a focusing hood, a Prismatic Focuser (Zeiss Ikoflex), or a Universal Prismatic Viewer (Photographic Importing & Exporting Co.) to remove any glare from the ground glass. Glare-free conditions are best for easy focusing; otherwise the eye cannot select the end point of precise focus. Prismatic Viewers produce an upright unreversed image, so that the ground-glass image moves in the same direction as your subject. In other viewers, the ground-glass image seems to be moving in an opposite direction to the actual line of subject motion.

6. Check your camera every six months for mirror cleanliness, lens alignment, etc. The mirror often becomes fogged by moisture condensing in the focusing chamber; or the metallic mirror coating may tarnish because of oxidation. A fogged mirror may reduce your viewing efficiency by as much as 75 per cent.

SAFE Focusing Techniques

Safe-Set Focusing for Action Shots. Safe-set action pictures require setting your focusing scale for the 3-inch lens, either at 30 feet for infinity to 15-foot sharpness, or at 12 feet for a 15- to 9-foot area. The iris opening is presumed to be f/6.3.

Safe-set focus is important if you want to produce pictures of rapidly moving subjects. For example, if you photograph a wedding

procession, you must decide where your picture will be taken. Otherwise you will be changing focus continuously, and may not be able to get a clear picture at all. The best technique in this case is to focus the camera on a pew, flower, etc., as a reference point. Then, wait until the subject in the procession moves opposite this reference point and snap the picture. It will be sharp!

Focusing for a Flash. The inside exposure taken with a flash differs from that taken outdoors because its dependence on the light-to-subject distance is critical. If this distance changes, then your exposure changes. Therefore, the hyperfocal distance and depth-of-field settings are rarely used with flash. Flash photography and flash focusing will be discussed in Chapter 6.

Out-of-focus Backgrounds. Portraits often appear best when the background is out of focus. Since the wide-open setting of the top lens generally shows the background to be out of focus, you can duplicate this effect by taking your picture at the same wide opening.

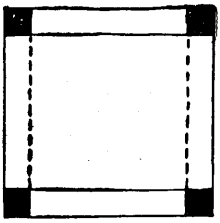
For practice, alter your settings for shutter speed, iris opening, and distance until these changes become a matter of "second nature." Make your pictures sharp. A sharp picture may be diffused for a softened effect at a later time, but it is impossible to take an out-of-focus image and make it critically sharp.

If the Safe-Set Method is used, leave the focusing knob alone. It has been the author's experience that when one turns to see the focusing point, one actually moves the indicator from infinity down to almost the closest focusing distance. Then, to make matters worse, the picture that one may have wanted to take appears when the lens mount is turned or the focusing knob is twirled.

Overhead Focusing. If you hold your camera above your head and look into the ground glass, the images will still be right side up. You can therefore focus and compose over high walls or over the heads of a crowd. It is also possible to hold the camera around the corner of a building and focus without your being seen. When the camera is held to the side this way, the images are upside down. With a little experience, you will be able to focus and compose this way as easily as the regular way.

Picture Composition

For better composition, place ¼-inch squares of black masking tape in each corner of your ground glass. If your composition is



placed vertically inside the top and bottom portions of the masking square, then you will have the perfect proportions for an 8x10 vertical enlargement. When your composition is horizontally inside the black masking squares, the proportions are perfect for a horizontal 8x10.

If, in addition, you will divide your ground glass into one-third sections and place four dots (with India ink) at the intersections, you will have a number of reference points for composing your subject in a square format that has an interesting off-center arrangement. Since you can simultaneously focus and compose your subject on your ground glass, you have all the advantages of a combined rangefinder and viewfinder system. The ground-glass portion acts as a rangefinder, while the compositional aids on your ground glass will show you the exact arrangement of the subject in the field of view.

Viewfinding Parallax

At distances closer than 7 feet, the problem of parallax (the approximate 1½-inch difference in view between the viewing and taking lens) must be considered. Otherwise your subjects would have their top borders cut off, e.g., a portrait would be clipped across the forehead.

To correct this, some cameras have built-in compensation devices (Rolleiflex, Circoflex, etc.); some show a smaller than normal ground glass (Argoflex); others are raised ⅛ inch.

Review Your SAFE

You have now learned the S, A, and F points of the SAFE method of picture-taking. Take the time to review the highlights of each one. Summarize and memorize the following:

Hyperfocal distance is used outdoors when large areas must be sharp.

