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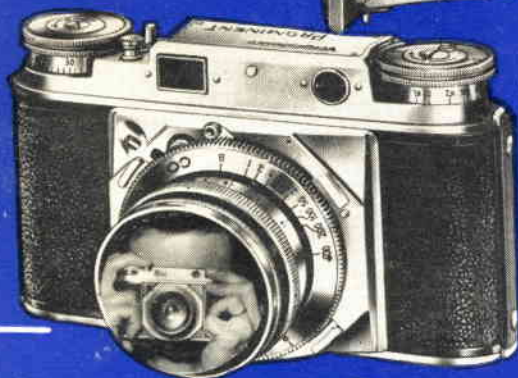
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VOIGTLANDER 35mm

GUIDE

**VITO II, VITO III,
VITESSA,
PROMINENT**



with special
COLOR
section

Kenneth Tydings, S.P.E.

THE MODERN CAMERA GUIDE SERIES

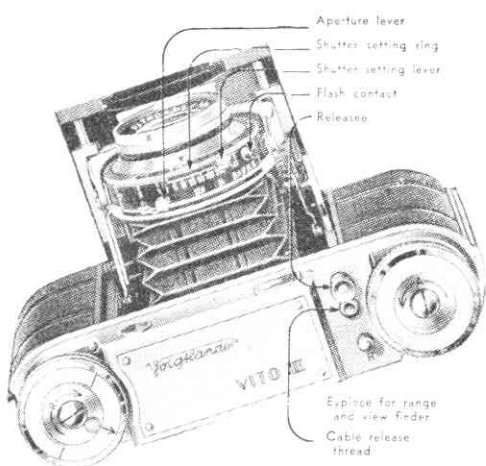
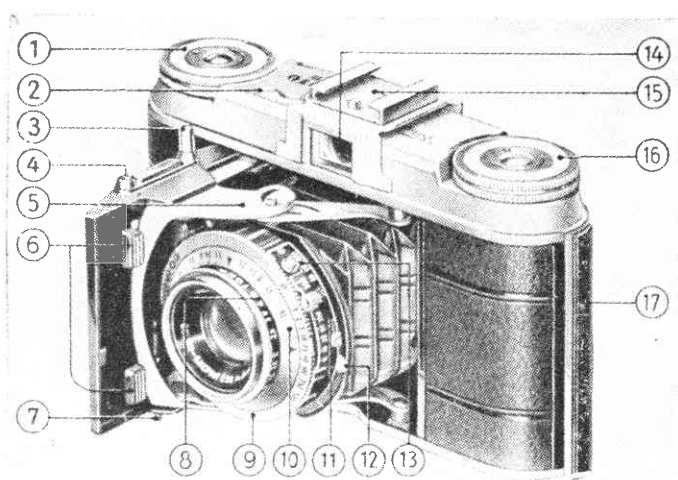
INTRODUCTION

The Voigtlander company has to its credit many firsts in the development of advanced lens designs of the finest quality. It was the first to manufacture, in 1840, the Petzval lens which was the optical phenomenon of its day because it reduced the exposure time for the sensitive film emulsions then used from many minutes to a few seconds. All Voigtlander lenses carry with them a surety of the highest degree of precision, standardization, and refinement possible in a manufactured lens.

Besides pioneering in the optical field, Voigtlander designed and produced many fine cameras in the miniature, reflex, stereo-reflex, and larger plate sizes which have had wide acceptance in both the professional and amateur fields.

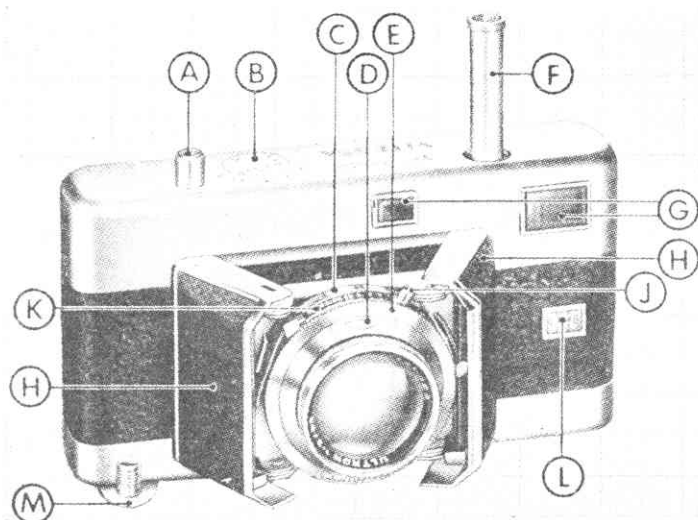
You can have the fullest confidence in your Voigtlander, but you must learn how to operate it efficiently to realize the fullest potentialities of each model. As the author is not affiliated in any way with the Voigtlander company, his descriptions of the various 35mm cameras are as objective as those of a disinterested person can be. Each model is described and discussed from the viewpoint of helping you to improve your pictures and to attain truly superior results. The author's Safe-Set Method to simplify camera handling for beginners will enable you to pre-set your camera controls for sure-fire pictures immediately. Sections on lighting, work with color, and such specialties as microfilming, stereo, and scientific photography will be of tremendous help to the advanced amateur and the professional.

Your Voigtlander can give you many pleasurable hours if you learn to operate it correctly. This Guide will show you the way.



The Vito II Nomenclature

- 1 Film winder ("A knob")
- 2 Film counter window
- 3 Release
- 4 Cable release socket
- 5 Struts
- 6 Keys for closing camera front
- 7 Front support
- 8 Lens mount with distance scale
- 9 Speed setting ring
- 10 Front plate
- 11 Shutter tensioning lever
- 12 Aperture setting lever
- 13 Contact for flash equipment
- 14 Optical viewfinder
- 15 Accessory shoe
- 16 Rewinding knob ("R knob")
- 17 Locking ledge for camera back



- A Release with socket for cable release
- B Distance Scale with depth of field dial
- C Aperture Scale
- D Front Plate with red closing marks
- E Shutter Setting Ring
- F Transport Plunger tensions shutter and transports film
- G Window of Viewfinder
- H Front doors
- J Synchron Flash Contact
- K Speed Setting Scale
- L Window of film counter and film selector
- M Rewind Lever (also camera support)

CHAPTER 1 / **RAPID RESULTS WITH YOUR VOIGTLANDER**

There are many models of the Voigtlander camera. For convenience of description, they may be divided into two general classes—the rigid and the folding. Each class may be further sub-divided into those with and those without a rangefinder, and also models with interchangeable and models with non-interchangeable lenses.

Folding: Without Rangefinder: Vito I, II.

With single window rangefinder and viewfinder: Vito III, Vitessa.

Rigid: With single window rangefinder and viewfinder: Prominent
Interchangeable lenses: The Prominent is the only Voigtlander 35mm camera with interchangeable lenses.

All 35mm cameras use standard 20 or 36 exposure cartridges. The dimensions of the cartridges or color transparencies produced are the standard 24x36mm size (1x1½ in.).

These camera models meet the needs of photographers of varied ability. The beginner generally may start with the Vito II and proceed, when he discovers the limitations inherent in a low-priced camera design, to the more advanced Vito III, Vitessa or Prominent.

Whether you have purchased or have been presented with your Voigtlander, you are naturally interested in using it immediately and getting good results. The illustrations in this chapter will show you the simple mechanical camera adjustments that can be made to get pictures at once, even though you may have used only a box camera previously. In fact, to let you in on a little secret, these settings duplicate the controlled settings of a box camera. So, if you will forget for the moment that your Voigtlander is capable of many control variations and only think of it as a simple box camera with few adjustments, you will have the confidence of getting the same, sure results you got with “the old reliable box”. The acknowledged versatility of the Voigtlander should not encourage you, at the beginning, to play around with the different controls until you are more familiar with the camera. By using your Voigtlander as illustrated, you cannot go wrong. Later, when you have learned the difference in the relationship of shutter speed to aperture opening, you can easily make the necessary changes of settings as subject or lighting conditions differ. But, for the time being, use the Safe-Set Method to improve your photography because of its tested, sure-fire simplicity.

1. Have a camera store clerk show you how to open and close the cameras that have a folding lens standard (Vito II, Vito III, Vitessa). Have him show you, in particular, how to pull the lens forward to its set (infinity) position so that the standard will be set rigidly and securely when it clicks into place.

2. Load the camera with daylight type color film following the instruction sheet, or have him load it for you.

3. Set your distance indicator knob at 18 feet for scenic pictures.

4. Set your aperture opening so that the space between 8 and 5.6 comes opposite the indicator mark.

5. Set your shutter speed so that the 50 is next to the marking point.

6. Cock your camera shutter. Do this gently. You will hear a click when the shutter is set.

7. Hold the camera correctly.

8. Look through the viewfinder window. Your subject will appear much smaller than it actually is, but whatever you do see in the viewfinder will be seen by the camera at most far and middle distances. For near close-ups, some correction is necessary because the window of the viewfinder is higher than the lens of your camera.

9. Wait for a bright, not too harsh, sunny day. Since you probably will be using color, it is desirable to wait for that type of day when colors will be most brilliant. If the sky is dull and overcast, the colors in your final picture will also be dull. You will find that the camera controls described here are correct for a bright day. For other light conditions, consult an exposure chart or use a meter.

To simplify the handling of the camera, the Safe-Set Chart (page 9) gives the beginner beforehand the distances for any particular picture that may be wanted. For example, a head-and-shoulders portrait should be taken at $3\frac{1}{2}$ feet. The focusing scale is set at this distance, while the shutter speed and iris settings remain the same (outdoors only). Then, all you need to do is to approach within $3\frac{1}{2}$ feet, checking your camera distance by an auxiliary rangefinder or by looking through the built-in rangefinder if your camera has one. With a rangefinder, your estimate of the distance is more accurate because the subject image will be razor sharp when in focus. Owners of cameras without rangefinders need not worry greatly because the depth of field permits a 5-inch allowance on either side of the focusing point. If you are within 5 inches of $3\frac{1}{2}$ feet, your picture will still be sharp. When you are at the $3\frac{1}{2}$ -foot distance, you then shift your eye

to the viewfinder (the Prominent, the Vito III, and the Vitessa Models have a combined rangefinder and viewfinder so that no eye shift is necessary). When your subject is at the peak of action or expression, gently squeeze the shutter release.

If the weather is not ideal, you may use your camera indoors or outdoors with its accessory flash unit. You must remember that your flash synchronization takes place at certain specific speeds with 1/25 second a safe choice for most flashlamps and flashtubes. Here again, the Safe-Set Method simplifies your controls to the point of making indoor flash the nearest thing to "push-button photography". For indoor pictures with indoor Kodachrome Type A film, I suggest only an SM or SF flashlamp because with these lamps no color-balancing filter is necessary. For Ansco color, indoor type, any flashlamp can be used with its appropriate light-balancing filter.

The Safe-Set Method for indoor pictures differs slightly from the outdoor technique in that the exposure is dependent upon the flashlamp. As the distance of the lamp to the subject changes, so does the effective light intensity change. Therefore, for different distances, you must use different lens openings to compensate for the different light volumes. In order to eliminate any chance of error, the chart on page 8 has the pre-calculated openings for the set distances of the subject size. Using once again a distance of 3½ feet for a head and shoulders pose, you will find that an aperture of f/16 is needed. So, pre-set your rangefinder at 3½ feet, set the iris at f/16 and the shutter speed at 1/25 second. To get a perfectly exposed and perfectly sharp picture, all you need do is to approach your subject at approximately 3½ feet, using a rangefinder or simply guessing the distance. When the distance has been accurately checked and the subject viewed through the viewfinder at its peak of action or expression, you need only squeeze gently to release the shutter. By following the Safe-Set Method, you have pre-set and co-ordinated all your picture-taking factors. The only thing for you to do is to squeeze the shutter at the right moment for a successful picture.

10. With a 35mm camera you must rewind the film back into its original cartridge and the roll is finished. Do not open the back of the camera until you have completely rewound the film.

11. 35mm Kodachrome or Ansco Color Cartridges should be carefully packaged in their shipping bags and mailed to the appropriate laboratory for processing.

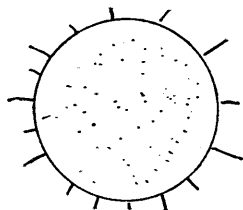
12. The returned color transparencies may be viewed, enlarged or projected.

DR. TYDINGS' COLOR OUTDOOR SAFE-SET FORMULA

Lens - 2" Focal Length

	Field Size in Inches Vertical	Approx. Distance
Child Head		
Head	22x15	2.5 feet (.75M)
Head & shoulders	32x21	3.5 feet (.96M)
Three-quarters	45x30	5.5 feet (1.7M)
	63x41	7 feet (2.13M)
Full body	90x60	10 feet (3.05M)
Horizontal-Full body	126x82	14 feet (4M)
	144x96	16 feet (4.6M)

For children: Use all settings for the previous size e.g. a child's full body, vertical equals an adult's three-quarter body size.



1. Film: Color daylight; Type A or Kodacolor A with No.85B; Ansco Color Indoor with Conv. No.11.
2. Light: Clear day; not harsh.
3. For scenes: Set focus at 18 feet; keep subject at least 10 feet away.
4. For portraits, etc.

- A. Choose the subject distance from the chart.
- B. Pre-set your rangefinder for your subject distance.
- C. Look through the rangefinder or guess your distance.
- D. View and compose your subject.
- E. Gently squeeze the release at the peak-of-the-picture.
- F. Wind for the next exposure.

For children: Use all settings for the previous size e.g. a child's full body, vertical equals an adult's three-quarter body size.

For children: Use all settings for the previous size e.g. a child's full body, vertical equals an adult's three-quarter body size.

