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INSTRUCTION MANUAL

for

GRAFLEX

CAMERAS

Series B • RB Series B
RB Series D • RB Super D
Auto • RB Auto • Auto Jr.
RB Tele • RB Jr.

THE FOLMER GRAFLEX CORPORATION
Rochester 8, New York, U. S. A.
AN INSTRUCTION MANUAL

for the

Series B • RB Series B
RB Series D • RB Super D
Auto • RB Auto • Auto Jr.
RB Tele • RB Jr.

GRAFLEX CAMERAS

Since this material was printed THE FOLMER GRAFLEX CORPORATION has changed its name to:

GRAFLEX, INC.

(Please address all future correspondence accordingly)

We are using this manner of calling this change in name to your attention, in order that we may use up stocks of on-hand literature and so conserve war-vital paper supplies.

GRAFLEX, Inc., Rochester 8, N. Y., U. S. A.

PRINTED IN U.S.A.
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PRINCIPLES OF THE GRAFLEX—All Models

Graflex Photography is built around three simple elements:

1. a **reflex viewing-focusing optical system** that shows on a ground-glass an exact, erect image of the scene to be photographed, without parallax and with the same depth of field as the image on the negative;

2. a **multiple-speed focal-plane shutter** giving a wide range of exposures up to 1/1000 with efficiency and reliability; and a

3. **wide selection of sensitized materials** through availability of various types of holders, and a quick, simple, positive means of attaching them to the camera.

The first two elements are interlocked to make operation rapid and simple; the third gives an unlimited choice of emulsions to suit all conditions and types of work.

1. **Reflex focusing** is illustrated in Figure 1. Light enters the camera through the **lens 5** and is reflected upward by the **mirror 3** to the **ground-glass screen 2**; visibility of the image is improved by the light-excluding **focusing-hood 1**. The lens is focused by **focusing control 4**. Since the **focusing screen** and the film are equidistant from the lens, sharpness of the image
on the ground glass indicates the sharpness of the negative. The mirror automatically lifts away just before exposure, so that light from the lens passes directly to the film to form the image.

2. The focal-plane shutter is a curtain (Figure 2) of special cloth containing five slits of different widths. It is carried on an upper roller and winds down across the film and onto a lower roller when released by movement of the mirror. (Its action may be observed with the film holder removed from the back of the camera.) The time of exposure is governed by two variables:

a. the width of the slit (or curtain aperture), and

b. the speed of the curtain (controlled by tension of the lower roller)

The shutter-speed plate (Figure 6) shows the various exposures resulting from different combinations of slit and tension.

Directions for the shutter controls will be found on pages 9, 10 and 11.

3. Sensitized materials to receive the image are carried in a suitable holder behind the curtain (Figure 8). Several types of accessories are available for this purpose: sheet film holders, plate holders, filmpack adapters and sheet film magazines for all sizes of the Graflex; and for certain sizes only there are plate magazines and roll holders. Instructions for using the last three types of accessories are supplied with them.

A fine camera is primarily an instrument rather than a machine, and the reputation which Graflex products have won for sturdiness and continued functioning under adverse conditions should in no sense be an invitation to abuse them. To insure the long and trouble-free life of which your camera is capable, study and follow these directions as you handle it for the first time. Above all, do not twist any knobs or push any buttons on this camera until you know what this pamphlet tells about them. Do not lend your camera to anyone not familiar with it without instructing him in how to use it. If you lose this book, write us for another and enclose 10c to cover postage-handling costs.

Since the manner of operating all Graflex cameras is the same in all important details, this manual applies equally well to all current and most older models. Minor points of variation between the different models
will be clearly emphasized and explained. These differences relate principally to 1 opening and closing the camera, 2 interchanging lenses, and 3 focusing controls.

The National Graflex, RB Series C, and the 5 x 7 RB Home Portrait Graflex and some of the earlier folding cameras, are covered by their own special manuals.

**OPENING THE CAMERA AND FOCUSING**

**Series B • R.B. Series B • R.B. Series D • R.B. Super D**

**R.B. Tele • Auto (Stationary Back) • Auto Jr. • R.B. Jr.**

The top is first opened (Figure 3) by releasing the spring catch L at the upper front of the camera, pulling the top up and back until the focusing hood is fully extended, and straightening the two side braces until they lock in position.

Then open the front of the camera by turning the knurled focusing control O forward (clockwise); this moves the lens carrier and lens forward and automatically releases the front door so that it snaps up.

The opened door of the R.B. Super D and Series D serves well as a lens-shade by virtue of the side flaps.

**R.B. Auto Graflex**

Open the top as directed above.

This model has an extra-long bed, which accommodates the additional bellows extension and also serves as the front door. Release it by pressing on the bed-release button under the leather at the top of the extreme front of

Figure 3
the camera, and press the bed firmly down until the bed braces snap into position (Figure 10).

There are two focusing controls for the R.B. Auto Graflex (Figure 10, Page 24): one at the lower right front corner of the body, is used for normal work; the other, on the right side of the bed near the front, comes into use when the bellows are given considerable extension—as when focusing at very close range.