Depth-of-field scale is used to estimate the sharpness of subjects that are in moderate depth, usually interiors.

The ground glass is used for precision focusing of subjects that have little, or shallow, depth or when the lens is used wide open.

Whatever focusing system or method you use, your subject must always be *sharp.*

E: EXPOSURE

You Are Ready to Take Pictures!

In this section you will learn the E of the SAFE method of taking pictures. It is the last of the picture-taking mechanics for you to know, since you can now set your shutter and iris and focus. All that is left to do is to decide on what exposure you want and to expose the film.

There are three general methods for determining the proper camera settings to be used with daylight (D) film, outdoor lighting; or with tungsten (T) film, photoflood light or ordinary illuminating light. Flash shots require a different exposure technique. This will be discussed also.

First: Check Your Film

Black-and-white film. Expose black-and-white film for shadows, but develop it for the highlights.

Color film. Color film should be exposed for highlights, but the shadows must be filled in to a 3:1 or 4:1 ratio, but not greater than 3:1 except for special effects. This low lighting ratio is necessary because of the inherently low contrast limitations of most color-emulsion films.

Use the instruction sheet that is usually packaged with the roll of film. The *D* on a chart refers to daylight, while a *T* signifies tungsten or artificial light. The instructions will also recommend shutter and iris settings for different light conditions. If you follow these suggestions, you will definitely get pictures that are exposed satisfactorily. Remember that the manufacturers take great pains to ensure the accuracy of their published information.

Measuring Light for Correct Exposure

Using an Exposure Chart

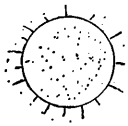
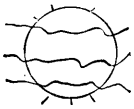
The exposure chart given on page 30 standardizes the setting procedure so that only one variable remains—the iris opening. The shutter speed and film speed are always the same. The different iris openings are derived by the use of simple arithmetic. First choose the number allocated to the specified light condition and then multiply it by the suitable subject classification number. The product of the

multiplication is your iris setting. For example, if you are using a film A.S.A. 50 and a shutter speed of 1/100 second, then when your subject is average (Class 3) and is multiplied by a hazy sky lighting (Class 2), the result will be 6. If you set your iris at f/6.3, your ex-

SIMPLIFIED OUTDOOR EXPOSURE CHART

Film: Outdoor Color—A. S. A. 10 B & W—A. S. A. 50
#85 Filter with Indoor Color Shutter Speed 1/100

Shutter Speed—1/25th

45° Light Angle to Subject	 4—Sunny Strong shadows	 3—Bright Soft shadows	 2—Cloudy	 1—Dull
4 - Wide, clear open spaces	16	12	8	4
3 - People, trees, architecture in outdoor middle distances	12	f/9 or **COLOR Basic recommended setting 1/50th at 6.3**	6	3
2 - Average subjects; open street, near distances .	8	6	4	2
1 - Shaded street	4	3	2	1

For normal subjects, normal conditions, normal areas.
Use 1/2 stop wider for dark subjects, etc.
Narrow 1/2 stop for light subjects, etc.

posure will be "on the nose." Practice this system for different subjects and different lighting conditions; you will find that it is mastered easily.

This chart gives you iris openings for one shutter speed only, but you can change the settings at will to maintain the same relationship of volume-of-light/time-of-exposure. The f/ number chart of Chapter 2 will help you to figure the different shutter speeds that are required as the iris is narrowed or widened.

Photoelectric Light Meters

The photoelectric meter is an accepted means of measuring light accurately when computing the correct exposure. A chart may be used for outdoor settings that are illuminated uniformly and broadly, but only the photoelectric meter is recommended for use with artificial lighting, or for extreme accuracy in outdoor conditions where the lighting is tricky, has great contrast, or shines at unusual angles.

There are three accepted types of photoelectric meters: reflection, incident light, and a single meter convertible to either of the first two systems.

1. *The reflection type.* The reflection type measures the amount of light reflected from the subject. If possible, a neutral tone reading is desired because the black-and-white portions of the subject will fall in exact order as a gray scale and will produce every tone accurately. You can secure a neutral tone (midpoint of the gray scale) exposure for any light by taking a reflection reading from the meter as you hold it in the palm of your hand. In doing this, keep the meter from you at a distance that is approximately as long as the diagonal measure of your palm.