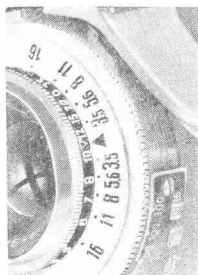
For children: Use all settings for the previous size e.g. a child's full body, vertical equals an adult's three-quarter body size.



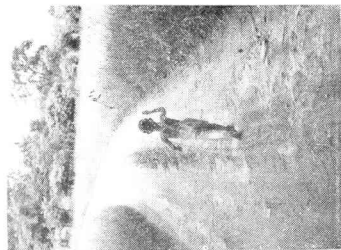
S-Shutter



A-Aperture



F-Focus



E-Effect

DR. TYDINGS' OUTDOOR SAFE-SET FORMULA FOR COLOR FLASH

Code:- H - Handkerchief; Thin, white linen.

- Child's Head,

§ - Head,

† - Head and Shoulders,

‡ - Three Quarters,

+ - Full Body, Vertical,

§ - Full Body, Horizontal,

$$f/16 = f/22 + 1H = f/32 + 2H = f/45 + 3H$$

2" (50mm) Lens:

1/50 Sec. 5B, 25B	Outdoor	48	1'	#1'6"	§2'2"	3'	4'4"	46'	8'7"	+12'	§15'
	Kodachrome	85	#2'	§2'7"	†3'10"	‡5'3"	7'8"	+10'	§15'	20'	24'
	Ansco Color	55	1'3"	#1'8"	§2'6"	†3'6"	4'6"	7'	+10'	§14'	16'
	Kodacolor										

FLOODLAMP GUIDE—LAMP BESIDE THE CAMERA

Lamp: Floodlamp 1 in suitable reflector or one RFL2

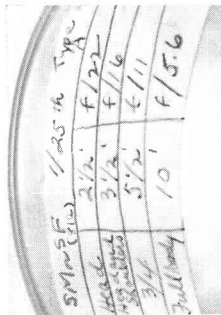
Film: Indoor Color, Type A

Shutter Speed:	Opening	Lamp-to-Subject Distance
1/25	f/2.8 f/3.5 f/4 f/5.6	4.6 feet 3.7 3.25 2.3
1/5	f/2.8 f/3.5 f/4 f/5.6 f/8	10 feet 8 7 5 3.5

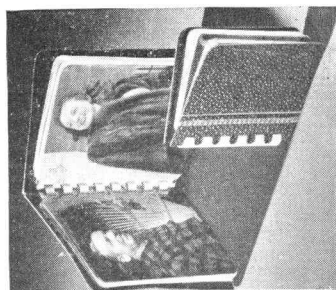
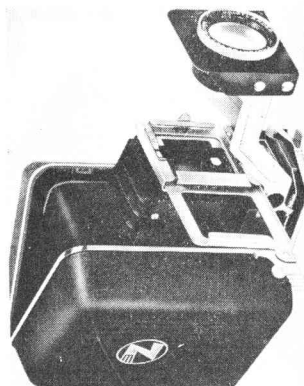
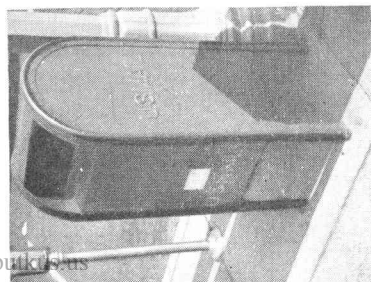
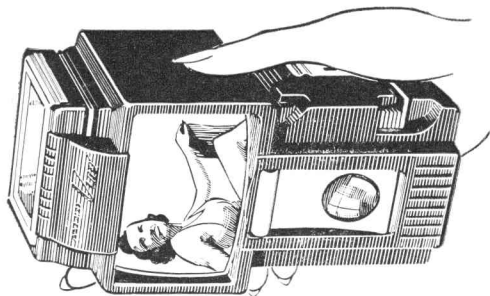
Back of flash reflector



Flash setting



Check your name, address and postage before mailing. The returned picture may be enjoyed by viewing, projection or enlargement.



To use the chart on page 8 to best advantage:

(1) Copy field sizes onto a piece of labeling tape.

(2) Standardize on one film, one flashlamp, etc. and copy this onto the tape. e.g.

Lens of 2" focal length

SM or SF with Kodachrome Type A Shutter 1/25

UV-16 with Ansco Color Indoor Shutter 1/25

Vertical—Head	2.5 feet	f/22
Head & Shoulders	3.5 feet	f/16
$\frac{3}{4}$	5.5 feet	f/11
Full Body	10 feet	f/5.6

(3) Place it on your camera case or on the back of your flash reflector for easy reference.

(4) Pre-select and Safe-Set each exposure.

You can make out a chart for any flashlamp or flashtube and for different films or shutter speeds.

Once the chart is filled out, you have all the information for taking your picture. These apply for average subjects. For light subjects, pre-select all your factors and then narrow your opening one half stop. For dark subjects widen the opening one half stop. An opening is conveniently widened or narrowed one half stop by moving it one half the space between each stop. High efficiency reflectors are suggested. If your reflector is inefficient, make your preliminary settings and then widen or narrow your opening one half stop.

These instructions are simple and at a minimum. The only judgment required on your part is to wait outdoors for a bright, sunny day and, for scenic subjects only, to keep your subject at least 9 feet from the camera. For portraits and similar close-ups, the chart will give you the desirable pre-set distances. For indoor exposures, you pre-select your subject size, pre-set your camera, iris and shutter and wait for the peak of action or expression. If these elementary instructions are followed, you can be sure of fine results.

Your miniature camera may, however, be used under greatly differing conditions. The next four chapters will show you how to change the basic settings so that your camera will be truly flexible. The time to remember all these picture-taking factors is before the exposure has been made. As an aid to remembering these important points, always recall the word *SAFE* before you are ready to release the shutter.

S—Shutter; A—Aperture; F—Focus; E—Exposure.

COMPARISON OF VOIGTLANDER 35 mm CAMERAS

Camera	Shutter Speed	Lens Opening	Focusing	Range-finder	Flash	Flash Connection	Filter Size	Type	Inter-changeable Lenses	Combined Film Advance and Shutter Set	Self-timer
Vito I	Prontor S 1/300 Compur 1/300 Compur-Rapid 1/500	f/3.5 Skopar	Front Cell	—	— — —	To be added	29 mm	Bellows	—	—	Yes
Vito II	Prontor S 1/300 SV Compur-Rapid 1/500	f/3.5 Color Skopar	Front Cell	—	S - synch SV - MX X - synch	Compur	29 mm	Bellows	—	—	Yes
Vito III	Compur-Rapid 1/500	f/2 Ultron	Unit	Combined range and viewfinder	X - old New M-X model	Compur	37 mm	Bellows	—	Yes	—
Prominent	Compur-Rapid 1/500	f/1.5 Nokton	Unit	Combined range and viewfinder	X - old New M-X model	Compur	47 mm	Rigid	Yes	Yes	Yes
Vitessa	Compur-Rapid 1/500	f/2 Ultron	Rear film movement	Combined range and viewfinder	X - old New M-X model	Compur	32 mm	Bellows	—	Yes	—

CHAPTER 2 / S—THE SHUTTER

The shutter of your camera may be compared to a water faucet. When the faucet is open, water will flow. Similarly when the shutter is opened, light will enter your lens. 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 period of time. The volume of light that is available will determine whether it is necessary to leave the shutter open for a long or for a short time. When the light volume is very low, you may be required to leave the shutter open for as long as an hour at a time (time exposure). On the other hand, for sports or action spots a picture may have to be taken in as little as $1/500$ second because of the fast action.

A simple rule for the beginner to remember is that still (inanimate) subjects can be taken with a slow shutter speed, while living active subjects can be taken with as rapid a shutter speed as the camera has available. But, as you will find later, a slower speed may permit a narrow iris opening with a gain in depth of field and over-all sharpness so that by choosing the correct shutter speed, you can still stop the motion of your subject while managing to retain the greatest amount of sharpness and depth. This choice may very often be an important point in making or breaking the effect of a picture. A simple way to remember what speed to use is to know the meaning of the series of numbers, 25,5,25. This basic number means that for a subject 25 feet away, moving at 5 miles an hour, with a line of motion directly toward or away from the camera position, the shutter speed need be only $1/25$ second. With a 45-degree line of motion, the shutter speed is doubled, while with a 90-degree line of motion the shutter speed is three times the original $1/25$ second. On the other hand, if the speed of the subject is increased to 10 miles per hour, then all numbers are doubled. As the subject speeds are increased, the shutter speeds must also be increased in direct proportion. If, on the other hand, the subject distance is increased to 50 feet, all numbers must be doubled. With a 100-foot distance the figures are quadrupled so that a moving subject at 20 miles per hour, 100 feet away, with a line of motion toward the camera will still require a $1/25$ shutter speed.

So with the basic 25,5,25 you can readily figure out whatever shutter speed is needed by simple multiplication or division. If your highest shutter speed cannot stop the motion of a rapidly moving

SHUTTER SPEEDS FOR MOVING SUBJECTS

LINE OF MOTION

SUBJECT AT 25 FEET

	↑↓	↘	↙
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 ($1/100 \times 2 = 1/50$).

For 100 ft. subject distances, multiply all speeds by 4 ($1/100 \times 4 = 1/25$).

*PAN to stop motion.

object from a set position, then you may stop the subject motion on your film by "panning" your camera. That means that you swing or move the camera in line with the direction of motion of your subject. When you trip the shutter, the subject will be stopped and will be sharp, while the background will be blurred. While this is not always the best photography, the resulting sharp subject justifies the compromise.

The shutter speeds of your Voigtlander camera, depending on model, generally are T, B, 1, 1/2, 1/5, 1/10, 1/25, 1/50, 1/100, 1/150, 1/200, 1/300, 1/500 second. For simplicity of marking the speed indicator dial, only the last half of the number is engraved. For example, when 200 shows on the scale, 1/200 is meant. A large range of speeds, while important for specialized work, is not necessary for the beginner. A survey of most salon prize winners showed that their average setting for a picture had been made at a speed of 1/100 second. With this fact in mind the amateur can see that his present camera will suffice for even superior work.

PANNING

If your highest shutter speed cannot stop the motion of a rapidly moving object from a set position, then the subject's motion may be stopped by "panning" your camera. This means that you swing or move the camera in line with the movement of your subject. When you snap your shutter, the object will be stopped in motion and will be sharp, while the background, of necessity, will be blurred. While this is not always the best photography, the resulting sharp subject justifies the compromise.

The shutter speeds of your Voigtlander "Compur" shutter, depending on the model, generally 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.

Set your shutter speed at points directly opposite the engraved numbers. Delicate mechanisms revolve each time you change the shutter speed. After they have been set, the tension of turning the shutter-setting dial may strain the gears. The $1/500$ setting must not be changed, ever.

PRE-SET SHUTTER SPEEDS

It is possible to pre-set and keep your shutter speed at $1/100$ second and compensate for any light changes by varying the iris. If your subject is average (Class 3), on a sunny day your iris is set at 12, on a bright day at 9, etc. All factors with the exception of the iris opening remain the same.

$1/100$ —f/12, sunny
f/9 , bright
f/6 , cloudy
f/3 , dull

For any marked speed interval, it is usually necessary to rotate a ring with the time numerals on it so that the desired setting is opposite an indicating dot. Once you have completed setting the shutter for the desired speed, the next step is to cock your shutter so that it may be released.

Once your shutter speed has been chosen and the shutter prepared for release, the next question which arises is whether the exposure shall be made with the camera hand-held or on a tripod. With shutter speeds slower than $1/50$ second, the exposure should be made with the camera supported on a tripod. You may hold the camera in your hand if your shutter setting is $1/50$ second or faster. You should try to minimize camera vibration because the finished pictures are mag-

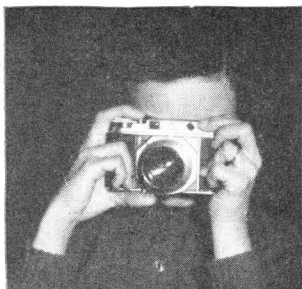
nified by enlarging, projection or viewing, and this magnification will show any body vibration as a blur. To limit the possibility of blurring with a hand-held camera at speeds of 1/50 second or faster, brace yourself in this fashion: Place your feet so that your toes are approximately four inches apart, your heels about six inches; hold your camera firmly, take a deep breath, exhale, and shortly after the exhalation (when you are at your steadiest), release the shutter. When no tripod is available, this method will yield good pictures even at 1/10 second. But at speeds slower than 1/50 second, it is far safer to use a tripod to provide a sturdy support. I suggest an easy height-changing type of tripod to minimize tripod manipulation.

Practice releasing or clocking and releasing the shutter (some release levers depress considerably before the shutter is actuated). Practice a number of times until you have the pressure and depth of release just right. Action pictures, baby portraits, etc. require split second exposures at the peak of action. The shutter must be released immediately, else you may lose in that split second the priceless once-in-a-lifetime expression or rare, never-to-be-repeated action. Practice releasing your shutter so that the camera will remain steady. No matter how steady you may think you are, you will always tend to push the camera slightly in the releasing direction. If you learn to release your shutter without vibration, your pictures at even 1/10 second will enlarge clean and not show any camera movement.

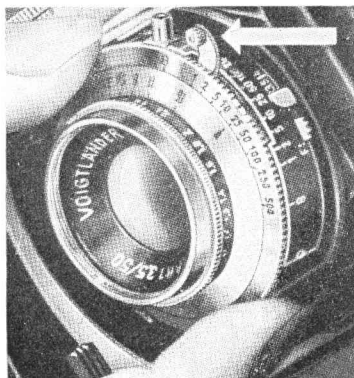
The best place to practice is in front of a large mirror. Stand fairly close, look through the viewfinder, and watch yourself in the mirror as you release the shutter. Any camera movement that you notice would have resulted in a blurred picture if you had had film in the camera. So learn to squeeze the release gently to reduce vibration or camera pushing while taking a picture.