Further data on close-up work with the R.B. Auto Graflex will be found on pages 24 and 25, and other specific information on page 9.

**CLOSING THE CAMERA**

Rack the lens all the way back into the camera and close the front door or bed, making sure that it snaps securely.

To close the top, fold the braces and push the top down, folding the focusing hood carefully back into its original position. Make sure the top is securely held by the snap-catch at the front.

**Important:** After closing the camera remove all tension from the shutter mechanism by releasing both the aperture and the tension controls to their lowest settings, and raise the mirror by pressing release E. (See bottom of page 9).

**Note:** Some large lenses when racked back may not permit the mirror to rise fully. In such an instance, release the mirror before racking the lens into the camera. This will prevent the mirror from accidentally striking the lens mount.

**HOLDING THE GRAFLEX—**

**All Models**

The shape of the Graflex and the position of its controls permit it to be held and operated comfortably and without strain. The fact that an erect image

Figure 4
is visible in the ground glass, right up to the instant of exposure, further simplifies the handling of the camera.

Rest the camera in both hands, with the fingers under the corresponding front corners of the body (Figure 4). The thumb of the left hand falls naturally on the release lever E, while the right thumb and the forefinger are in position to grasp the focusing knob S. To steady the camera, hold it firmly against the chest. To re-set the controls after exposure, tilt the camera to the left so it rests on the left hand and fore-arm.

**FOCUSING—General**

(See below for Super D with automatic diaphragm).

The Mirror must be set for focusing; see page 11. Information on the ground glass is on Page 14.

Moving the lens away from the film focuses on close subjects; moving it toward the film focuses on more distant subjects.

Focusing will be greatly facilitated by a large diaphragm opening. This gives a bright image, and in addition the shallow depth of field will make critical focusing on a specific point or plane much easier and more precise. *Don’t forget to set the diaphragm before exposing!*

**Focusing with Automatic Diaphragm—Super D**

The automatic diaphragm, as used in the Super D Graflex, permits you to focus with the lens wide open and then automatically stops itself down to a pre-selected aperture while the mirror is rising before exposure. This facilitates focusing with a filter in place, with poor light, with a very bright light that blinds the eyes, and whenever a critical focus is desirable. Since the depth of field (see page 18) is shallower with the lens wide-open than when it is stopped down, the plane of sharp focus is more clearly defined and accurate focusing is more rapid and certain.

To set the automatic diaphragm, pull out the stop-pin (left in Figure 5) and move it until its pointer is

*Figure 5*
opposite the aperture required by light conditions and shutter speed; release the pin so that it engages the corresponding hole and remains in position. Then set the mirror, slit and tension as directed on page 10. Lastly, move the aperture lever to the right (counter-clockwise) until it engages and is retained by the catch. (Figure 5 shows this position.) When the mirror-release is depressed, a coupled rocker-arm system within the camera lifts the catch so that the spring mechanism in the lens mount closes down the diaphragm, even to the smallest stop, before the curtain begins to open.

Note that, on the 6½" Kodak Anastigmat f/4.5, half-stop settings are available between f/5.6 and f/16. If it should be desirable to stop down the diaphragm before exposure, slowly depress the mirror release part-way until the diaphragm is heard to close; further pressure will release the mirror and curtain. Naturally you need not set the diaphragm full-open before exposure if you prefer not to for certain special conditions.

INTERCHANGING LENSES

Series B • R.B. Series B • Auto Jr. • R.B. Jr.

The lenses of these Graflex cameras thread directly into fixed lensboards, and are removed by simply turning the entire lens barrel counter-clockwise. Be sure to grasp the barrel itself, near the lensboard, so that you will not accidentally loosen the front cell of the lens. If the lens does not free easily, slightly loosen the four small screws in the face of the lensboard.

Certain telephoto lenses are suitable for use with these cameras. They must be fitted with an adapter or intermediate collar threading into the opening in the lensboard. Focusing and exposing with these lenses is carried out in the normal way.

R.B. Super D • R.B. Series D • R.B. Tele
Auto (Stationary Back)

Lenses of these models are fitted to removable lensboards. They are removed by pushing lens and lensboard straight up, against a hidden
spring, until the bottom of the lensboard is clear of the lower retaining strip; it may then be swung out and down, free of the camera.

If the lens has a very large diameter it may be necessary to unscrew it from the lensboard before the lensboard can be removed from the camera.

To replace the lens and lensboard, reverse the above procedure—making sure that the bevelled edge of the lensboard is at the top, so that it fits into the slot with the hidden spring.

Lenses in barrel mount and in automatic diaphragm mount are fully interchangeable in the Super D Graflex, without special adjustments.

R.B. Auto Graflex

Lenses of the R.B. Auto Graflex are fitted to removable lensboards, held in place by a slide-lock and retaining strip similar to those used on the back of the camera to retain the film and plate holders. To remove lens and lensboard, move the slide-lock to the left and up until the top of the lensboard is free; swing the top of the lensboard out and lift the bottom out from behind the lower retaining strip.