A gray card should be used in preference to your palm whenever possible because of its greater uniformity in shape and color. A gray card (available at your camera store) is a cardboard coated with a neutral gray tone to reflect a fixed amount (18 per cent) of light. A reading is made by holding up the gray card in the subject position so that it faces the camera lens, and then reading the reflected light from it with your meter. The gray card must be large enough so that only the reflection from it will register on the meter. If the gray card is too small, then the meter will pick up outside light sources. These stray light rays affect the accuracy of the reading. If no gray card is available, point the meter down, at a point halfway between your feet and the horizon.

2. *The incident-light type.* This meter measures the light falling directly on a scene or a subject. The incident type generally has a collecting sphere (like half a table-tennis ball), a diffusing glass, or a grid-screen type of hood. The collecting devices are pointed at the camera instead of at the subject. The collectors integrate light beams of different strength and automatically show the settings for the midpoint of a gray scale.

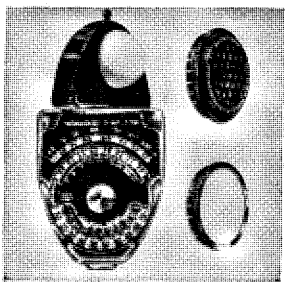
These meters minimize the possibility of too high readings when a spotlight or other intense light source shines directly on the subject. If the middle gray is correct, whether or not it is read with either type of meter, the skin tone will be correct and the white-and-black portions of the scale will photograph as they appear to the eye.

3. *Conversion types.* The DeJur, Ikophot IIa, General Electric, Weston, and Norwood can be converted to either the reflection or incident-light type.

When a reading is taken with either type of meter, keep your body from blocking out any light that falls on the scene by squatting and holding the meter free and clear. In this way, your meter reading will be a correct measure of the light and the exposure time can be computed accurately.

All types of meter require some judgment on your part even after the exposure scale has been read. If dark objects predominate in your scene, the iris may be opened one-half stop, while the iris may be closed one-half stop if very light objects or surroundings are in the picture.

Some foreign exposure meters are calibrated in either the American A.S.A. or the European D.I.N. system. If you use a film that is calibrated in a different system than your meter, use the following comparison ratings to set your meter correctly.



A.S.A.	*D.I.N.*
10	12/10
12	13/10
16	14/10
40	18/10
50	19/10
80	21/10
100	22/10

Photoelectric Exposure Meter.

Safe-Set Exposure Method

Learn the exposures for different light conditions with one film. As an example, f/6.3 at 1/50 is the basic recommended setting for color film outdoors. If sky predominates, the opening is closed to f/8; if there are dark objects or ground, the iris is opened to f/5.6. If another film is used which has five times the speed of daylight color film, it is best to increase the shutter speed to 1/250 and to continue to use your basic setting and basic changes. Learn to standardize your procedures so that you can be assured of a picture each time. When you have the secure knowledge that you will get a picture each time, your entire concentration may be directed toward your subject.

Technique for Flash Exposures

The exposure settings for flashlamps and flashtubes are quite different from those determined by either of the preceding methods in which the exposure guide number is the important thing. Every flashlamp or flashtube is supplied with an exposure-guide-number chart by the manufacturer. This chart gives you guide numbers for various film speeds and various shutter speeds. Once you know your film and shutter speeds, as well as the lamp that will be used, the only remaining unknown will be the iris opening.

The iris opening is found simply by dividing the camera-to-subject distance into the specific film guide number for the shutter speed and lamp. For example, if your flashlamp has a guide number of 110 with an A.S.A. 40 film at 1/100 second, and your subject distance is 10 feet, divide 110 by the 10-foot distance to get 11. The iris opening of your lens is then set at f/11. If the subject is 20 feet away, the division will produce f/5.5. If a guide number of 56 is used at 6 inches (½ foot), then 56 is divided by ½ and the indicated iris opening will be f/112. Should this be the case, your problem will be to get this f/ number, since most camera lenses narrow only to f/22. In this event, use a number of layers of thin handkerchiefs or white linen cloth to reduce the light intensity of your flash so that it will be correct for your narrowest lens opening. One thin handkerchief reduces the light by one-half; two handkerchiefs reduce the light one-quarter; three handkerchiefs reduce the light one-eighth; and four handkerchiefs reduce the light one-sixteenth. This is explained further in Chapter 9.

Standardize with one flashlamp at the beginning so that you know its characteristics well. With standardization you will always be so assured of uniform results that you will be able to turn your concentration fully on your subject, rather than be distracted by wondering if your picture will or will not come out. Finally, be sure to hold your camera firmly and to squeeze the shutter release gently so as not to jar the camera.