CABLE RELEASE

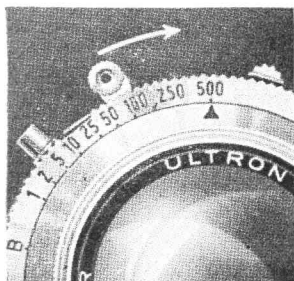
Adjacent to the shutter release, you will find a socket or threading to take a cable release. Your camera dealer will fit the correct cable release for your specific model. Caution: Use only the cable release that matches your shutter threading. If the wrong tip is used, there is a possibility of the plunger piercing the shutter housing and ruining the delicate parts. With a cable release, there should be no camera vibration. However, the release must be long enough to form an easy loop between your hand and the shutter. If your release is too short, the vibration of pushing the cable will transmit itself to your camera with poor picture results. With proper use, your pictures will improve through the use of a cable release.



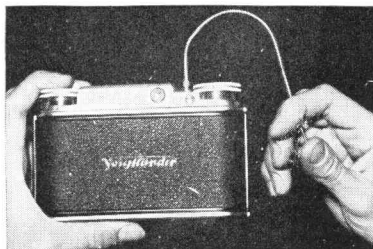
Holding the Prominent



Setting the shutter speed



Cocking the Shutter



Loose looped cable release

SELF-TIMER

There are a number of self-timers (delayed-action mechanisms) which may be used with your camera. A self-timer is particularly desirable whenever you wish to get yourself into the picture. With it, you can also take flash pictures of yourself. With a self-timer, you are able to add that necessary touch of human interest for any otherwise routine landscape, architectural study, etc. The self-timer can be used with the camera on a tripod when a cable release is not available and a slow speed is necessary for the picture. Since releasing a shutter, even on a tripod, may cause vibration, the use of the self-timer allows a lapse of approximately 15 seconds before the picture is taken. During this time interim, the vibration caused by the releasing action will have been dissipated.

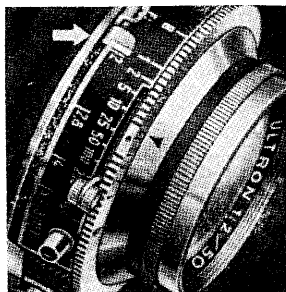
For best results, learn to use one shutter speed at the beginning. This is in line with the idea of keeping all variables to a minimum.

CHAPTER 3 / A—APERTURE (IRIS)

Opening a faucet allows water to flow through it for the length of time that the faucet remains open. However, an important item is the width of the faucet opening. If the faucet diameter is narrow, a small amount of water can come through. If the faucet diameter is large, then a greater amount of water will pour through for a stated interval of time. The relationship of the diameter of the faucet to the length of time that it remains open is similar to the relationship of the lens opening to the shutter speed. The shutter speed, in turn, determines the length of time that the lens will continue to remain open. The diameter of a faucet is measured in inches. Photographically, the lens opening diameter must be related to the focal length (lens-to-film distance), at which it forms an infinity image, and this ratio is usually shown as an f/number .

The f/number is the relationship of the size of the lens opening to the length or distance that the light rays must travel before they form a focused, sharp image on the film. A small number indicates a wide opening, whereas a high number indicates a narrow opening. The wider the opening the greater the amount of light that is admitted at a given interval of time. The narrower the opening, the smaller the quantity of light that enters the camera in the same time interval. For equal exposures you can have a large opening and a short shutter speed, or a narrow opening with a long exposure. There are different advantages to be derived from either choice. A wide opening will permit a short exposure such as is necessary for action pictures. A narrow opening will give increased sharpness over a larger area of the picture. When a sharp image is desirable but not always possible, you compromise by getting what you can with at least your main subject in sharp detail. Lenses narrow generally at full stop intervals to $f/22$. If intermediate settings are desired, the chart is useful in figuring out what compensation must be made for the difference in time when you make an opening larger for a shorter shutter speed or narrow your opening so as to require a longer exposure or an equivalent density of exposure.

The iris diaphragm of the lens regulates the size of the opening which admits light to the camera. The diaphragm is in many ways similar to the iris of the eye. Look into a mirror while bringing a light close to your eyes. As the light is brought closer, you will see that the iris opening narrows; as the light is moved away, the iris



Setting the aperture

FULL-STOP MARKING		RELATIVE LIGHT INCREASE, IF ONLY THE IRIS IS WIDENED
f/1	1	<p>These are full stop openings with a 100% difference in light transmission between two adjoining stops.</p> <p>If the indicator is moved approximately half way between the two markings, the iris is opened $\frac{1}{2}$ 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.</p>
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	<p>These specific numbers produce a difference in light transmission of 50% from one mark to another.</p>
f/4	$1\frac{1}{2}$	
f/4.5	2	
f/5.6	3	
f/6.3	$4\frac{1}{2}$	
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 $\frac{1}{2}$ 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.

widens. You duplicate this narrowing and widening in the camera by moving the iris opening indicator from the lower to the higher numbers. Look through the back of your camera and you will see the similarity between the iris of your lens and the iris of your eye.

Remember that the narrower the opening of your lens, the greater will be the depth of field. Therefore, narrow stops give great depth and wide stops yield very shallow areas of sharpness.

A constant iris opening:

f/12(11)—1/100, sunny
1/50 , bright
1/25 , cloudy
1/10 , dull

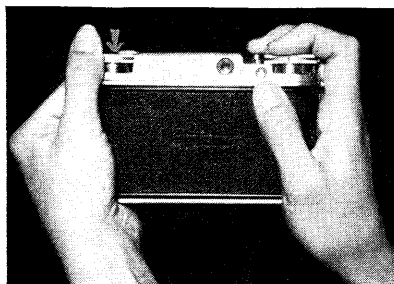
It is possible to pre-set and keep your iris opening constant by varying the shutter speed. This may become necessary if a certain depth of field is required. So by changing the shutter speed only, your depth of field is maintained and the speed varied to compensate for any changing light. As an example, if your subject is average (Class 3) and the iris is set for f/12, you use 1/100 second for a sunny day; 1/50 for a bright day, etc.

An inherent quality of a 2-inch lens of short focal length is its remarkable depth of field. A 2-inch lens at f/4 has the same depth of field as a 4-inch lens at f/8 or an 8-inch lens at f/16. In getting an equal depth of field for a given amount of light, this knowledge is very valuable. With a 2-inch lens set at f/4, you will be able to get a picture. At f/16 with a lens of longer focal length for the same depth of field, your picture will be hopelessly underexposed. In many cases, the depth of field possible with a lens of short focal length and a wide opening are the all-important differences which make a picture possible. With a fast shutter speed, your lens opening will have to be as wide as possible to admit more light (f/3.5 or even f/2, if available). When your shutter speeds are slow, you may narrow your opening so as to get an increase of your depth of field. So far you have learned to set your shutter and control the variable opening (iris) on your lens.

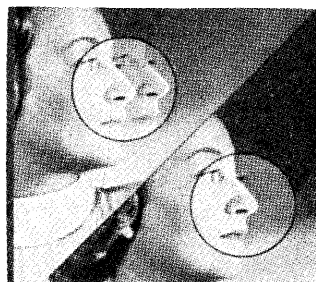
CHAPTER 4 / F—FOCUSING

Focusing is the process of insuring the maximum amount of image sharpness. To estimate the correct subject to camera distance.

you may use either a coupled rangefinder, an auxiliary rangefinder, a pre-measured string or tape measure, or simply guess the distance. To help you with your guess, you may take advantage of either the depth of field or hyper-focal distance settings of the lens of short focal length. Because of the tremendous depth of field of your lens of



Focusing the Prominent



Two images, out-of-focus; one image, in focus

Distance Focused on	f:3.5 Sharply Focused		f:4 Sharply Focused		f:5.6 Sharply Focused		f:8 Sharply Focused		f:11 Sharply Focused		f:16 Sharply Focused	
	From	To	From	To	From	To	From	To	From	To	From	To
3	2' 11"	3' 2"	2' 10"	3' 2"	2' 9"	3' 3"	2' 8"	3' 4"	2' 7"	3' 7"	2' 5"	3' 11"
3.5	3' 4"	3' 9"	3' 4"	3' 10"	3' 2"	3' 10"	3' 1"	4' 1"	3'	4' 5"	2' 9"	5' 1"
4	3' 9"	4' 4"	3' 9"	4' 4"	3' 7"	4' 6"	3' 6"	4' 10"	3' 3"	5' 3"	3'	6' 1"
5	4' 7"	5' 6"	4' 6"	5' 7"	4' 4"	5' 10"	4' 2"	6' 4"	3' 11"	6' 6"	3' 6"	9'
6	5' 5"	6' 9"	5' 3"	6' 11"	5' 1"	7' 1"	4' 9"	8' 2"	4' 5"	9' 6"	4'	13'
8	6' 11"	9' 6"	6' 10"	9' 10"	6' 5"	10' 9"	5' 10"	12' 8"	5' 4"	16' 4"	4' 8"	32'
10	8' 4"	12' 6"	8' 2"	13'	7' 6"	15'	6' 9"	18' 9"	6' 3"	28'	5' 3"	∞
15	11' 6"	22'	11'	23'	10'	32'	8' 9"	55'	7' 9"	∞	6' 2"	∞
25	16' 6"	53'	15' 8"	63'	13' 9"	162'	11' 6"	∞	9' 6"	∞	7' 6"	∞
50	24'	∞	23'	∞	19'	∞	15'	∞	11' 9"	∞	8' 9"	∞
100	32' 2"	∞	29' 6"	∞	23'	∞	17' 4"	∞	13' 2"	∞	9' 5"	∞
∞	47'	∞	41'	∞	29'	∞	20'	∞	15'	∞	10'	∞

2-inch focal length, your images will be sharp from infinity to most middle distances without critical focusing. However, a rangefinder is valuable for focusing distances between 7 and 3 feet.

A rangefinder is a simple, triangulating device which estimates distances by forming a geometric pattern of your subject from two separated points of view. When the images which are seen from these different points of view are brought together by a movable mirror so as to form a single continuous image, you can read the subject distance because the amount of mirror movement is calibrated. The greater the distance the mirror must be moved the closer is your subject. The rangefinder is usually marked (calibrated) so that you may read the exact rangefinder-to-subject distance from the coordinated measurement scale. The Vito II does not have a rangefinder.

The Vito III, the Vitessa, and the Prominent cameras with rangefinder have a super-imposed image type of rangefinder. In the last mentioned type you see the whole subject at all times, but in the center tinted area you will see two duplicated images when the subject is out of focus. When the lighter image is brought over the darker image and the two form a continuous non-separable subject, then the lens is again in focus. These rangefinder cameras are unique in that the rangefinder and viewfinder are combined so that you look through only one eye-window for both focusing and composing. As with all new instruments it is advisable to practice using the rangefinder and/or the viewfinder of the camera without any film in it.

Since the Vito II does not have a coupled rangefinder, you may use an auxiliary (detachable) rangefinder for these cameras with excellent results. To do so you should purchase a pocket type rangefinder which is inexpensive and available at most stores. This type of rangefinder lends itself to a pre-set method which will produce excellent results. To use one by this method:

1. Set your detachable rangefinder at the distance of the expected action, e.g., 10 feet.
2. Set the focus of your camera lens at 10 feet.
3. Your shutter and iris settings must be ready for instant picture taking.
4. Place your detachable rangefinder over your camera.
5. Look through the rangefinder and walk forward or back until the rangefinder image window indicates that your subject is in sharp focus.
6. With your subject in focus, shift your eye to the viewfinder. When the subject reaches the peak of action or expression that you

think ideal, release the shutter. By this method your camera without a rangefinder attains the high accuracy of the built-in rangefinder models.

FOCUSING BY SCALE

If you must guess your distance because you may not have the time to use a rangefinder, it is a good idea to know something about depth of field and the hyper-focal distance. Your short focal length lens has a great depth of field which means that very large areas will be sharp even without accurate focusing. Sharpness in a photograph is a relative term based on the fact that the film image is composed of many fine silver grain dots. If the dots are close together so that the eye cannot distinguish them separately, the image appears smooth and continuous. If the dots are far apart and individually distinguishable, the image will appear granular, hazy and unsharp.

An unsharp image is distinctly different from the granularity produced by a high-speed coarse-grained developer. When you read in your distance table that everything is sharp from 21 feet to infinity, this does not mean that your subject abruptly becomes completely blurred at 18 or 19 feet. Rather, the 21 feet to infinity sharpness by definition usually means that at a 10-inch viewing distance, the eye will be unable to distinguish a separation of two image dots if they are $1/100$ inch apart. When you can see the separation between the two dots of your image, it is no longer a smooth continuous picture but will be fuzzy or sandy. To the eye a fuzzy image does not appear sharp. To get back to the subject, at 18 or 19 feet you will just begin to see the beginning of the separation of the two dots of your film image. At 14 or 7 feet the dot separation will definitely be distinct. Usually there is no abrupt dividing line from a sharp to a granular image. Rather there is a gradual deterioration of sharpness depending upon your lens opening, development, exposure, etc.

The 35mm film must be enlarged from at least 5 to 10 times in order to be viewed easily. When the film is enlarged to 10 times, the $1/100$ inch separation of the dots of the image will be pulled apart and the dots will now show as distinct points one-tenth inch apart ($100 \div 10 = 10$). Since we readily distinguish dots $1/10$ inch apart, the image will be granular and hardly usable.