To replace a lensboard, reverse the above procedure—making sure that the bevelled edge of the lensboard is at the bottom.

THE FOCAL-PLANE SHUTTER—All Models

This type of shutter is so-called because it operates close to the focal plane of the lens (the location of the film). Its principal advantages are: 1 ready interchangeability of lenses, 2 high efficiency, 3 ability to produce extremely short exposures, and 4 long, trouble-free life.

The controls of the shutter and mirror, shown in Figure 3, are located at the right rear of the camera. The release lever E, which is depressed to make an instantaneous exposure, is actually the mirror release and is located at the front of the left side conveniently under the left thumb.

On nearly all models each of the shutter and mirror controls has an
identifying letter stamped into it. These letters are the same on all models of the Graflex (except the National Graflex which has its own manual) although the form of a particular lever or key may differ somewhat from one camera to another. The letters used below refer to Figure 3.

The various combinations of the six tensions and four apertures give 24 exposure speeds (shutter settings), ranging to 1/1000. (Figure 6).

Before actually using the camera, set it on a table and follow the description below by manipulating each control as it is mentioned.

Setting the Curtain Aperture (slit)

The mirror-setting lever H, just under the aperture control A, (Figure 3) is extremely important because the curtain cannot move (except when set for time) until the mirror has been set by pressing this lever down and back (toward the rear of the camera). The curtain aperture (slit) to be used for an exposure is set by the aperture control A; and the tension (which determines the speed with which the curtain moves) is set by tension control B. Windows F and G, next to their respective controls, show the settings of these adjustments. Turning A counter-clockwise (clockwise in the Auto Jr.) with the arrow, winds to narrower slits; moving curtain-release lever M toward the back of the camera allows the curtain to unwind to wider slits.

The figures on the scale showing in F indicate the aperture that will next pass across the film when the curtain is released. When set on T (for Time Exposure), releasing the shutter places the slit O in front of the film, exposing the entire film at the same time. Operating the curtain-release M a second time closes the curtain.

In the 2⅛ x 3½ R.B. Series B, it is necessary to wind A two clicks between settings; the number exactly centered in F indicates the aperture for which it is set.

The curtain is closed when any number except O (Open) is centered in F.
Setting the Tension

Tension control B is turned clockwise (counter-clockwise in the Auto Jr. and R.B. Jr.) to set to higher tensions, and is released for lower tensions by pushing up and down on tension release P immediately below it.

Mirror-setting lever H (Figure 3) contains a sliding bar* with an I on one end and a T on the other. Make sure the I shows when you wish to make any instantaneous exposure. This bar cannot be changed unless the mirror is down; (full information about its use will be found on page 12 in the section headed "Making a Time Exposure").

Lever H is rotated clockwise to move the mirror into focusing position; when the mirror is released by pressure on mirror release E (on the left front of the camera), the resulting rotation of H causes the lug on the end of the I-T bar (or disc) to trip curtain-release lever M; this releases the curtain and makes the exposure.

Making an Instantaneous Exposure

1. Set the mirror by pushing back on lever H.
2. Determine the exposure time; this is covered on page 19 of this manual. Having decided on (for example) 1/160, find the correct aperture and tension on the shutter-speed plate (Figure 6). Locate 160 on the plate; reading straight to the left you find tension 3, and reading straight up you find aperture 3/8.
3. Set the tension by rotating B or releasing it with P until the desired number (3 in our example) appears in window G.
4. Set the curtain aperture by rotating A or releasing it with M until the desired number (3/8 in

*Some cameras have a disc. When the letter I is opposite the notch or line in the top of lever H, it is set for an instantaneous exposure. Depressing this disc and revolving in a clockwise direction will set the camera for Time as indicated when T is opposite the notch.
our example) appears in window F. The **aperture control A** will not turn unless the mirror is down in focusing position.

5. Remove the slide from the film holder.

6. Compose and focus on the ground glass.

7. See that the diaphragm is set correctly.

8. Press slowly and steadily on release lever E with the left thumb. This permits the mirror to rise clear of the field of the lens, its motion rotating lever M until it releases the curtain. The slit in the curtain then passes across the film and the exposure is made.

9. Re-set the mirror by pressing back on H.

10. Turn key A until 3/8 again appears in window F. Change the film. (Replace the slide if the film carrier is removed from the camera.) You are now ready to make another picture with the same exposure.

Note: A "drop-curtain" exposure of about 1/5 second is obtained with the curtain at O and the tension at l.

**Making a Time Exposure**

The procedure for a Time exposure is somewhat different, because the mirror and curtain are released separately.

1. Set the **mirror** by pressing on H.

2. Move the I-T bar* all the way to the right until the I is covered and the T is visible; this disconnects the mirror from the shutter.

3. Set the **aperture** at T.

4. Set the **tension** at l.

5. Make sure the camera is firmly supported, as on a Crown Tripod or a steady table. Compose and focus on the ground glass.

*If your camera has a disc instead of a bar, see footnote on page 11
6. See that the diaphragm is set correctly.