Now You Are SAFE!

S, A, F, and E are the fundamentals of good picture-taking. Apply every one—shutter, aperture, focus, and exposure—to your twin-lens reflex camera and you will be delighted with the results.

TYDINGS SAFE-SET METHOD
OUTDOORS

Light: Clear day, not harsh, sunlight. *Film:* Daylight color, Type A with No. 85 conversion filter; or Ansco Color, tungsten type, with conversion filter No. 11.

Safe-Settings

Type B film with No. 85B filter:

S—Shutter: 1/25 second
A—Aperture: Color f/25; black and white f/22
F—Focus: 30 feet for sharpness from infinity to 15 feet
12 feet for sharpness from 15 feet to 9 feet
E—Effect: Release shutter at peak of action or expression

2¼-inch square frame

	Code	*Distance*	*Field Size, inches*
Head	§	2′8″ (0.8M)	21x21
Head & Shoulders	†	3′6″ (.96M)	28x28
¾	‡	5′ (1.52M)	40x40
		7′ (2.13M)	56x56
Full body	+	10′ (3.05M)	80x80

Richokin or Bantam 1x1½-inch frame

Subject	*Code*	*Distance*	*Field Size*
Child's Head	※	2′8″	17x11
Head	§	3′5″	21x14
Head & Shoulders	†	5′	30x20
¾	‡	7′	42x28
Full body	+	14′	90x60

3. Loading and Unloading Your Camera

The Loading Mechanism

Loading the camera means preparing it for picture-taking with fresh film. This is a very simple operation. The film spool is either No. 120 or No. 620 size for twin-lens reflex cameras. The 120 has a larger winding slot than the 620. Some cameras have a cleverly designed engaging pin that will fit both No. 620 and No. 120 film. In general, engaging pins fit only one or the other size of spool. These sizes are standard throughout the world. Daylight loading is possible because the film is covered by a completely opaque paper backing. The film can be processed by most photofinishers with standard equipment that delivers routine enlargements (jumbo size) without any extra cost over that of contact prints. While the camera may be loaded in full daylight, it should be loaded in subdued light for safety. If there is brilliant light everywhere, as for example outdoors, then turn your back to the light source so that your body will shield the film and the camera.

Methods of Loading

There are four basic methods of loading a twin-lens reflex camera:

1. *Manual.* The film is placed in the fresh-film chamber, and the paper leader unwound and inserted into the take-up spool. When the back is closed, the red exposure-number window is used to keep track of each exposure. It is advisable to open the red window, turn the film-advance knob until the next exposure number appears, and then close the window. The red window must be closed completely after the film has been changed, because light leakage through it will fog the edges of your film.

2. *Manual with an automatic exposure counter.* In these systems, the first exposure is set in a red window and the exposure counter released so that it registers No. 1. Thereafter, the exposure counter is released and wound until it stops. It will then automatically have moved the film for the next exposure (the counter will show the next number in sequence).

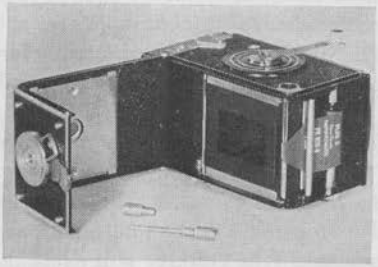
3. *Automatic film advance and exposure counter without an automatic shutter-tension interlock.* In the Rolleicord III, the paper leader is inserted into the take-up spool, which is wound until two arrows are opposite two red dots. The back is closed and winding is continued until the knob can turn no farther. At this point the winding mechanism of this camera will have brought fresh film into position and will have set the exposure counter automatically at No. 1 exposure frame.

4. *Fully automatic.* The Automatic Rolleiflex is the only true automatic camera in that the paper leader is passed through two unique "feeler" rollers, inserted into the take-up spool, the back is closed, and the winding crank is turned clockwise until it stops. In this camera, the fresh film is brought into position, the exposure counter is set at No. 1 or moved to the next exposure, and the shutter is cocked simultaneously.