As all your film requires enlargement for viewing, pre-calculate your subject distances and iris openings and be sure that your picture is as sharp as possible. At close range, you must use your rangefinder for accurate distance measurement. A perfectly focused image will

24 mm LENS DEPTH OF FIELD

Scale Setting	f/5.8		f/8		f/11		f/16		f/22	
	from	to	from	to	from	to	from	to	from	to
3½'	2'10"	4'7"	2'7"	5'3"	2'5"	6'6"	2'1"	10'8"	1'10"	46'
5'	3'9"	7'6"	3'5"	9'7"	3'	14'3"	2'7"	130'	2'2"	∞
7'	4'9"	13'3"	4'2"	21'4"	3'8"	93'	3'	∞	2'6"	∞
10'	6'	30'9"	5'1"	277'	4'4"	∞	3'5"	∞	2'9"	∞
15'	7'6"	∞	6'3"	∞	5'	∞	3'10"	∞	3'	∞
30'	10'	∞	7'9"	∞	6'	∞	4'5"	∞	3'4"	∞
∞	14'	∞	10'	∞	7'4"	∞	5'1"	∞	3'8"	∞

N.B. ∞ = Infinity

100 mm LENS DEPTH OF FIELD

Scale Setting	f/5.5		f/8		f/11		f/16	
	from	to	from	to	from	to	from	to
3½'	3'4"	3'8"	3'4"	3'8"	3'3"	3'9"	3'2"	3'10"
5'	4'10"	5'3"	4'8"	5'4"	4'8"	5'6"	4'6"	5'9"
8'	7'4"	8'8"	7'2"	9'	7'	9'6"	6'6"	10'3"
10'	9'2"	11"	8'9"	11'6"	8'4"	12'6"	7'9"	14'
15'	13'	17'6"	12'6"	19'	11'9"	21'	10'6"	26'
25'	20'	33'	18'6"	38'	17'	48'	15'	83'
50'	34'	98'	29'	∞	25'	∞	21'	∞
100	51'	∞	42'	∞	34'	∞	26'	∞
∞	102'	∞	72'	∞	52'	∞	36'	∞

N.B. ∞ = Infinity

give you a resolution far beyond your required minimum tolerances so that you can easily produce a film image that will enlarge well.

The subject of the size of your image point formation is known as the "circle of confusion." When you know beforehand that your subject will need projection or enlargement to immense diameters, then stop down (narrow the opening) at least one or two stops in addition to secure greater sharpness than the table indicates. The depth-of-field table can be used if you can either accurately guess your distance or measure it. Once you have your subject distance, choose your surrounding areas of sharpness according to the iris opening.

Related to the depth of field is a table for your hyper-focal distance. When you set your distance (focusing scale) in co-ordination with certain aperture settings, everything will be in focus from half the set scale distance to infinity. This important table, which minimizes the need for extremely accurate focusing when certain light conditions permit, is available in this chapter. An easy way to remember the whole table is by the key number series, 2,4,42. This number

HYPERFOCAL DISTANCE CHART

<i>f</i> /opening	24 mm		50 mm (2")		100 mm (4")	
	<i>Setting</i>	<i>Sharp Focus</i>	<i>Setting</i>	<i>Sharp Focus</i>	<i>Setting</i>	<i>Sharp Focus</i>
f/4	21'	∞ to 10-1/2'	42'	∞ to 21'	84'	∞ to 42'
f/8	10-1/2'	∞ to 5-1/4'	21'	∞ to 10-1/2'	42'	∞ to 21'
f/11	8'	∞ to 4'	15-3/4'	∞ to 7-7/8'	31-1/2'	∞ to 15-3/4'
f/16	5-1/4'	∞ to 2-5/8'	10-1/2'	∞ to 5-1/4'	21'	∞ to 10-1/2'
f/22	4'	∞ to 2'	7-7/8'	∞ to 4'	15-3/4'	∞ to 7-7/8'

N.B. ∞ = Infinity

means that a 2 inch lens at f/4, focused for 42 feet, will produce an image that is sharp from 21 feet to infinity. At f/8, the setting of 21 feet will have everything in focus from 10½ feet to infinity, etc.

As the table indicates, an iris opening of f/16 with the distance set for 10½ feet will yield a sharp image if your subject is as close as 5¼ feet. You can see that this tremendous depth of field minimizes the need for exacting rangefinder focusing. However, if the subject is mostly at infinity (distant landscapes, etc), you may secure a sharper distance image by leaving the rangefinder setting at infinity. Since hyper-focal distance is based on the "circle of confusion," you can understand that when your rangefinder is focused at 10½ feet, your infinity distance will be sharp only within certain limits. As you enlarge your film, these limits are rapidly passed and the image will appear fuzzy. However, if you set the focus on infinity, then the image is focused exactly at the far distance focusing point and is not dependent upon the iris opening for its sharpness.

Pre-set action pictures call for setting your focus for either of the distances:

○ 30 feet—f/8 for subject focus from 15 feet to infinity.

△ 10 feet—f/8 subject will be in focus from 7 to 15 feet.

The viewfinder is generally a reverse Galilean telescope and is adequate from infinity to most near middle distances. Parallax assumes great importance at close distances. Chapter 19, Close-ups and Parallax Control, describes in detail methods for correcting it.

For better subject composition, divide your viewfinder into thirds both horizontally and vertically and place four dots at the intersections of your lines using a sharp pen with India ink. While these dots will not interfere with your viewfinder, they will serve as excellent guide points for effective composition.

The Safe-Set Method for focusing is suggested because it has been my experience in teaching to find that when the beginner starts to focus, he rotates the focusing mount great distances before he finds the critical sharp point. A half turn of your focusing mount will change your distance setting from infinity to five feet, so you can see how much chance there is for visual error in trying to focus rapidly. Whereas when the distance is pre-set and you approach your subject with any checking method, a 5 per cent distance difference is the greatest error possible.

Make every effort to take sharp pictures. If desired, the sharpness may be later diffused for a softer effect. Remember that it is impossible to take an out-of-focus image and ever make it critically sharp.

CHAPTER 5 / **E—EXPOSURE**

Now that the mechanics of picture taking have been described, all that remains is for you to integrate this knowledge and prepare to take a picture.

You now know how to set your shutter and iris, but you must know which settings are to be used. There are three methods of determining the proper camera settings for normal lighting conditions.

1. Every package of film has an information sheet. On this sheet, you will find recommendations for shutter and iris settings for different light conditions. If you follow these recommendations, you will definitely get properly exposed pictures. Remember that the manufacturers take great pains to insure the accuracy of their published information.

2. There are always three factors in determining your camera settings: Film, shutter speed and iris. The exposure chart in this chapter standardizes the setting procedure so that the only variable will be your iris opening. And, to make your choice easy, the different iris openings are derived by the use of simple arithmetic. First choose the number for the correct light conditions and multiply it by the suitable subject classification number. The product of the multiplication will be your iris setting. For example, if you are using film with an ASA 50 and a shutter speed of 1/100 second, then when your subject is average (Class 3) and multiplied by hazy sky lighting (Class 2), the result will be 6. If you set your iris at 6.3, your exposure will be

“on the button.” Practice a number of times for different subjects and lighting conditions until you have mastered the chart. While this chart gives you iris openings for set shutter speeds only, you can change the settings at will since you can increase your shutter speed by opening your iris in proportion so as to maintain the same volume-time relationship of light. The f/number chart of Chapter 4 will show you the different shutter speeds for proportionate iris opening changes. If you know what speed is needed, then you can open and close the iris from the table number and still maintain the correct exposure.

3. The photo-electric meter is an accepted standard for accurate measurements in indicating correct exposure. While a chart may be used for outdoor settings, only the photo-electric meter is recommended for use with artificial lighting or even outdoors where extreme accuracy is needed for color work.

There are two types of photo-electric meters.

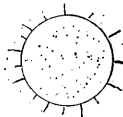
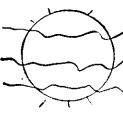


- a. *The incident light type.* This meter measures the light that is falling on a scene or a subject. The incident type generally has a collecting sphere (like half a table tennis ball), light masks or great teen type hoods which take a reading by pointing these collecting devices at the camera. The collectors are used to integrate any varied strengths of light reaching them so that the readings are very accurate and are set at the mid-point of a gray scale. The sphere also minimizes the possibility of too high readings when a spotlight or any other intense light source shines directly on the subject.
- b. *The reflection type.* The reflection type measures the amount of light reflected from the subject. It is pointed at the subject for an intensity reading. However, a gray card must be used with this type of meter for accurate results. Because gray is a neutral tone, you will automatically photograph your blacks and whites in their correct tonal differences. If a gray card is not used, then you can see that different reflected readings will result from dark or light subjects. Since both readings cannot be correct, you must do some mental calculation to figure out a new middle value that you hope will give the correct result. The only precaution when using a gray card is to be certain that it is large enough for a reading (point the meter at the card from at least a ten-inch distance) and so be assured that only the reflection

SIMPLIFIED OUTDOOR EXPOSURE CHART

Film: Outdoor Color—A. S. A. 10
#85 Filter with Indoor Color

B & W—A. S. A. 50
Shutter Speed 1/100

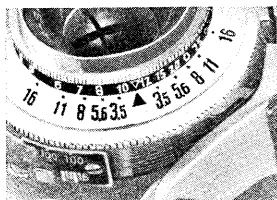
Shutter Speed—1/25th

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.



Built-in depth-of-field scale: Look at the same f/stop number on either side of the distance indicator to read the limits of focus directly. At f 5.6 everything is in focus from 8 to 20 feet.

from the gray card will influence the meter. In addition, be sure that your body is not blocking any light from its source. Bend your body away or take a knee bend so that your hand is holding the meter free and clear. With these precautions your meter readings can yield excellent results.

With both types of meter there is still some judgment required on your part. For dark subjects the iris may be opened a half stop, while with very light subjects the iris may be closed one half stop below the indicated scale readings.

In actual use, both types must be used for an ideal exposure. The balancing of light ratios is best performed with a reflection type meter, while the overall exposure may best be taken with the incident light type. The manufacturers have realized this because they have produced attachments or built-in masking devices for changing the function of their meters from one form to another.

EXPOSURE FOR FLASH

The exposure factors for flashlamp and flashtube are quite different from those determined by either of the above-mentioned methods. Every flashlamp or flashtube is supplied with an exposure guide number chart by the manufacturer. This chart provides you with a guide number to be used with certain speed films at definite shutter speeds. Since you know your film and shutter speeds, the only remaining unknown is again the iris opening. The iris opening is found by simply dividing the subject distance into the specific guide number. If, for example, your flashlamp has a guide number of 110 with an ASA 40 film at 1/100 of a second when your subject distance is 10 feet, then you divide 110 by 10 to get an answer of 11. The iris opening of your lens is now set at f/11. If a subject is 20 feet away, then the iris opening will be f/5.5. If your guide number is 56 and your flashlamp-to-subject distance is 6 inches ($\frac{1}{2}$ foot), then divide the $\frac{1}{2}$ into the 56 and the indicated opening will be f/112. Since your camera iris generally is narrow only to f/22, then you must use a number of layers of handkerchiefs or white linen cloth to reduce the light intensity of your flash so that it will be correct for your minimum lens opening. This is further explained in Chapter 17.

Standardize with one flashlamp so that you know its characteristics well. With standardization will come a uniformity of results so that you will be able to concentrate on your subject. Finally, I should caution you again to hold your camera firmly and learn to push the shutter release lever gently so that you will not jar the camera.

ANALYSIS CHART

1. Camera & Lens	2. Film & #	3. Illumination	4. Angle	5. Gradation	6. Angle	7. Accentuation	8. Angle	9. Separation	10. Angle	11. Filter	12. Exposure	13. Negative Development Time	14. Paper & Grade	15. Paper Developer	16. Remarks
PX	#2F	45°	#1F	camera	spot	one	#2F	45°	K-2	f/8	D-76	VanGam	D-72		
#1	H	45°	1	height	8	hair	2	up	1/25	14	#5				
#2															
#3															
#4															
etc.															

Using the Analysis Chart: List only factors that are important.

- | | | |
|--|---|--|
| 1. List the camera and lens.
2. Name of Film and the number of the exposure.
3. In the Illumination box, top half names the lamp used, the bottom half the ratio of light balance. | 4. Record the angles of your light to the subject.
5. Gradation box: top half for the lamp used, bottom half for the ratio of light balance.
6. Angles of the Gradation light.
7. Accentuation: top half for the lamp, | bottom half for the light ratio.
8. Angles of Accentuation light.
9. Separation light: top half for the lamp, bottom half for the light ratio.
10. Angles of the Separation light.
11. Filter
12. Exposure used, etc. |
|--|---|--|

The analysis chart is a positive record of what you did for your exposure. The final print will show wherein any faults may be. From this information you can improve your pictures. Use it!

CHAPTER 6 / **LOADING AND UNLOADING THE CAMERA**

Loading a camera means preparing it for picture taking with fresh film. This operation is very simple with all Voigtlander 35mm

cameras. Practice loading and unloading your camera a number of times until you can do it perfectly.

The film which is to be loaded in the camera is packaged in standard 35mm cartridges which are made to uniform dimensions and may be purchased anywhere in the world. These cartridges were designed for loading in your camera in full daylight. However, I do recommend that the loading procedure take place in subdued light. If no subdued light is available, turn your body so that when the camera is in front of you it will be away from the light source and then you can finish your loading operation in this position. The illustrations demonstrate methods for loading the different cameras.

1. When you thread the end of the film into the take-up spool be sure that your leader is secure. If it is not, you may find that at some time during the course of winding the film, the insecurity of the leader upon the spindle may cause it to slip.

2. The important point in loading is to be sure that the perforations engage the sprockets. If this is done, the film automatically aligns itself properly on the take-up spool. It is only necessary to see that the perforations engage the sprockets and the film is centered over the back frame.

3. As most negatives or transparencies exposed in miniature cameras are enlarged for viewing, every precaution must be taken to safeguard the negative from the slightest scratch or pin marks. Even the slightest scratch becomes noticeable and distracting in an enlargement. Since your negatives require such careful treatment, you must start at the beginning by loading the camera correctly.