7. Raise the mirror by pressure on release E.

8. Open the curtain by a steady, gentle pressure on the curtain-release M.

9. At the end of the required exposure time, close the curtain by another steady, gentle pressure on M.

10. If you are going to make another Time exposure of the same subject with the same composition and focus, leave the mirror up and insert the slide in the holder before re-winding the curtain to T. Or you can re-set the mirror, wind the shutter, change the film, check the focus and release the mirror.

11. If you are not going to make another Time exposure immediately, replace the slide, set the mirror by pressure on H, and re-set the I-T bar so that the I is showing and the camera is ready for an instantaneous exposure.

THE CAMERA BACK—All Models

Revolving Back

Most models of the Graflex are equipped with a revolving back. This is an arrangement permitting the rotation of the film or plate so that its long dimension may be either vertical or horizontal, to make possible vertical or horizontal format of the picture without turning the camera on its side. To revolve the back, push in on the revolving-back release-button X (Figures 3 and 7) and revolve the extreme back of the camera. Make sure that the catch clicks to hold the back in the proper position; however, if the back is to be revolved
only partially, this click will not make itself evident. The back is light-
tight and may be turned with the film holder in place and the slide withdrawn.

The Ground Glass

The viewing area of the ground glass is shaped somewhat like a cross; 
when the back is vertical use the rectangular area running fore-and-aft 
for framing the picture, and when the back is horizontal use the cross-
ways portion. The two sets of boundary lines show the limits of the field 
in each direction, and the center cross-lines help in keeping the camera 
horizontal and in locating the center of the field.

The Focusing Panel

When it is desirable to observe the image on a ground glass at the 
back of the camera, for instance when the camera is placed on a high 
support, the accessory Graflex Focusing Panel will be required. It 
may be fitted to the back of the camera and held in place by the retaining 
strip at the bottom and the slide lock at the top. The accessory focusing 
panel is provided with side shields and a metal door which can be 
released by pressing down on the small latch directly beneath the door. 
When raised, this door permits direct ground-glass focusing and com-
posing of the image produced by the lens. Note: Make sure that the 
focal-plane shutter is set at O, the I-T bar at T, and the mirror raised.

Film and Plate Attachments

The various types of film and plate carriers attach 
directly to the back of the camera (without adapters) by 
means of a slotted slide-lock and a fixed retaining 
strip (Figure 7). To insert a carrier, first open the slide-
lock by moving it to the right. Then place one edge of 
the carrier under the retaining strip and press the 
other edge firmly against the camera body below the 
slide-lock; lastly lock the carrier in position by moving 
the slide-lock down as far as it will go.

Figure 8
Loading Holders

If you are unable to secure an old film with which to practice in daylight, use a sheet of new film.

**Sheet film holders** should be loaded in *complete* darkness—preferably in a photographic darkroom. Place the holders on a *clean* workbench and withdraw the slides, laying them to one side well within reach. As the box of film is opened, note that the sheets are interleaved with black paper.

To find the emulsion side of a piece of sheet film in the dark, note the position of the notches cut into one of its shorter edges. The emulsion side will be facing you when the unnotched short side of the film is nearest you and the notches are in the upper right-hand corner. Always handle the film by its edges and never touch the front (emulsion) surface.

Open the wood **flap** at the end of the holder, and slide in the film. (Figure 8). Make sure that the edges are beneath the **side rails**. The film should be pushed home so that it is under the rail at the other end of the holder. Close the wood flap and replace the slide in the holder, with the raised dots on the outside to show that this side of the holder contains unexposed film. (If the slide does not fit fully into the slot in the end of the flap, the film has not been pushed under the rail at the closed end of the septum). Turn the small brass **slide-hook** over the end to prevent accidental withdrawal of the slide. When slides are replaced after exposure, have the raised dots inside to show that the film has been exposed.

**Plate holders** are loaded in much the same way as film holders, except that there are no side rails and the end of the plate is slid in under a projection at the slide-handle end of the holder. The plate is held in place when the wood flap is closed and slide inserted.

**Film packs** can be loaded in daylight, but strong or direct light should be avoided. When handling a pack always grasp it by only the sides, since the films will be fogged if the protective black paper is depressed. Release both catches and swing the back of the adapter open. Carefully insert the closed end of the film pack under the light-break at
the hinge. Be sure that the opening of the pack rests next to the slide of
the adapter. With the paper tabs held straight out, close the back. Before
making the first exposure, pull the first tab (marked O) straight out from
the pack until a resistance is felt; then bring it around toward the back
of the camera and tear it off with a smooth, even motion. After the first
exposure tear off tab 1 in the same way, and so on after each exposure
until the last tab (12) has been torn off. (Pulling the tabs moves exposed
film from the open front of the pack to the back.) After the last tab has
been pulled the exposed pack is somewhat self-protected, and may be
removed from the adapter in subdued light to be wrapped in the original
paper and box. *Handle the film pack only by its edges.*

**Magazines and Roll Holders** are covered by special instruction
manuals which accompany each of these attachments.

**LENSES—All Models**

The lenses supplied by Graflex with Graflex cameras are selected as
the best available for the requirements of both black-and-white and
color photography.