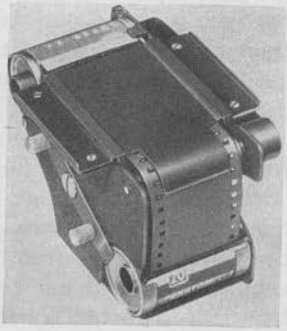
Helpful Loading Hints

1. Run your finger along the open film-frame mask. If you feel any unevenness, no matter how slight, ask your camera dealer how to eliminate these minute projections that can scratch your film. Film scratches must be avoided completely.

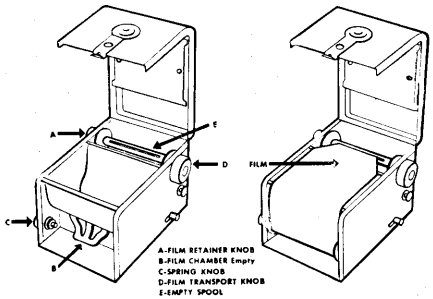
2. Thread the end of the paper tongue evenly and securely into the take-up spool to keep the film from slipping and causing consecutive exposures to overlap. When you are winding your film with the visual counters, keep the exposure numeral on the back of the paper in the same position in the red window for each number, or wind the



Loading with the Bantam Adapter



Richolin 35mm Adapter



Loading the Camera

automatic-counter types fully until the winding knob can turn no farther.

3. The edge of the paper leader must be placed absolutely parallel to the inside edges of the spool; otherwise the film will wind at an angle. After the fourth or fifth exposure has been made, the resulting side pressure may cause the film to buckle so that an out-of-focus picture results. It is truly disheartening to have a picture spoiled because of poor loading, especially when it is so easy to load a camera properly.

4. The 35mm Rolleikin and Richokin are 35mm adapters for use on the No. 120 size of spool. The film sprockets must engage the gear teeth cleanly for automatic self-alignment.

The 35mm Back

Any 35mm film (black and white, Kodachrome, or Ansco Color) may be used with the Rolleis and the Richoflex. The 35mm film can be used to advantage because it is available in bulk film for black and white, and produces a semitelephoto effect with the regular twin-lens reflex with 75/85 focal length (a regular 35mm camera usually has a lens of 50 millimeter focal length). The cost of 120 color film and of 35mm film, both of which are returned from the processing laboratories cut and mounted, is the same. The 35mm size, however, is returned ready for projection, while the 120 size must first be cut and mounted.

If your color pictures are to be used for illustrations or for separation negatives, then the large 120 size is preferred. However, the amateur will favor the 35mm color size because he can take and project his pictures without doing any processing work. The vertical format is the one drawback of 35mm color film. Vertical composition

is not suitable for every subject, and it is difficult to focus and compose the subject sideways while your head is turned at an angle. If the vertical format is too long, you can mask it to shorten it.

The 35mm color-film size is available in rolls of 20 or 36 exposures. Use the 20-exposure roll of color. Otherwise, you will tire of waiting for the completion of the longer 36-exposure roll, especially if you would like to use your camera for 120 black-and-white film.

Loading Sheet Film

The Rolleiflex and Rolleicord are the only twin-lens reflex cameras that can be converted for use with sheet film. The advantages of sheet (cut) film are:

1. A single exposure can be taken and developed at one time.
2. A variety of emulsions can be used so that three pictures of the same subject may be taken with color film, panchromatic film, or orthochromatic film. The use of roll film makes it necessary to complete each 12-exposure roll before another emulsion can be loaded in the camera.
3. All the great variety of emulsions available in the sheet film form can be used.
4. Glass plates may be used when extreme accuracy is wanted.

Unloading

After your visual or automatic counter tells you that all your exposures have been made, continue turning or cranking the winding knob until you hear the end of the paper backing moving across the film-mask opening and finally turning freely in the take-up spool chamber. At this point, open your camera carefully and pull out the exposed film by grasping it between your thumb and forefinger to prevent any unraveling. After the spool has been gently lifted from its chamber, bend the end portion of your paper backing down and under, and then wet the attached adhesive label so that it will firmly seal and prevent your film from unrolling.

If, at any time, your winding knob or crank handle cannot turn to wind your film, do not force it. Use a black changing bag or go into a darkroom to discover the reasons for the snag. It is far less expensive to spoil a roll of film than to force a single gear. If you still cannot loosen the film, close the camera back and give it to your camera dealer or mechanic who will probably save both the film and the winding mechanism.