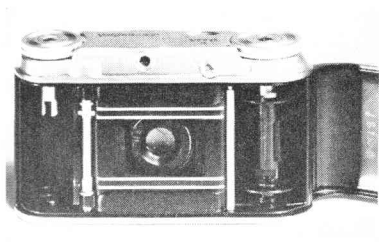
4. To minimize film handling, I recommend that you first place the end of the leader in the take-up spool and then move the magazine back as film is paid out to its place in the take-up chamber. In the Vito II, III and Prominent, the film is wound from left to right; in the Vitessa, from right to left.

5. Be sure that the locking catch of your camera back is fastened securely. If this is not done, your camera back may suddenly fly open at the most inopportune time and spoil all the film which you have exposed with such great pains and considerable expense.

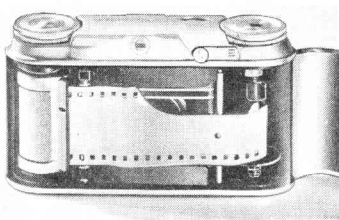
6. After closing the back of your Voigtlander 35mm camera, the equivalent of three frames should be wound off before you start to take pictures. This is done by winding the film until the exposure counter moves to the next number and stops turning. If there is an interlock, an exposure should be made in order to release it. The set and release routine is repeated twice, but instead of releasing the

interlock after the third winding, set your exposure counter at ~~1~~1. The first frame of film is now in picture-taking position.

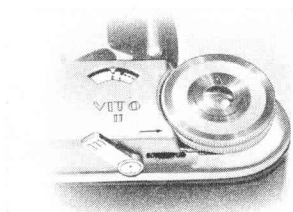
All the Voigtlander 35's feature an automatic double interlock. After the exposure has been made, the shutter release cannot be depressed until the film has been wound to the next exposure. This procedure definitely prevents any unintentional double exposure.



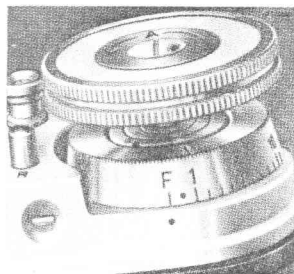
The Vito II open



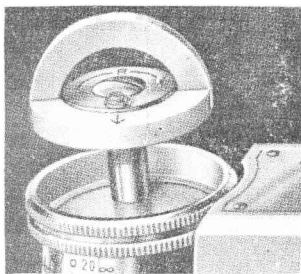
The film inserted



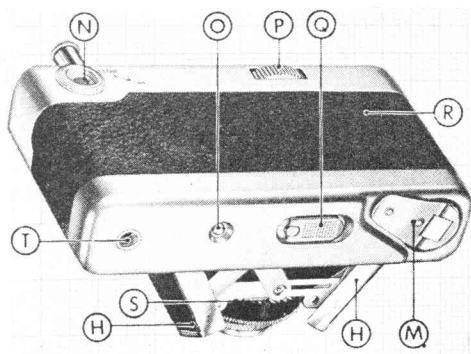
Exposure counter and release lever



Pull up A-knob then set counting drum to "F"



Pull up rewind key to load film



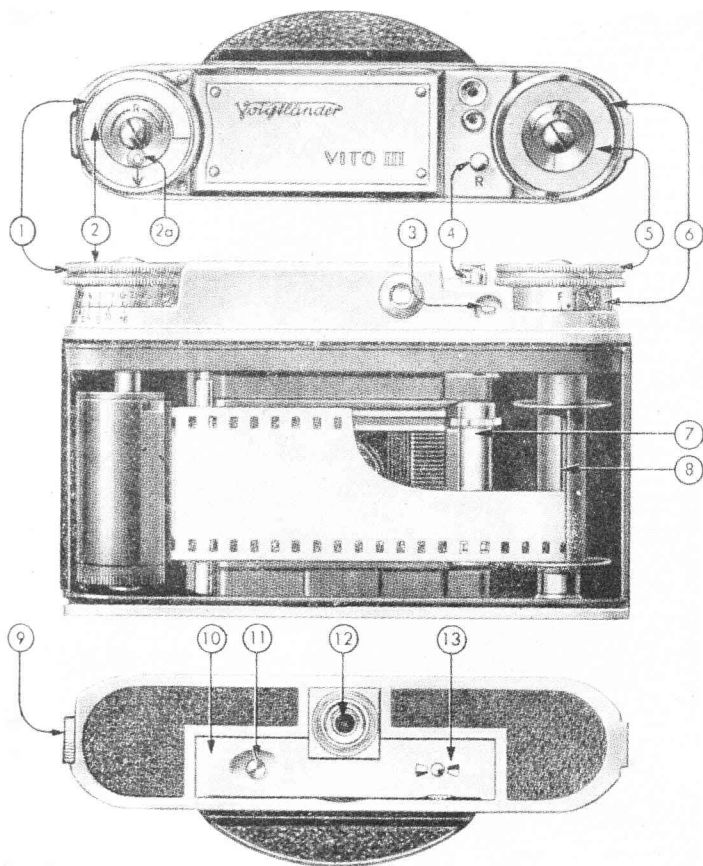
- H Front Doors
- M Rewind Lever
- N Eyepiece of View and Rangefinder with parallax compensation
- O Rewind Button
- P Milled wheel to set distance
- Q Body latch to open camera back
- R Camera back
- S Sprocket Wheel to set "stops"
- T Tripod Bushing

UNLOADING

You will know that you have made all your exposures when your exposure counter indicates that the last film number has been reached. 35mm film is different from the usual paper-backed roll film spool. There is no paper backing because the extra thickness would add a tremendous bulk to the cartridge. Instead, there is a light trapped cartridge which permits the winding of your film back into the original cartridge after all the exposures have been made so that you may safely take your rewound film out of the camera in daylight.

When you have turned the rewind knob in the indicated direction for some time, you will find that there is some loss of tension and you will hear or feel the end of the film leaving the take-up spool and sliding across the film aperture into the magazine. Another simple way to determine when the film is completely rewound is to observe a moving part on the outside of the camera. For example, on most cameras the winding knob will turn backward while the film is being rewound and will stop turning completely when the end of the film comes off the spool. At this point, you may open the camera safely. If you have torn the film from the spool by winding with too great an effort at the end of the roll, then it will be necessary to go into a dark room, open your camera, remove the cartridge and take it apart so that you can re-secure the last portion of your film to the center core with scotch tape. Then, replace the core in the outer shell of the cartridge and finally snap on both sides. (A similar procedure is used in winding bulk film.) You can then rewind your film by hand, or by replacing and winding the cartridge in the camera. Be sure to wind

or re-wind smoothly. A jerky motion will produce friction, scratches, and cinch marks.



- 1 Focusing knob
- 2 Rewind key 2a. Spring release
- 3 Locking lever
- 4 Rewind release button
- 5 Advance knob
- 6 Exposure counter
- 7 Counting shaft

- 8 Take-up spool
- 9 Camera-back lock
- 10 Camera stay
- 11 Press-button to open camera front
- 12 Tripod socket
- 13 Indicator for film material.

LOADING:

VITO II

1. Turn winding key until counter locks.
2. Open camera back.
3. Thread film into the slit of the take-up spool.
4. Pay out film, then drop in cartridge chamber.
5. Push back rewind knob.
6. Close chamber back securely.
7. Lift and hold film counter lock release while
8. Turning film counter index to F; then release film, lock. Turn film until it stops.
9. Lift lock lever up and release.
10. Turn winding knob till it stops. Film counter now shows #1.

VITO III and PROMINENT

1. Turn winding key until counter locks.
2. Open camera back.
3. Move knob (2a) on rewind; key springs up.
4. Pull up R-key.
5. Clip film end into take-up spool.
6. Pay out film and drop into cartridge chamber.
7. Give full turn to film transporter to start and wind film.
Premature locking of the A key is released by a short pressure on the locking lever.
8. Close camera back.
9. Pull A knob up and turn counting drum to F.
10. Push A knob back and turn it as far as it will go.
11. Depress lock lever and turn A knob. If it stops at 1, you are ready.
- 11(a) If a red dot shows, then locking lever has to be pressed and the A knob turned to the next stop.

UNLOADING:

1. Set camera for rewinding
 - (a) Vito II — Lift and maintain pressure on lock lever; turn R key in direction of the arrow.
 - (b) Vito III and Prominent — Press R knob and turn R key.
 - (c) Vitessa — Press R knob, at the same time depressing the transport completely. Fold up rewind lever and turn it in the direction of the arrow.
2. Slowly rewind film back into the cartridge.
3. Open back.
4. Remove cartridge.
5. Replace back or prepare for re-loading by winding until the exposure counter stops.

VITESSA

1. Push winder down so shutter sets counter lock.
2. Hold camera in left hand and open camera back with your right hand by giving body latch (Q) a quarter turn so that it points to "off" and then pull latch. It will pull the back away from the rest of the body.
3. Move take-up spool until slot appears if it is not in place.
4. Push film end into slot.
5. Lift pressure plate, pay out and place film straight and flat across the film mask, then drop cartridge in its chamber. Fold down pressure plate.
6. Hold pressure plate and cartridge in your left hand and then rotate your hand so that the front (lens side) of the camera faces you.
7. Set film counter on the diamond indicator; set film speed selector.
8. Push camera and body together.
9. Adjust latch or, if necessary, the rewind lever for final fitting together of body and back
10. When closed, turn latch and fold it.
11. Press down and release the transport plunger. Press down and keep pressed down the shutter release with your right hand.
12. Press down and release transport.
13. Let go the shutter release.
14. Press down and release the transport.
15. Pointer of counter is at 0.

UNLOADING

1. Set camera for rewinding
 - (a) Vito II — Lift and maintain pressure on lock lever; turn R key in direction of the arrow.
 - (b) Vito III and Prominent — Press R knob and turn R key.
 - (c) Vitessa — Press R knob, at the same time depressing the transport completely. Fold up rewind lever and turn it in the direction of the arrow.
2. Slowly rewind film back into the cartridge
3. Open back.
4. Remove cartridge.
5. Replace back or prepare for re-loading by winding until the exposure counter stops.

Intentional double exposures may be made by pressing the rewind lever while advancing the film transport or winding the R key.

FILM TYPE INDICATOR DIAL

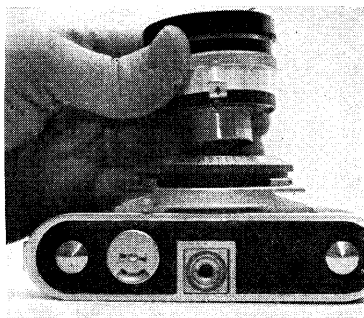
The Vitessa, the Vito III, and the Prominent have a Film Type Indicator Dial. Set this dial for the type of film that is in the camera. It is startling to find out how poor your memory is from week to week and unless you set the indicator, you may be guessing about the film speed or type of film that is currently in your camera. The Vito II does not have a film type indicator, but you can help your memory by tearing the film name from the cartridge carton and placing it inside your carrying case. This will serve as a reminder.

CHAPTER 7 / WIDE-ANGLE AND TELEPHOTO LENSES

Your regular camera lens is known as a prime lens. The lenses of the Vito II, III, and the Vitessa miniature cameras are non-removable and non-interchangeable. A change in focal length is often desirable to produce a change of perspective and a change of pace in your pictures. A wide-angle picture shows a wider area from the same viewpoint than does the prime lens. A telephoto lens on the other hand, while it covers a smaller area, enlarges the size of the subject image. So that while you see less with a telephoto lens, the subject is much larger than usual. The illustrations demonstrate the effects of a wide-angle and a telephoto lens as compared to the area covered by the regular lens.

Although you cannot substitute a different lens for the one that is regularly fixed to these cameras, you may alter its focal length by the use of an auxiliary compound lens. Such a lens is placed over your regular camera lens in order to alter the present focal length for a shorter (wide-angle) or longer (telephoto) effect. These lenses are most effective with any model that has an $f/3.5$ lens or narrower.

Auxiliary Wide-Angle Lenses. When a multi-element auxiliary lens is placed over your regular lens, there is a considerable increase in the angle of view. While this increase is only moderate, it is at the moment the best that is currently available. Since color transparency film requires exact total film area composition because of the difficulty of enlarging or cropping, this small increase may "tighten" your composition for the exact effect that you want. For color the larger area that can be taken with the wide-angle lens will help the over-all compositional effect. A co-ordinated viewfinder is available and must be



Press button, twist carefully, and lift to remove the Prominent's lens.

used with the wide-angle lens because of the change of view. Instructions for focusing the lens should be typed on a slip of paper and cemented directly to the lens barrel for easy reference.

Auxiliary Telephoto Lenses. It is possible to emphasize the subject by the use of a telephoto lens. It enlarges your subject with the Vito II, III, and the Vitessa but only a small area is included in the picture. The enlargement ratio is approximately 30 per cent which is not a very material increase in image size, but it is the only type of telephoto lens available at the moment. Very often, this slight enlargement will mean the difference that can make a picture unusual. A coordinated telephoto viewfinder mask is available and must be used for your telephoto lens because of the change in the subject size. The construction of the auxiliary compound telephoto or wide-angle lenses is such that your exposure remains the same as if no addition had been made to your regular lens. While no exposure increase is necessary with either lens, it is best to stop down to $f/5.6$ or $f/8$ for satisfactory definition and resolution. Within their limitations, these auxiliary compound lenses will definitely alter the focal length of your lens. While these effects are not overpowering, they are helpful because they aid exact composition by efficiently filling the film area with your subject. There remains a definite need for more auxiliary compound lenses which will materially increase the angles over any that are now available.

For the best method of taking a series of pictures with these lenses, observe the technique of the motion picture when you next see a movie or are watching television. You will see how the first scene of a play generally establishes the locale. This is usually done with a wide-angle or long distance shot. Once the setting has been established, the atten-

PHOTOGRAPHIC EFFECTS OF

Wide-angle Lens

1. Increases the angle-of-view from the same camera position.
2. Shows a larger amount of total background; each background subject is much smaller.
3. Increases the apparent size of foreground subjects; increases the apparent depth of the foreground.
4. Shorter focal length increases the depth-of-field at equivalent openings.
5. A large image requires a short camera to subject distance.
6. Increased depth-of-field allows the use of wider openings for poor light color exposures.
7. Necessary for interiors; or where space is cramped.