Most lenses on Graflex cameras are in barrel mount, (either *normal*
or *sunk*), although certain models will accommodate lenses in shutters.
The RB Super D Graflex also accepts lenses in automatic diaphragm
mount. (See page 7.)

**Lens Aperture**

Lenses (Figure 9) are normally equipped with an *iris diaphragm* be-
tween the cells, which forms a many-sided opening whose diameter is
altered by the rotation of a ring outside the lens. The diaphragm controls
1 the amount of light passed by the lens, and 2 the depth of field.

The size of the opening of the dia-

*Figure 9*
phragm is indicated by a series of numbers associated with the diaphragm-control ring; these are the f/ numbers, expressing the relationship between the focal length of the lens and its effective aperture—(not the diameter of the diaphragm opening). The rated speed of a lens is its maximum relative aperture, as indicated by the f/ number engraved on the front cell—usually as a part of the name of the lens. Equal f/ numbers have substantially equivalent light-transmitting values on all lenses regardless of focal length. The larger openings, passing larger quantities of light, are associated with smaller numbers such as f/2.9, f/3.5, or f/4.5. The smaller openings, passing less light, are represented by larger numbers like f/22 or f/32. Full information about the use of the diaphragm will be found under the heading "Correct Exposure" on page 19.

Focal Length

The focal length of a lens is the distance, when it is focused on infinity (very distant objects), from the plane in which the image is formed to the rear nodal plane of the lens (in standard lenses, generally located near the diaphragm). Like the maximum relative aperture (f/ number), the focal length is usually engraved on the lens cell. It is expressed in inches, millimeters or centimeters.

The size of image given by a lens at any particular working distance varies with the focal length: for instance, if a 3-inch lens gives a 1-inch high image of an object, a 6-inch lens in the same position will give an image 2 inches high of the same object.

The "normal" lens for a given size of negative has a focal length approximately equal to the diagonal of the negative. The Revolving Back Graflex and other reflex cameras require focal lengths slightly greater than "normal" to allow clearance for the mirror when it swings up.

The greater the focal length the farther the camera can be placed from a subject for obtaining a given image size, with improved perspective.

The greater the focal length of a lens, the less its depth of field for a given working distance and aperture. This is discussed fully under the heading "Depth of Field" on page 18.
Long-Focus Lenses and Telephotos

When it is not possible to approach close enough to a distant or semi-
distant subject, as in sports photography, long focal-lengths are desirable
to give as large an image as possible on the negative. Telephoto lenses
are long-focus lenses specially designed so as not to require as great
bellows extension as ordinary lenses of the same equivalent focus, thus
making the camera more compact and usable. Telephoto lenses can be
used with most models of the Graflex; full information is under "Inter-
changing Lenses" on page 8.

Wide-Angle Lenses

These lenses have focal lengths materially shorter than "normal" for
the negative they are designed to cover, special optical design making
possible a sharp image over the entire area of the negative. They can-
not be used in Graflex, or other reflex, cameras because they do
not provide clearance for the swing of the mirror.

DEPTH OF FIELD

Although we may focus most precisely on a certain portion of an
object, we all know that things slightly nearer to the camera as well as
some slightly farther away may also appear sharp in the final print. The
field of sharp focus extends farther behind the object than in front.
This range of distances within which all objects appear equally sharp is
called the depth of field.

As in the case of static motion to be considered in the following
section, our acceptance of sharpness will depend upon the nature of the
print and how it is viewed; and the sharpness to be demanded of a
negative for making such prints must depend upon the amount of en-
largement contemplated. Depth of Field, therefore, is not a precise
physical quantity which can be measured. Most lens manufacturers
publish tables under the heading "depth of field," or less correctly
"depth of focus," which some photographers find useful. The great
majority of camera users, however, find observation of the image on
the ground glass and the following easily-remembered facts to be
enough of a guide for all practical purposes.

1. **The greater the distance to the object focused on, the greater the depth**
of field for a given focal length and relative aperture.

2. **The greater the focal length of the lens, the less the depth of field at a**
given relative aperture and distance.

3. **The greater the lens aperture (the smaller the f/ number), the less the**
depth of field for a given focal length and distance.

4. **The sharp field is deeper behind the object than in front of it.**

If you want the greatest possible amount of material to appear sharp
in your picture, stop the lens down as far as you can without requiring
an exposure time so long that movement becomes objectionable. If, on
the other hand, you wish to minimize the background or nearer objects
by purposely throwing them out of focus, open up the lens to one of its
larger apertures. If you want the maximum sharpness at the precise
point on which you focus without regard to objects nearer or farther
away, choose a lens aperture approximately half way between the
greatest and the smallest which your lens can give.

When using the automatic diaphragm of the Super D Grafex, bear in
mind that the depth of field will be greater when the lens has stopped
itself down than when you focus wide-open.