4. Close-ups and Parallax Control

Desirable Picture Size

How large a picture can I take of my subject? This question is asked by the beginner as soon as he has mastered picture-taking at the regular near distances for most cameras, normally 3½ feet. Therefore, a big picture or a close-up will extend, by definition, from the 3½-foot near-focusing mark to as close as 10 inches. Ten inches is chosen because that is the normal reading distance. At shorter distances than 10 inches we are in the field of macro-close-ups, for which your camera has limited possibilities because its lenses are not interchangeable.

A close-up is desirable whenever you wish to fill the negative with the subject to show the fullest amount of detail possible. It is wiser to take a close-up of a small subject than a regular-size picture because of the smaller amount of enlarging necessary to produce an 8x10. A close-up, too, can be used in a story sequence, either to open or close the story.

Close-up Problems

Two problems are inherent in taking close-ups with the twin-lens reflex, namely, close-up focusing and close-up parallax control. Since the twin-lens reflex has two lenses, one for focusing and one for taking the picture, both must be co-ordinated accurately in order to focus together, and the top lens must be corrected for its higher position of 1½ to 2 inches so that it will view the same field as the bottom taking lens. Unless this difference, parallax, is corrected, a head of a portrait may be cut off, composition will be inaccurate, and the picture effect will be uncertain. Parallax must be corrected at the same time that your regular top and bottom lenses are corrected for close-up focusing.

Correcting Close-up Focus

Portrait Attachments. Your normal lens will focus to approximately 3½ feet. For closer distances, special supplementary lenses called Proxars, or portrait attachments, must be placed over the

camera lens so that you can focus to less than 3½ feet. These portrait attachments come in different strengths of magnification, with the Plus 1 focusing from 40 to 21 inches, the Plus 2 from 20 to 14 inches, and the Plus 3 from 13 to 9 inches.

Since the twin-lens reflex camera has both top and bottom lenses co-ordinated, two similar portrait attachments are needed to co-ordinate both lenses so that they will focus simultaneously for the new distances. In other words, two Plus 1's, two Plus 2's, or two Plus 3's are needed to maintain correct focusing of both top and bottom camera lenses.

Regular Lens.

Plus 1.

Plus 2.

Plus 3.

There are two convenient ways for correcting the top lens so that it views the same field as the bottom lens:

1. *Mechanical.* After the subject is focused for the close-up, the camera is lifted on a specially made stand or in such a manner that approximately ⅓ to ½ inch of ground-glass space is above the top edge of the subject. While this method will work with portraits, it should be used only for emergencies because of its uncertainty.

2. *Optical.* Parallax can be corrected optically by the use of prisms. They are recommended because they eliminate guess work and their effect is instantaneous. You get exactly what you see without having to lift the camera or make other time-consuming compensations. The prisms are available in three forms:

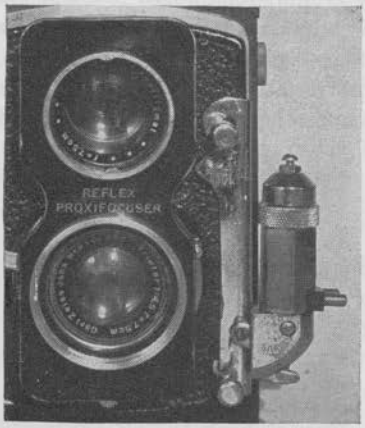
a. Separate without power. The correcting prism is an individual unit that fits over the top portrait lens. The portrait lens corrects for close-up focus, while the separate prism corrects the parallax (Rolleipar). In this system three different units are required—two portrait lenses and one prism for the top lens.

Ikoflex Close-up and Parallax Correcting Lens.

b. Combined prism portrait lens. The prism and portrait lenses are combined as one unit (Angle-Lens, PhotoLix, Inc., Long Beach, New York). This combination is used over the top taking lens.

c. Single-unit correction adapter. The author has designed an adapter that incorporates both the top-prism portrait and the bottom-taking corrections in a combined set position as part

of a single adapter plate. This combination is available as an interchangeable unit for any camera with the use of individual adapters such as the Reflex Proxifocuser 1, 2, and 3 (PhotoLix, Inc.). Carl Zeiss also has a unit specifically designed for the Ikoprox only.



(Left) Reflex Proxifocuser fits most cameras. (Right) Proxifocuser combined with a close-up ring.