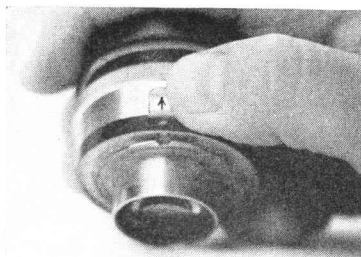
Telephoto Lens

1. Decreases the angle-of-view from the same camera position.
2. Decreases the total background area but increases the size of each individual subject.
3. Increases the subject size in relationship to the proportions of the background.
4. Increases the working distance separating the subject from the camera.
5. Longer focal length decreases the depth-of-field.
6. Narrow lens openings necessary for increased depth-of-field.
7. Needed to bridge space where a camera cannot be set up, e.g. sports, rivers, mountains, etc.

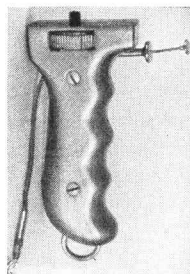
tion is drawn to an area or a group of individuals. For most middle distances, your regular lens may be used. Finally, the center of interest in the scene is established with the use of a close-up or with a telephoto lens. This intermixing of wide-angle, normal and telephoto shots provides the variety and change of pace which make for a story of continuing interest. If you wish to do a story on your town, your industry, or your family, write a short scenario of the important points to be photographed. Then to guide yourself when on location, break down each scene into long distance, medium and close-up shots so that your story will have both direction and pace.

PRIME INTERCHANGEABLE LENS

The Prominent differs from the other Voigtlander 35's in that the lenses are interchangeable. An interchangeable lens is always desirable because a prime lens can generally be better corrected than an auxiliary lens. Two lenses are available, at the moment, with a whole group undergoing design and testing. The two immediately available are the 24mm wide-angle with a phenomenal angle of 87° and the 100mm telephoto with an angle of acceptance of approximately 24° .



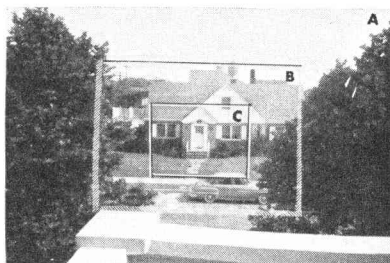
The Prominent's lens removed.



Pistol Grip Release
for extension flash.



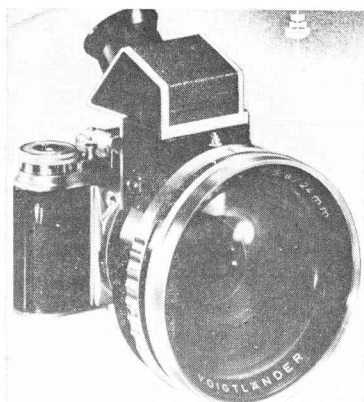
An auxiliary telephoto lens.



Field of view of the 24, 50, and 100 mm
lenses.



The Telemar with the convertible
ground-glass focusing eye-piece and
Kontur e-type Sportsfinder



The Ultragon with the ortho prism that
permits correct vertical and lateral
image viewing

CHAPTER 8 / **FLASH WITH YOUR VOIGTLANDER 35mm CAMERA**

Ours is an age of bottled, packaged and portable sunshine (flash-lamps and flashtubes). It is indeed fortunate that this type of light is available. Otherwise, most of our indoor action pictures, whether in black and white or in color, could not have been taken. Color especially requires tremendous amounts of light and the only dependable and readily available source is the flashlamp or the flashtube.

A flashlamp consists of magnesium or magnesium aluminum alloy in a very fine wire form (Class M) or in pill paste form (Class F), and may have the conventional house lamp shape or, as recently modified, be condensed to the size of a walnut. When approximately a $4\frac{1}{2}$ -volt electrical current as supplied by small batteries courses through the flashlamp the aluminum compound in the bulb flares up for a tiny fraction of a second. Although this flash seems instantaneous to the eye, there is a short time required for the flash compound to heat up to the flashing point. There are two classes of lamps available with different flare-up time delays: Class F and Class M. The Class F lamps are fast acting, the delay being only five milliseconds ($1/200$ second) and the complete flash peak duration is also $1/200$ second. The Class M lamps are medium acting with an ignition delay of 20 milliseconds ($1/50$ second) and here the flash peak duration is only $1/50$ second.

Since the flashlamp can be used just once, inventors have tried to produce a source of flash light that will yield a large number of flashes without burning up. The result of their experiments is the electronic flashtube. This type of flash consists of a rare gas (bottled under pressure in a glass tube) which glows brightly only when a high voltage current courses through the tube. The duration of the glow is much shorter than in the flashlamp, usually $1/5000$ second, and the guide numbers are in the low 30's. For these reasons, while most flashtubes produce at least 10,000 flashes without burning out, they are still not too practical.

When any dimly lighted activity is being photographed, flash is a must to stop the action. Assuming that color film is being used, you must realize that at this point of our technical development, color film emulsions are relatively slow and each exposure requires huge amounts of light to secure any fairly rapid exposure such as $1/50$

second. Flash is the only source of light that can supply the quantity and swift "wallop" of light necessary to produce such short exposures.

Taking flash pictures with any Voigtlander camera is a simple matter. All the newer cameras have flash contacts built in with the shutter mechanism. Older models may be synchronized with auxiliary units that are specifically designed for each camera. Caution is required in the selection and fitting of an auxiliary synchronizing unit in order to be sure that the synchronizer selected is correctly designed for either the Prontor or Compur shutters. A synchronizing unit which is improperly fitted for plunger length may cause the shutter housing to be pierced and ruin the delicate inner mechanism.

There are three different shutter synchronizing methods:

1. *Prontor-S.* Synchronizes with Class F lamps up to 1/25 second with the Class M lamps above 1/50 second. Flashtubes should not be used with the Prontor SV shutter only.

2. *X-Shutter.* Consult the chart for using this shutter with Class F and Class M flashlamps as well as with O-delay flashtubes.

3. *M-X Shutter.* Synchronizes with all flashlamps and flashtubes.

Choose the information for your particular shutter, then type it and tape it onto your reflector. Standardize with one lamp so that there will be just one table to give you the correct information rather than a vast number of charts which may cause confusion.

A note of caution with flashtubes: Do not use flashtube units that are flashed by means of heavy duty relays or solenoids through contacts which use your shutter as the switch. The surge of current from such heavy units may completely destroy the delicate shutter.

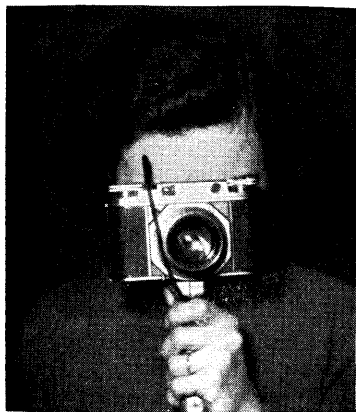
In reading a table of flash guide numbers, you may note that the guide number given for Class M lamps, as an example, up to the speed of 1/50 second is always the same. It changes only at faster speeds. The choice of correct synchronizing speed may do much to help the balancing of the light in your picture. The I-G-A-S formula (see following chapters) demonstrates the need for balancing your light in order to meet the relative contrast in sensitivity of your film emulsion. If the amount of light, then, provided by your flashlamp is one unit, then your background light must also provide one unit to have a 1:1 ratio. However, your background light of one unit does not necessarily have to be flash; it may be a floodlight for reasons of economy. Assuming that it is a floodlight, then the distance location of your floodlight is directly related to the shutter speed. At 1/25 second, the floodlight may be placed further away from the background than at 1/100 second. The further back your light is placed, the more even the illumi-

nation will be and the heat problem from the glowing flood lamp is not so great. In a similar manner, if you are using your flashlamp on the camera as a fill-in for an outdoor picture, the outdoor scene may be perfectly exposed at 1/25 second while at 1/100 second, even though the flash intensity remains the same, the general scene will be underexposed. Therefore, even if you are given a choice of speeds for a single guide number, the selection of the speed to be used should be made and co-ordinated on the basis of understanding the complete lighting problem for the scene, rather than for just the one flash factor. The problem of balancing all your lights will be discussed at greater length in following chapters.

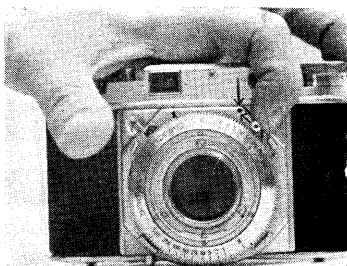
Note that Class F means fast action and that Class M signifies medium action. The names SM and SF have confused the public because both are Class F lamps. In speaking of Class F lamps note that the duration of its flash is 1/200 second. This means that even if a 1/25 shutter speed is used, the 1/200 action of the Class F lamp will still stop most actions.

CALCULATING SINGLE FLASH EXPOSURE FOR DEPTII

With a properly synchronized flash unit, the Voigtlander 35mm camera is totally independent of any existing light conditions and photography becomes even simpler than with the old-fashioned box camera. With flash it is no longer necessary to wait for adequate light.



One hand release suggested for flash



Cocking the self-timer. Ideal for self-time flash.

You simply carry your own light with you, always ready for instant use.

SINGLE LAMP FLASH FOR DISTANCES IN DEPTH

When only one lamp is available to cover a great depth, this method is used to compute your exposure:

1. Determine the depth of your subject, e.g., if your subject depth is from 8 to 24 feet, the total subject depth is 16 feet.

2. Estimate your flash exposure for $\frac{3}{4}$ this distance; $\frac{3}{4}$ of the 16-foot depth equals 12 feet.

3. Add this $\frac{3}{4}$ distance to your nearest subject point. 12 plus 8 equals 20 feet. Calculate your guide number for 20 feet. Aim your flash at the 20-foot distance.

4. Focus for $\frac{1}{3}$ the subject depth. $\frac{1}{3}$ of 16 is approximately five feet. Add this figure once again to your near subject point. 5 plus 8 equals 13 feet.

5. With your factors Safe-Set, approach your subject until a sharp image is seen (this will be your 13-foot subject) and release your shutter at the peak of action. The single flash will cover the subject depth with as evenly exposed lighting as is ever possible with only one lamp.

The beginner and professional must make every picture count. As a definite help for a sure-fire, push-button type of photography, I recommend the Safe-Set method with the flash unit right on the camera. With this method, there are no variables. You pre-set your distance, pre-set your iris, and pre-set your shutter speed. All you need to do then is to approach your subject, set the focus, compose your subject in the ground glass, and as soon as the peak of expression is anticipated or seen, release the exposure lever. You will get a perfect picture.

FLASHLAMP AND FLASHTUBE CHARACTERISTICS

Flashtube Adjustments:

X-Shutter

Class X or O-Delay (Bleed type). As electronic tubes have no ignition delay between the flare-up and the light, they flash instantly when a contact is made. Any X-shutter setting can be used. With the X-type shutter, a contact is closed when the shutter is wide open. At contact, the Strobe discharges completely because the closed circuit causes the condenser charge to bleed through the flash tube.

Non-X-Shutter Settings

Five millisecond delay.

Caution: This type of flashtube adjustment should not be used with an X-setting.

Certain relay operated electronic flash units may be used with shutters which have *F* or *M* settings. The relay is adjusted to fire the flashtube five milliseconds (1/200 second) after the relay is closed.

Twenty millisecond delay.

Caution: This type of flashtube adjustment should not be used with an X-setting.

This 20ms. relay-operated unit is generally used in conjunction with a solenoid. This 1/50 second delay type simultaneously starts the solenoid operating while the flashtube is timed to delay ignition until the shutter blades are open widest. A flashtube twenty millisecond delay gun may be used with any solenoid that is already adjusted for

M-X SHUTTER SYNCHRONIZATION

FLASHLAMPS:			Lever at:	Lever at:
M Class	Name	Type	X-Setting	M-Setting
F Fast Acting	G.E.	SM	1 second to 1/100	Not recommended
	Sylvania	SF		
M Medium Acting	G.E.	#5, #11, #22	1 second to 1/25	1/50 to 1/500
	Sylvania	#25, Press 40, Press 50		
	Sylvania	#2	1 second to 1/25	1/50 to 1/100
S Slow Acting	G.E.	#50	1 second to 1/10	1/25 to 1/50
	Sylvania	#3		

FLASHTUBE (Electronic Flash): M-X Synchronization

Lever at: X only Bleed or 0 delay	Zero Delay	1 second to 1/500	Not recommended
5 ms delay for shutter	Use relay for 5 ms delay	1 second to 1/100	Not recommended
20 ms delay for shutter	Use relay for 20 ms delay	1 second to 1/50	Not recommended

X-SHUTTERS ONLY

1/500 sec. - Bleed or Zero delay flashtubes without relays
 1/100 sec. - SM or SF (Class F)
 1/25 sec. - Class M. (#5, #25, #0, Press 40) 20 ms delay

a Class M flashlamp, without any additional changes of either the solenoid or the twenty millisecond flashtube gun.

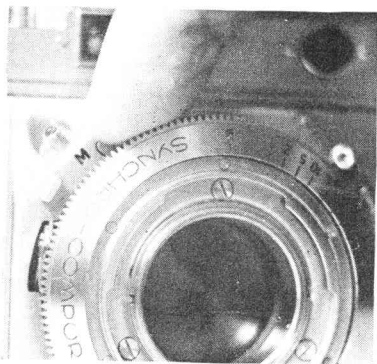
Flash Lamps

F—Class F (Fast Acting).