**CORRECT EXPOSURE—All Models**

While the final goal of most photography must be admitted to be a
satisfactory print, the **first** goal of the camera user is a negative in
which at least the main subject of interest is sharply defined and of a
contrast and density which will permit making a print with good tone
values. These two factors will depend upon the brightness range of the
subject, the speed of the film, the processing subsequently given the
film, and upon the lens and the shutter settings in relation to these
quantities.

It is difficult, if not impossible to give specific directions for setting
up a camera for the making of every type of picture. However, for your
guidance in estimating exposures you will find the tables supplied
by film manufacturers to be very satisfactory for the majority of average situations. Such tables are usually included with film packs and rolls, and are generally available for sheet film and other materials on request to the manufacturers and their Dealers.

Since any exposure guide, no matter how complete, can represent only an approximation of the many various light conditions you will encounter, we strongly urge that you eliminate a good deal of the complication involved in the determination of the exposure by using a good exposure meter. The price of one of the better photo-electric models will be repaid many-fold in good negatives and general satisfaction. In any event, be sure to keep a small card on which to jot down a word or two about each picture: character of the subject, prevailing light conditions, shutter speed, diaphragm opening, and meter readings. These data will be of great assistance in evaluating your resulting negatives, and will also assist you to broaden out into the use of other emulsions, diaphragm openings and shutter speeds.

But the exposure meter or exposure guide will only go so far as to present you with a rather wide choice of lens-aperture and shutter-speed combinations, telling you that if you choose f/11 (for example) then you must set the shutter for 25 (1/25); or that if you wish to use 1/100 in order to stop some fast motion then you must set the lens aperture to f/5.6.

"Increasing the shutter speed" means that a shorter exposure is given—as, for example, in changing from 1/50 to 1/100. In other words, the shutter passes light for a shorter length of time.

"Increasing the Exposure" means that a slower shutter speed is used, as in going from 1/100 to 1/50.

"A larger stop" or "opening up the lens" means that the actual diameter of the aperture of the lens is increased, and hence more light is passed by the lens in a given length of time. The smaller f/ numbers indicate larger apertures—f/8 being larger than f/16, f/3.5 larger than f/5.6, etc.

The relation between these combinations of diaphragm opening and shutter speed is really very simple, and knowing one of them is sufficient
to give you any other without even a pencil. The rule is simply this: every time you open up the lens one full stop (to the next f/ number *), double the shutter speed; and vice-versa.

The choice of a combination of shutter speed and diaphragm opening will be determined by the type of subject. If the subject is moving take the lowest shutter speed necessary to stop its motion and set the diaphragm accordingly; if the subject is static use the diaphragm opening giving the required depth of field and set the shutter speed for that value.

Suppose, for example, that you determine from your meter or the exposure tables that the correct exposure would be 1/50 at f/16. But your subject is going to move and you have estimated that 1/200th will be needed to stop it on the negative. You know that this will require opening up the lens so you proceed to do so, counting as you go from stop to stop: starting at the next larger will be f/11, for which you double the speed—(going to 1/100th); the following stop is f/8, for which you double the speed again—(going to 1/200). And there you have it: f/8 at 1/200 (use 1/195 which is the nearest speed produced by the shutter). The exposure meter dials will be found to bear the same relation between the combinations offered.

Like so many so-called "rules" the above one also has an exception, which applies to only some lenses at maximum aperture. Going from f/32 to progressively larger apertures, each calling for a doubling of shutter speed as we go down the list, the ideal diaphragm scale would be marked:

f/32, 22, 16, 11, 8, 5.6, 4, 2.8, 2, 1.4, 1

The lens on your Graflex probably has just these same stops indicated from f/32 to f/5.6. But if its maximum aperture is f/4.5 that figure will follow the f/5.6 without being twice as fast; it is about 50% faster and would therefore call for a 50% increase in shutter speed instead of the 100% set by our rule. A similar caution must be observed if you have an f/3.5 objective, as it will be marked at f/4.5 and f/3.5 even though

*Except from f/5.6 to f/4.5 or from f/4.5 to f/3.5. The difference here may be considered as being 50%, or 1/2 stop.
the 2-to-1 exposure factor does not lie between these two apertures.

Any of these combinations which an exposure meter offers you will give the same density of negative; but the over-all sharpness of those negatives and the amount of subject that will appear to be in good focus will vary with the exact combination you choose. And the choice which the photographer must make will be a compromise between the need for stopping motion (calling for the higher shutter speeds and the larger lens apertures) and the desire to have the greatest amount of material in sharp focus (calling for smaller lens apertures and slower speeds).

STOPPING MOTION—All Models

If the subject you intend to photograph is moving, its image on the plate will likewise move. It will move some during even 1/1000th second, although only about one-tenth as far as it will during 1/100th second. All the photographer can hope to do is to give a short enough exposure so that the motion of the image on his film will not be objectionable. And just what constitutes "objectionable" depends both on the observer and upon the use to which the negative is to be put. A negative which is to be enlarged 10 times or to be printed in a magazine must be sharper than if it were to be reproduced in its original size. And a print which is apt to be examined through a reading glass must naturally be sharper than one to be seen from a distance only, as a highway billboard.