3. *Prism Correction Limitations.* While the portrait prism permits instantaneous pictures for distances as near as 9 inches, it is best to use a focal frame for shorter distances. A focal frame is a mechanical device for outlining the field size of the subject and for measuring the subject-to-camera distance at the same time. No top viewing portrait lens or correcting prism is needed with it because the frame itself outlines and focuses to the field. The focal frame is simple to use. You simply attach it to the bottom taking lens, bring it up to the subject, and snap the picture.

Taking the Close-up Picture

Precautions to Observe

Close-ups with the twin-lens reflex are easy to take if you keep these points in mind:

1. The Proxars, or portrait attachments, do not alter your exposure factor. The regular exposure read from your exposure meter is used, or your regular flashlamp opening for the closed distance remains the same.

2. Since the depth of field is shallow at short-focusing distances, use your ground glass for accurate focus and composition.

3. Your body or camera must not shield the light source from the subject as the exposure is made.

4. Avoid head-on pictures because your depth of field is shallow and only parts of the subject will be in focus. Try to compose your subject parallel to the film in order to lessen its front-to-back depth. This technique is recommended especially for portraits to retain perspective; otherwise the foreshortening of the mouth and nose is disturbing.

Step-by-step Procedure

1. Measure the area of your subject in length, width, and depth.

2. By consulting the close-up tables, determine the Proxar, Angle-Lens or Proxifocuser needed for the field size (length and width) that you have just measured.

3. Determine and then stop-down your iris to secure the needed depth of field.

4. Adjust your lights so that this iris opening and a convenient shutter speed will be available.

5. Safe-set the distance and then move the camera back and forth, without touching the focusing knob, until the image is sharp on the ground glass and pleasingly composed. Then press the shutter release.

Don't Miss! Use Safe-Set

The Safe-Set Method is recommended again because it will standardize your picture taking. Once you have a satisfactory working set-up, tabulate the data for a Safe-Set chart. Type it on labeling tape and fasten it to the camera for permanent availability.

5. Twin-lens Reflex Accessories

What Accessories You May Need

The twin-lens reflex cameras are essentially simple because you can focus, compose, and set the iris and shutter speed quickly—so quickly in fact that beginners can get good pictures with the first roll. At least 90 per cent of all the normal picture-taking requirements will be met without adding a thing to the camera in the way of intricate attachments or special accessories.

However, there are occasions when it must be adapted to meet specific conditions. As an example, the camera must be adapted for close-ups with parallax-correcting and focusing lenses because it normally focuses and corrects up to approximately 3 feet.

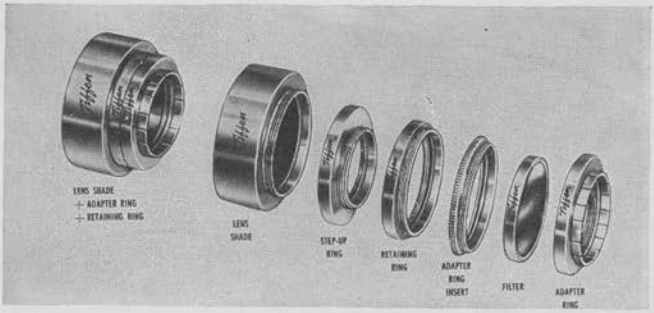
In cases where it is necessary to correct differences in the light from those for which the film was balanced in manufacture, or to change the contrast or appearance of a subject, filters must be added to, and used on, the lens. To solve these and other problems, accessories are added to the camera to enable it to operate under new conditions.

Types of Accessories

Accessories are many in number. They may be divided for better description into two broad categories: convenient and functional.

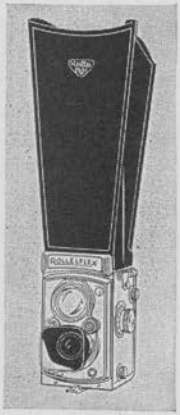
Convenient Accessories. Convenient accessories are helpful because they simplify your picture-taking effect, protect the camera, or help to standardize any step of your photographic procedure. Some of the convenient accessories that have proved useful are an elevator tripod, the carrying case for the protection of your camera, and a cable release. In other words, any device that aids in picture-taking, without performing a truly photographic function of its own, is a convenient accessory.

Functional Accessories. These accessories are primarily photographic in nature and effect in that they aid or alter the formation and the film image. Used over the camera lens, these basic attachments may be stacked one on top of the other by the use of single push-on or screw-in mounts, or by compound interchangeable Series V or VI adapters.