There is a five millisecond ($1/200$) heat-up delay before this lamp flashes. The G-E SM and the Sylvania SF are typical of this class. The flash itself lasts for $1/200$ second and is often used at a slow shutter speed to stop the motion of a subject while permitting background lights to register more fully.

M—Class M (Medium Acting)

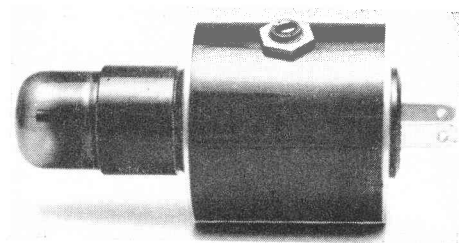
Twenty milliseconds ($1/50$ second) delay. G-E №5, №11 and №2 and the Sylvania №0, №25, Press 40 and Press 50 as well as the



Setting the Flash lever at M



The Flash lever at the X-setting



Slave unit for wireless flashtube ignition (Speed-light Center, NY)

number 2 are typical examples of this type. The peak of the flash lasts for approximately 1/50 second.

NEW GUIDE NUMBER CALCULATIONS FOR MULTIPLE FLASH WITH BLACK & WHITE OR COLOR FILM

If two lights are used multiply Guide Number for 1 lamp by 1.4 e.f., #45 now becomes 63
 If three lights are used the Guide Number for one lamp is multiplied by 1.6 so that #45 becomes 72
 If four lights are used the multiplying factor is 2 and number 45 becomes 90

Sun as the Main Light:
 Color settings with Ideal conditions

1/500 - f/2
 1/400 - f/2.2
 1/300 - f/2.5
 1/200 - f/3.5
 1/100 - f/4.5
 1/50 - f/6.3*
 1/25 - f/9

*Recommended basic setting

Color Sun-Flash Balancing - Sun as Mainlight

If flash is removeable:
 Ratio Color Fill-in with #5B, 25B at 1/50 sec.

Set flash lamp from subject at

1:1	1:2	1:3	1:4
7	10	12	14

If flash is fixed to the camera; intensity is cut:

1/2 (2x) by 1 thin, clean white handkerchief

1/4 (4x) by 2 thin, clean white handkerchiefs

1/8 (8x) by 3 thin, clean white handkerchiefs

Sun as the Color Fill-in

#5B, 25B at 1/50 as mainlight

Sun fills-in

Flash to subject-distance

7	5	3 3/4	2 1/2
1:1	1:2	1:3	1:4

Balance fill-in lights by

- 1-Change lamp distance with extension outlets.
- 2-Change reflector surface.
- 3-Change reflector size.
- 4-Change reflector focusing position if available.
- 5-Remove reflector (around 2 stop difference) for raw light effect.
- 6-Change lamp size.
- 7-Change shutter speeds to alter Effective Guide Number.
- 8-Change reflector position (feathering the light).
- 9-Use thin white handkerchief or spun glass diffusers, etc.
- 10-Alter shutter speeds with electronic flash because its Guide Number remains the same.
- 11-Bounce light from ceiling indoors, or from a cardboard reflector or wall outdoors.

N.B. Black & White Charts should be prepared separately based on the same rules.

THE RAPID f/ METHOD FOR FILL-IN COMPUTATION WITH ANY FILM

1. Determine your main light or sun light setting, e.g., f/4.5 at 1/50.
2. Your light balancing is now based on the f/4.5 setting:
 - a. 1:1 ratio - The fill-in's light intensity must equal 4.5, therefore divide your f/opening into #45 if #5B, or 25B lamps are used, the result is the distance for placing the fill-in lamp, 10 feet.
 - b. 1:2-1 stop less fill-in light is needed. One stop less than 4.5 is 3.5. So divide 3.5 into 45 for a 13 foot distance.
 - c. 1:3-1 1/2 stops less light compared to the f/4.5 main light is needed. f/2.8 is required so when 2.8 is divided into 45, the light, this time, is placed at 16 feet.
 - d. 1:4-2 stops less fill-in or an f/2.5 equivalent. Dividing 2.5 into 45 results in an 18 foot lamp placement distance.

S—Class S (Slow Acting)

There is a 30 millisecond (1/30 second) delay in flashing. The G.E. №50 and the Sylvania №3 represent this most powerful class of flashlamps. The flash lasts for approximately twenty milliseconds.

CHAPTER 9 / USEFUL ACCESSORIES

Your basic miniature camera provides at least 90 percent of the requirements for most picture taking. However, there are times when a Voigtlander miniature camera may be adapted, by the addition of accessories, to meet specific conditions. As an example, the taking of extreme close-ups necessitates a supplementary lens accessory because the camera generally focuses to 3½ feet only.

Accessories are many in number and, no matter how important they may seem at the moment, many are used only once or twice a year. If you think you must purchase an accessory, be sure that you will need it often and use it frequently throughout the year. In the course of the years, certain stock accessories have become accepted as useful devices for either protection or operational helps. These include a light shade, cable release, carrying case, tripod, etc., all of which will be later explained. When optical accessories to be used at one time are numerous, the proper attachment of each is important.

There may be as many as nine attachments, and the correct order is as follows:

1. A filter holder. This is the basic unit which will hold all the other lens accessories. Therefore, it is important that it be secure. If there is any bit of wobble or play, your filters, close-up lenses, etc., will not be mounted flat (parallel) in relationship to the film, but will be set at a distorting angle. The prism effect produced by the distortion will invariably produce a poorer picture. So be certain that the filter holder that you use is rigid, and film and lens parallel.

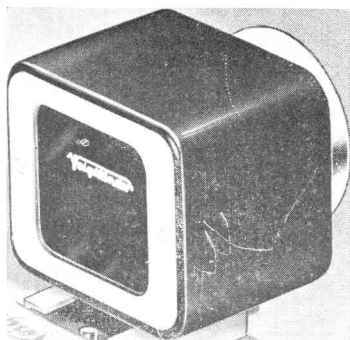
2. Portrait or other positive lens. These should be first quality, perfectly centered ground and polished lenses.

3. Retaining ring.

4. Diffusion disc.

5. Retaining ring.

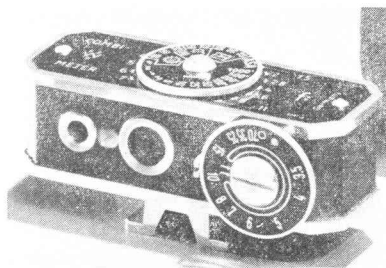
6. Filters. The Voigtlander filters are ground and polished to



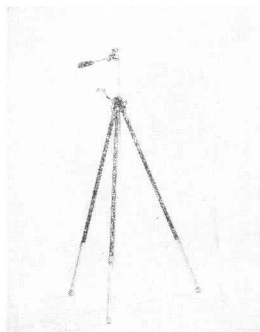
Kontur finder outlines the field of view full size



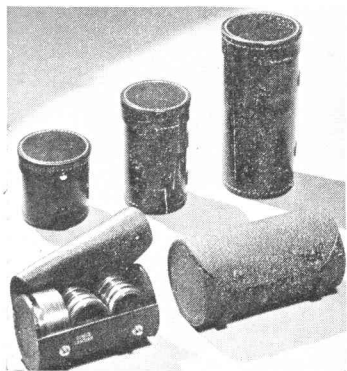
Convenient, accurate exposure meter



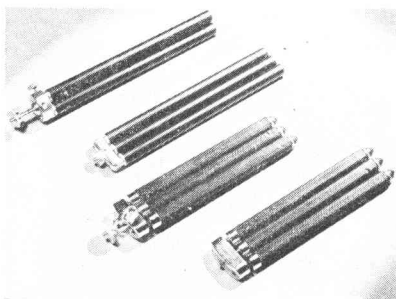
Auxilliary rangefinder



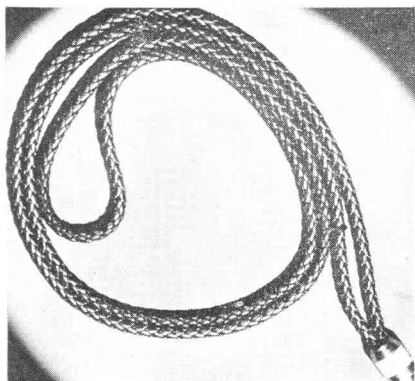
Elevating tripod



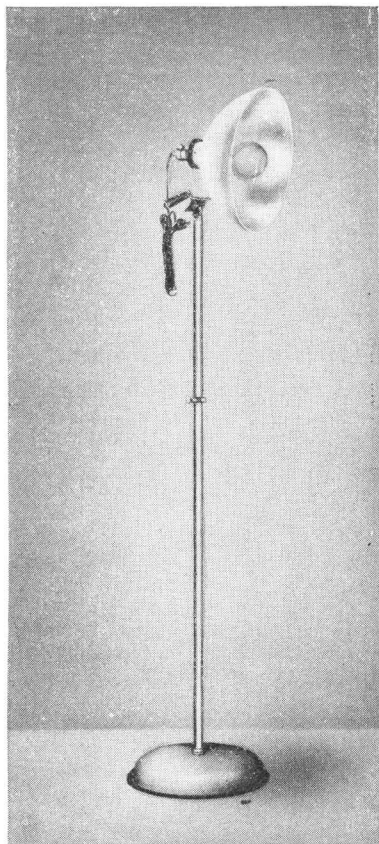
Filter carrying kits



Handy travelling tripods



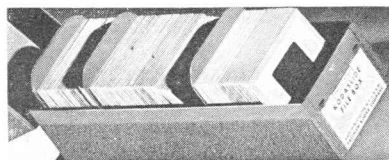
Camera carrying wrist strap



Varibeam Floodlight, floor model



Photographic album



Slide file

high standards. They are flat and parallel and will not produce image distortion.

7. Retaining ring.
8. Polarizing filter (Pola screen).
9. Lens hood (also acts here as a retaining ring).

When all items are used, this is the order of sequence. But, you may use only 1, 2, 3, 8 and 9, or 1 and 9. With this sequence, loss of light is minor and distortion is reduced to a minimum. However, more than two optical lenses are not recommended, because the increased length of your accessories may act as a shielding tube and cut off the corners of the negative. Each retaining ring must be correctly sized to hold each portrait, filter, polarizing, etc., disc in proper parallel alignment. Finally, check each filter and disc for proper thickness. If they are too thin, the loose fit in the filter holder or retaining ring will cause them to lean sideways when the accessories are placed upon the camera lens and the camera is tilted slightly. The leaning will cause prism distortion and must be avoided.

ATTACHING ACCESSORIES

Accessories are fitted to the camera lens barrel by either of two methods:

Non-interchangeable (push-on nesting; combinable)

1. Fits only one specific lens diameter.
2. Compact; one attachment nests into another.
3. Easily slips on and off.

Interchangeable (Series V, VI, etc.)

1. One series set will fit any specifically fitted rear filter holder of a similar series.

2. Discs, retaining rings, etc., are interchangeable (illustrations).

3. Series sizes are determined by lens diameters, e.g., $\frac{3}{4}$ " to $1\frac{3}{16}$ ", Series V; $1\frac{1}{4}$ " to $1\frac{21}{32}$ ", Series VI, etc.

Photographic Dictionary

This brief dictionary has been prepared to serve as a convenient source of reference for the new camera owner.

ABERRATION—Distortion in the lens.

ACID—Chemical used to stop development.

ADAPTER—Converting unit attached to the lens.

ALKALI—Chemical used to accelerate development.

ALUM—Chemical film hardener which prevents softening, reticulation, and scratching.

ANASTIGMAT—Flat, distortionless, straight-line image.

ANGLE OF VIEW—Subject area seen by a lens in all directions.

ANGLE SHOT—Picture from an unusual angle.

ANHYDROUS—Without water.

APERTURE—Lens opening allowing image-forming rays to enter camera.

ARTIFICIAL LIGHT—Light other than sunlight.

A.S.A.—American Standards Association. Systematizes materials, procedures, techniques, etc.

AUXILIARY LENS—Extra lens attachment to change the function of the regular camera lens.

B (BULB)—At this setting, the shutter will remain open as long as pressure is maintained on the shutter release. Shutter closes when pressure is removed.

BETWEEN-THE-LENS SHUTTER—Blades or leaves of the shutter widen to open, then completely close to make an exposure. Located between the lens elements.

BLOWUP—An enlargement.

BOUNCE LIGHT—Light method using walls and ceilings to reflect light.

BRIGHTNESS RANGE—Permissible light-to-dark difference possible for subject, negative, or positive.

BULB EJECTOR—Device for removing hot flashlamps.

BULB EXPOSURE—Picture taken with the shutter set at *B*.

BULK FILM WINDER—Economical device for winding your own individual cartridges from larger rolls.

- CABLE RELEASE**—Wire, shutter-releasing device which enables you to take pictures without touching the camera. Cable releases may be used five or more feet from the camera.
- CAMERA**—Light-tight box, having sensitive film on the inside and a light-admitting device (lens) at the other end.
- CAMERA, PLANAR**—Single-lens camera.
- CAMERA, STEREOSCOPIC**—Double camera, lenses set side by side with a separation of 65 or 70mm. Made so that the apertures and shutters operate simultaneously.
- CARTRIDGE, STANDARD**—Regular 35mm daylight-loading film-holder which may be purchased anywhere.
- CHROMA**—Purity of a color mixed with gray.
- CIRCLE OF CONFUSION**—Area in which two dots appear as one. Two separated dots will appear as one when separated by 1/100 inch at a 10" reading distance.
- CLOSE-UP**—Picture taken closer than eight (8) feet from subject.
- COATED LENS**—Anti-reflection deposit on lens surface to permit more light to pass.
- COLOR BLIND**—Film sensitive only to blue or violet light.
- COLOR CONTRAST**—Distinct separation of different colors.
- COLOR CORRECTED**—Optically balanced to assure similar sharpness of all colors.
- COLOR HARMONY**—Combination of colors producing a pleasing effect.
- COLOR SENSITIVITY**—Varying color response of different films.
- COLOR TEMPERATURE**—The degrees K° refer to the comparative color changes that occur when a black body (iron) is heated. A low number indicates a more reddish color; a higher number, a bluer shade. Most important for natural color film.
- COLOR TEMPERATURE METER**—Device which measures color temperature, establishes color balance.
- COMPLEMENTARY COLORS**—Any two combined colors other than the primary.
- COMPOSITION**—Orderly arrangement of a picture to produce the most pleasing effect.
- CONDENSER**—Light-concentrating lens.
- CONTRAST**—Comparison of light to dark.
- CONTRASTY**—Abrupt difference of light-to-dark tones.
- CROPPING**—Trimming a picture for the most effective composition.