Not knowing precisely how his negative may be used, the average photographer must aim at "average acceptability," and it is on this basis that the following table has been compiled. It allows the photographer to take into account the four factors which are present at the time of his exposure: Namely, the focal length of his lens, the distance he will be from the subject when he releases the shutter, the velocity with which the subject will be moving at the instant of exposure, and the direction of its motion relative to the direction in which he is pointing his camera.
Suggested exposures to stop motion at right angles to the camera when the subject moves 10 miles per hour

<table>
<thead>
<tr>
<th>DISTANCE FROM SUBJECT IN FEET</th>
<th>APPROXIMATE FOCAL LENGTHS IN INCHES</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>1/500</td>
<td>1/600</td>
<td>1/700</td>
<td>1/800</td>
<td>1/1000</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>1/250</td>
<td>1/300</td>
<td>1/350</td>
<td>1/400</td>
<td>1/500</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>1/125</td>
<td>1/150</td>
<td>1/170</td>
<td>1/200</td>
<td>1/250</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>1/70</td>
<td>1/80</td>
<td>1/90</td>
<td>1/100</td>
<td>1/125</td>
<td></td>
</tr>
</tbody>
</table>

These speeds are only approximate, and have been "rounded off" to give numbers easy to multiply and divide. The need of greater accuracy is doubtful in view of the uncertain speed of the object to be photographed.

The above table applies to a subject moving 10 miles per hour at right-angles to the camera. In all probability your subject will be doing something different. If so, modify the shutter speed called for in the above table by the following rules:

* Double the speed of the shutter for double the velocity of the subject.
** Half the shutter speed for half the velocity.

* Double the shutter speed for half the distance to the subject.
** Half the shutter speed for double the distance.

* Double the shutter speed for double the focal length.
** Half the shutter speed for half the focal length.

Use one-third the shutter speed if the subject is coming directly toward you or going directly away from you.

Use two-thirds the shutter speed if it is coming or going at 45 degrees.

When in doubt, use the next higher speed.

*—1/100 instead of 1/50, for example.
**—1/50 instead of 1/100, for example.
SPECIAL INSTRUCTIONS FOR
THE R. B. AUTO GRAFLEX

Rising Front and Drop-Bed

In some instances, you may find it necessary or helpful to raise the lens slightly to bring the subject into better position on the ground glass, or to prevent tilting the camera up and causing the convergence of vertical parallel lines when photographing a high building. This is accomplished by loosening the rising-front knobs on each side of the front standard, shifting it vertically, and locking it in the new position by the rising-front knobs. See Figure 10.

The drop-bed similarly takes the place of pointing the camera down in photographing objects below the level of the camera. To drop the bed, rack out the track until it is entirely on the front bed and then depress the side braces; this frees the bed so that it falls into the dropped position. (This will be useful principally for "table top" set-ups or with long focal-length lenses).

Double-Extension Bellows (for Close-up Photography)

When using the camera for close-up photography, the lens is placed at a greater distance than normal from the focal plane (film position). (See page 7). This will necessitate a change in the exposure, since the f/ values engraved on the lens are based on a relationship existing only when the lens is at the infinity position. For close-up photography, we recommend that your exposures be determined in accordance with the following table. The lens-to-film distance (bellows draw) can be determined approximately by meas-

Figure 10
uring from the diaphragm-control ring of the lens back to the plane occupied by the film (the ground glass).

<table>
<thead>
<tr>
<th>Reproduction Ratio (Image size to Object size)</th>
<th>Bellows Draw</th>
<th>Exposure Factor*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:8</td>
<td>1.125f</td>
<td>1.215*</td>
</tr>
<tr>
<td>1:4</td>
<td>1.25 f</td>
<td>1.75*</td>
</tr>
<tr>
<td>1:2</td>
<td>1.5 f</td>
<td>2*</td>
</tr>
<tr>
<td>1:1.5</td>
<td>1.75 f</td>
<td>2.25*</td>
</tr>
<tr>
<td>1:1</td>
<td>2 f</td>
<td>4*</td>
</tr>
</tbody>
</table>

*f = focal length

For black-and-white photography with standard films, you will find that the latitude of the film will compensate for much of the change in exposure so that no allowance for extension will be required unless copying close to full-size (1:1). However, for color photography, we would recommend that you follow this table very closely because of the limited latitude of color materials.

**FLASH PHOTOGRAPHY—Super D**

The Super D Graflex is equipped with a built-in electrical circuit, switches and socket, to permit use of a Graflex Flashing Unit for automatic open-flash work at the drop-curtain setting of the focal-plane shutter (See “Note” page 12) with short-duration lamps. This feature is invaluable for indoor portraiture, especially with children and pets, and full instructions are given in the manual supplied with the Graflex Flashing Unit.