Lens Mount Accessories

Filter Carrying Kits



Glare-reducing Hood

Self-timer

The single push-on or screw-in type units are self-contained. These units are so neat and thin that they may be left on the camera and the carrying case closed over them. Their disadvantage lies in their fitting only one diameter of lens so that a new set is required for each lens of a different diameter.

The compound type (Series V or Series VI) consists of a female accepting unit whose rear diameter adjusts for lenses of different diameter. However, each adapting unit of a similar series accepts portrait or filter disks of the same diameter. Female adapter rings,

which are fitted to different camera-lens diameters within the series, all accept the same size filter disk. Therefore, only the female adapter holder need be changed if the camera-lens diameter differs, while all the filter disks of a similar series will continue to fit the new holder. The manufacturers have conveniently grouped their disks into two major classes, Class V and Class VI. All lens diameters up to 35 mm can be fitted with a Series V holder and can be interchanged with all Series V disks; the larger diameters use a Series VI holder, which can be interchanged with all Series VI disks.

Once the size of the portrait or filter disk has been selected, then you may wonder about the logical order of attachment. The accepted order is:

1. *The portrait lens.* Two lenses are required to correct the lower-taking as well as the upper-viewing lens. In addition, the top lens requires an additional lens for parallax correction (see Chapter 4). These top two lenses may be attached as separate units (Rolleinar and Rolleipar with the Rolleis) or combined into a single-lens unit (Angle-Lens). In order to simplify the handing of both the top and bottom units, the Reflex Proxifocuser 1, 2, and 3, or the Ikoprox 1 and 2, are single self-contained units that hold all lenses together for convenient use.

2. *Diffusion disks,* such as the Duto-Rolleiflex, produce a pleasing image softness and are next in order. The single types can be stacked one on top of the other, while the series type requires an additional retaining ring to hold the disk. They are attached on top of the portrait lenses.

3. *Filters* are used to modify the color and intensity of the light entering the camera lens.

4. *A polarizing filter* eliminates glare by screening out unwanted rays shining at other than approximately 33½ degrees. It can be used by rotating it over the top lens to see exactly where the reflections will be eliminated and then shifted, in this position, down to the taking lens. There is a co-ordinated unit designed for the Ikoflex in which both lenses turn simultaneously.

5. *Lens hood.* This unit is the last in order of attachment, if the above groups are used, but it may be attached independently even if no lenses are added. It should be used at all times because it reduces glare and minimizes the chance of internal lens flare.

This is the sequence in which all items are used, but you may use only 1, 3, and 5 together; 2, 3, and 5; etc.

Because your twin-lens reflex is a miniature camera, avoid load-

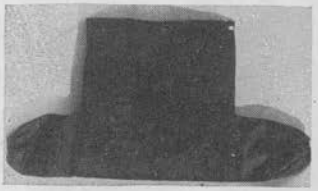
ing it—or yourself—with too many accessories. Should you do so, you are negating the main advantage of a miniature camera, that is, portability.

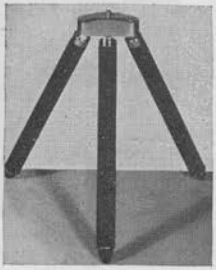
All necessary accessories can be carried by snapping the flap of the carrying case over the carrying strap of the camera, or by making a double slit in the carrying case and passing the strap through it.

Exposure with Accessories

Always safe-set your iris, your shutter, or your exposure meter to compensate for the difference in exposure resulting from continued use of a filter or polarizer. If a 2× filter is used, set the iris one stop wider than normal, the shutter speed one-half slower, or set the film speed on your exposure meter at one-half the regular speed. In this way, you will avoid a recalculation of your factors each time. For example, if your film speed is an A.S.A. 50, and a K-2 (medium yellow) filter with a 2× factor outdoors is used, set your A.S.A. film speed at 25. Then your exposure readings will be automatically corrected for the K-2 filter. Similarly, when a green filter (3×) is used, divide the increased factor into the original speed, and set your dial for 16. If the filter is not used, turn back the film speed to its normal, nonfilter setting. In all cases, always check yourself by saying *SAFE:* Shutter, Aperture, Focus, and Exposure factors (if any).

Never lose sight of the fact that the picture is the most important goal. Any accessory should be only a means towards the end. Since many accessories are used only once or twice a year, try to take your picture with what you have on your camera. On the other hand, a new basic accessory, such as a close-up lens, can open an entirely new field of photography and may be well worth the cost.





(Left) The Changing Bag. (Right) The Traveling Tripod.