Flashing Units consist of a battery-case, a reflector, a socket to hold a flash lamp, and a connecting cord to connect the battery-case with the electrical circuit in the camera. Mount the battery-case on the mounting bracket, and plug the connecting cord into the socket in the camera and the series outlet in the battery-case. Drop the mirror for focusing, set the tension at 1 and the curtain at 0, and insert the lamp in the socket. Determine the correct diaphragm opening for the particular

*Increase your exposure by the indicated amount, just as when using a filter having the same factor. For instance, if the factor is 2, expose twice as long—1/5 second instead of 1/10 second.*
lamp and the distance to the subject (on the basis of a "Time" or "open-flash" exposure) from the tables supplied by the lamp manufacturer, and set the diaphragm accordingly. To make the exposure, release the mirror by pressure on lever E, which will cause the mirror to rise, the lamp to flash, and the curtain to close. The time of exposure will depend on the duration of the flash; in the case of SM lamps, this will be in the neighborhood of 1/200 second. Do not use "long-peak" lamps of the type intended for other types of synchronization with focal-plane shutters.

Other Models

Because of the many variables involved, Graflex does not supply any accessory device for synchronizing Graflex focal-plane shutters. Various attachments for this purpose are on the market, and their manufacturers should be consulted for all information regarding them.

CARE OF THE CAMERA—All Models

Graflex Cameras are sturdily constructed, but like all fine equipment they should be handled with consideration. To preserve the neat appearance and increase the life of your camera, the leather may be cleaned with an occasional application of saddle soap or other good leather preservative. If kept in its carrying case when not in use it will be protected from dust, dirt and accidental blows.

The efficient life of any shutter will be greatly lengthened if all tension is released when the camera is not in use. In the case of the Graflex focal-plane shutter, operate levers M and P until the curtain and tension are run down. Never oil a shutter.

For best results the lens of your camera should be regularly cleaned. Use a soft, well-washed linen handkerchief, a camel’s-hair brush, or lens tissue. First, blow off the dust (a camel’s-hair brush or small rubber ear syringe is recommended) and then wipe without using pressure. To remove fingermarks or moisture, breathe upon the surface, and wipe. Always wipe lightly, and with a circular movement. Never use acids or any common household solvent for cleaning lenses. Lens cleaners
supplied by lens manufacturers may be used if the instructions accompanying them are carefully followed. If the inner surfaces require cleaning, the utmost care should be observed to remove the lens elements one by one; clean and replace each before others are taken out. When replacing these elements screw them securely in place but do not use excessive pressure.

The Graflex First-Surface Mirror

Graflex cameras of recent manufacture are equipped with a great aid to perfect focusing—the Graflex First-Surface Mirror. This mirror differs from ordinary mirrors in that the reflecting coating is on its front surface rather than on the back. This gives a much brighter image on the ground glass and eliminates the "double images" and undesirable reflections sometimes found troublesome when focusing on a strongly-highlighted subject.

The coating used for this special mirror is a highly-reflective aluminum compound which retains its brilliance in the absence of a protective coating. In order to insure maximum benefit from its use, care must be exercised in cleaning to guard against scratches from dirt or other foreign matter. Loose dust may be removed by brushing with a tuft of clean cotton saturated with water. Any marks left by the drying liquid may be removed by condensing breath moisture upon the mirror and rubbing with dry cotton. The mirror should not remain wet for any prolonged period as water is likely to leave an acid or alkaline deposit which may slowly attack it.

The underside of the ground glass can be cleaned by removing the lens and inserting through this opening a wadded, soft, lint-free cloth attached to a pencil or small stick. The top surface of the ground glass will require cleaning more often than the mirror. Release the focusing hood by pressure on the small spring-clip holding the front of the hood frame. This will permit the hood to be folded back far enough so that a damp chamois can be wiped across the glass. Caution: Do not remove the ground glass from the camera.
SERVICE

Graflex is equipped to inspect, clean, adjust and service all Folmer Graflex products, and to fit accessories and special lenses to Graflex and Speed Graphic cameras. All correspondence pertaining thereto should be addressed to the Service Department.

The Graflex Technical Department is anxious to help you get the most out of your Graflex-made equipment. Do not hesitate to write about any photographic problems you may have. When negatives are involved, be sure to send in the negatives with complete information concerning equipment, exposure, processing, and all other relevant data.

The Serial Number on your Registration Card is also stamped into the underside of the top door of your Graflex, just behind the top of the focusing hood. The numbers on the lens and the shutter-speed plate are not the serial number of the camera. Be sure to give the serial number of your Graflex in all correspondence concerning it.

The Registration Card attached to your Graflex when it left the factory should be filled out completely and accurately, and returned to us promptly. If furnishes us with information that facilitates answering your letters, and assures a permanent record of your equipment that can prove valuable in case of theft or loss. If you did not receive the Registration Card supplied with your camera, write us today for another.

Since this material was printed THE FOLMER GRAFLEX CORPORATION has changed its name to:

GRAFLEX, INC.

(Please address all future correspondence accordingly)

We are using this manner of calling this change in name to your attention, in order that we may use up stocks of on-hand literature and so conserve war-vital paper supplies.

GRAFLEX, Inc., Rochester 8, N. Y, U. S. A.

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