- CUTTER**—Special slicer for cutting film or print with clean or deckled (wavy) edges.
- DAYLIGHT TANK**—Special developing tank which permits negative processing in full light.
- DEFINITION**—Sharpness.
- DELAYED ACTION**—Automatic shutter release mechanism operating after a predetermined interval without human effort. Permits you to photograph yourself.
- DENSITOMETER**—Measures thickness of exposed and developed film silver deposit.
- DEPTH OF FIELD**—Area of satisfactory image sharpness. Distances at different apertures are usually supplied in table form.
- DEVELOPER**—Chemical which blackens only exposed portions of film.
- DEVELOPMENT**—Complete process of developing, shortstopping, and fixing exposed film.
- DIFFUSION**—Light which is scattered. Reduces sharpness of image.
- DOUBLE EXPOSURE**—Taking two pictures on one negative. May be accidental, or intentional for special effects.
- EASEL**—Paper-holding device for enlarging.
- ELEVATOR TRIPOD**—Convenient device for lowering or raising a tripod head without changing the length of the tripod legs.
- EMULSION**—Gelatin or resin carrier of sensitized silver particles.
- EMULSION SPEED**—Reaction rate of different films to light.
- ENLARGER**—Photo-optical device to produce large pictures from small negatives.
- ENLARGEMENT**—Large print made from a smaller negative.
- EXPOSURE**—Activation of sensitive silver in the film by light. Admission of light into the camera through the lens.
- EXPOSURE COUNTER**—Numbering device for counting the exposures in the order that they are made.
- EXPOSURE GUIDE**—Chart suggesting aperture and shutter settings for differing conditions of light and subject.
- EXPOSURE LATITUDE**—Film ability to be over- or under-exposed and still yield an excellent picture.
- EXPOSURE METER**—Light intensity measuring device to indicate correct aperture and shutter settings.
- EXTENSION FLASH**—Coordinated multiple flash from different locations used to light a picture with greater balance.

- FEATHERING**—Using only the edge portions of a light in order to avoid a hot spot.
- FILL-IN LIGHT**—Diffused weak light usually used at the camera position to prevent too dark shadows.
- FILTER**—A colored glass that fits over lens and separates white light. May admit certain colors (transmission) while preventing other colors from coming through (absorption).
- FILTER, GELATIN**—Non-permanent filter usually used for experimental purposes.
- FILTER, LAMINATED**—Gelatin filter cemented between two pieces of glass.
- FILTER, NEUTRAL DENSITY**—Increases exposure without altering color values.
- FILTER, POLARIZING**—Transmits light rays of only certain angles. Minimizes glare.
- FILTER, FACTOR**—Additional exposure necessary because all filters retard some light.
- FINE-GRAIN**—Controlled small grain needed to produce negatives suitable for huge enlargements.
- FIXING**—Removing unexposed and undeveloped silver salts from an emulsion.
- FIXED FOCUS**—Standard camera distance scale setting with a narrow aperture which produces great depth of field and lessens the need for accurate focus. Box cameras are fixed focus.
- FLASHGUN**—Combined battery and flashlamp holder.
- FLASHLAMP**—Powerful single-use light source. Flash duration generally 1/50 second.
- FLASHTUBE**—Powerful multiple-use light source. Flash duration 1/5000 second.
- FLAT**—Opposite of contrasty; showing little gradation of tone.
- FOCAL LENGTH**—The infinity (far distance) lens distance position from film.
- FOCAL PLANE SHUTTER**—Light admitting curtain similar to a window shade with a slit of varying size for different time intervals of exposure.
- FOCUSING**—Securing camera image sharpness for the lens at different subject distances by moving the lens forward or backward.
- FOCUSING SCALE**—Measurement chart which shows the required lens from film distance for different subject distances.

- FOCAL FRAME**—Convenient close-up camera device which eliminates the need for focusing or framing the subject.
- GRAIN**—Granular image breakdown due to optical or silver clumps formed by improper development.
- GRADATION**—Tone separation.
- GLARE**—Unwanted concentrations of light; hot spots.
- GUIDE NUMBER**—Flashlamp or flashtube reference number used to simplify the calculation of the proper aperture for different subject distances.
- HI-LO SWITCH**—Electrical device which permits focusing with dim lights and picture taking with brightened lights.
- HARDENER**—Toughens film or paper.
- HOT SPOT**—Undesirable concentration of light which over-exposes subject at the point of reflection.
- HYPERFOCAL DISTANCE**—Related focusing scale and aperture setting at which everything is in focus from half the set distance to infinity.
- HYPO**—Sodium thiosulfate, used to dissolve undeveloped emulsion on the film.
- ILLUMINATION**—Light necessary for photography. No illumination, no picture.
- IRIS**—Variable lens opening which may be adjusted to different sizes.
- JIG**—Holding device.
- KELVIN (K°)**—Visual comparison temperature number of a heated body.
- LATITUDE**—Permissible variation in exposure.
- LEAF**—One blade of a between-the-lens shutter.
- LENS**—Light-gathering system, usually of glass.
- LENS CAP**—Lens protective covering.
- LENS HOOD, LENS SHADE**—A light shield which prevents stray reflected light from entering the lens.
- LENS SPEED, f/ NUMBER**—Relationship of lens opening to film distance.
- MASK**—Shield; outline; cover.
- MASK, BORDER**—Uniform artistic outline around film or print.
- MAIN LIGHT**—Predominating light.
- MERGER**—Indistinct separation of subject or shades.
- MICROFILMER**—Convenient space-saving device for reproducing documents on 35mm film strips.

- MIDGET LAMP ADAPTER**—Device permitting the use of a small bayonet flashlamp in a standard size socket.
- NEWTON RINGS**—Irregular target-type spots resulting from imperfect mounting.
- OVER-EXPOSURE**—Too much light admitted for an exposure. Distorts tone values.
- PANCHROMATIC**—Black and white film sensitive to all colors.
- PARALLAX**—Viewpoint difference of camera lens and viewfinder.
- PEAK-OF-ACTION**—Apex, height of action.
- PEAK-OF-FLASH**—Broad plateau portion of the flashglow which makes flash synchronization possible.
- PHOTO-ELECTRICITY**—Electrical current generated when light strikes certain metals (selenium).
- PHOTO-FLOODS**—Incandescent lamps which burn brighter than normal because of over-voltage.
- PHOTOMICROGRAPH**—Picture taken by a camera through a microscope.
- PLANAR**—Single lens.
- RANGEFINDER**—Distance-measuring device, split-image or superimposed.
- RANGEFINDER, COUPLED**—Simultaneously measures the distance and correctly moves the lens focus into position.
- READING**—Estimate of an exposure by means of a photo-electric meter.
- REFLECTOR**—Device for directing light rays back to an area. Increases lamp efficiency.
- REFLEX**—Camera with image focused through a lens and reflected by a mirror onto a ground-glass.
- RETAINING RING**—Holding ring which keeps filter in filter adapter.
- RETICULATION**—Uneven wrinkling of the emulsion due to uneven temperature in development.
- RETOUCHING**—Pencil or brushwork on a negative or positive to improve the picture.
- REVERSAL**—Process which produces direct positives without a negative.
- REWIND KNOB**—Key or lever to wind film back into a cartridge.
- SAFETY-ZONE FOCUSING**—Setting the distance scale at 18' and aperture at f/8. Large subject areas are in focus at this setting.
- SET-SCREW**—Screw friction or mechanical device to limit the movement of mechanical parts.

- SHORTSTOP**—Solution which halts development.
- SHUTTER**—Device for governing the time interval that a lens remains open, like a water faucet that opens and closes.
- SHUTTER RELEASE**—Device for opening and closing a shutter.
- SILHOUETTE**—Subject is dark and outlined against the light background. Made by over-exposing the background while under-exposing the foreground.
- SINGLE-LENS REFLEX**—Reflex which focuses by the same lens that takes the picture.
- SLIDES**—Mounted transparencies.
- SOLENOID**—Electro-magnetic shutter-tripping device used to synchronize flashlamps and flashtubes.
- SPEEDLIGHT**—An intense flash from a radio-type tube, 1/5000 second duration. Also called electronic or speed flash.
- SPOTTING**—Minimizing or obliterating scratches, spots, emulsion imperfections on the negative or positive.
- SPOTLIGHT**—Special type of point-source light which produces straight-line rays. Used for crispness, contrast, and sharp outline.
- STOP**—Opening; full 100% difference in light aperture; full opening of the iris number; from $f/4$ to $f/5.6$ is one stop.
- STROBE**—Speedlight.
- SUPPLEMENTARY LENS**—An additional lens placed over the regular camera lens used to alter focal length. Rigid cameras (non-bellows) usually use the positive type for close-ups.
- SYNCHRONIZER**—Mechanical or electrical device used to coordinate the opening of the shutter with the peak-of-flash.
- TELEPHOTO LENS**—Lens which produces an enlarged image as compared to the size produced with the regular lens, both pictures from the same camera position.
- TEXTURE**—Detail revealing; 90° angle of light for maximum effect.
- TIMER**—Measures hours, minutes, or seconds at regular intervals; may be audible when used for enlarging.
- TIME EXPOSURE, T** —Long exposure, requiring set-screw cable release or T setting on shutter.
- TRIANGULATION**—Subject distance measurement by observation from two points of view. Principle of rangefinder operation.
- TRIPPING**—Releasing the shutter.
- TRIPOD**—Sturdy, vibrationless camera support.
- TRANSPARENCY**—Film intended to be viewed by transmitted light.

TWIN-LENS REFLEX—Double camera type, with the top dummy camera used only for focusing.

UNDER-EXPOSURE—Insufficient light admitted for a good picture.

VALUE, COLOR—Relative brilliance (lighter or darker).

VIEWFINDER—Optical device to outline the subject area as seen by the lens.

VIGNETTE—Picture with a different border. Only the desired area is sharp.

WIDE-ANGLE LENS—Has a greater angle-of-view than the normal prime lens.

WINDING KNOB—Handle, lever, or key to move film forward to the next exposure.

Stereo Terms

ACCOMMODATION—Ability of the eye to focus at different subject distances.

ALUMINUM SCREEN—Screen painted with aluminum paint. Maintains polarization and makes large-scale stereo projection possible.

ANAGLYPH—Red and green combined single stereogram. When separate red and green colored gelatin lenses are worn over the eyes, depth perception is possible.

BINOCULAR VISION—Vision involving coordinated view of two slightly different scenes seen by each eye.

BREWSTER—The lenticular stereoscope as contrasted with the Wheatstone mirror type used for large X-rays.

CONVERGENCE—Turning inward of the eyes as one approaches a subject.

CYCLOPS—Single, centrally located stereo viewfinder.

DEPTH PERCEPTION—Ability to see three dimensions. Some people may have binocular vision but are unable to see depth.

EXTENDED BASE—Pictures taken with more than the normal 65mm interocular separation. An extended base is used for long-distance stereo (hyper).

FREE-VISION STEREO—Artificial three-dimensional device to produce stereo without the use of a stereoscope.

FUSING—Combining and blending two stereo images so that they appear as one and have depth.

HOMOLOGOUS POINTS—Similar subject points on each film of a stereo pair.

HYPER-STEREO—Long-distance stereo photography.

- INTEROCULAR**—Separation distance between two lenses of a stereo camera when taking a stereo pair. Also eye lens separation of the stereoscope (viewer).
- INVERSION**—Image reversal so that the right side of the body faces left. Not the same as pseudoscopic stereo.
- LENTICULAR VIEWER**—Stereo-viewer with positive convex lenses (Realist viewer), as differentiated from a prismatic or mirror type.
- MASK, STEREO**—Holding and framing device for stereo positives. Position of the mask determines the distance setting in space of the “window” effect.
- MERGER, STEREO**—Regular planar merger (indistinct image separation) is, generally, not possible with stereo. Mergers may take place at infinity distances where triangulation ends and there is no depth perception.
- MOUNTING JIG**—Device for properly holding the film and mask for precise mounting.
- ONE-FIFTIETH RULE**—Calculation of the interocular separation by dividing lens-to-subject distance by fifty. The resulting number is the separation spacing of the two lenses.
- OPTICAL TRANSPOSITION**—Correction of the right and left view by optical means without cutting the roll of film.
- OUT-OF-HORIZONTAL**—Greater than normal spread of two homologous (similar) points of an image of a stereo pair. When the separation is greater than 65mm, the eyes can not both turn outward so that fusion (viewing) is impossible.
- PRISMATIC VIEWER**—Use of prisms permits 85mm homologous point subject positives with a 65mm principle prism point eye separation.
- PSEUDO-STEREO**—False stereo; stereo-like effect.
- PSEUDOSCOPIC STEREO**—Untransposed stereo; right eye sees left view and vice versa. Result shows foreground and background reversed. Confusing at first; may be difficult to detect.
- REDUCED BASE**—Stereo taken with less than a 65mm lens separation.
- RELIEF, STEREO**—Depth in stereo views.
- ROTATING STAGE**—Device to permit subject rotation between exposures, while maintaining perfect horizontal and vertical alignment.

- SHIFT BAR**—Device for shifting the camera between exposures.
Used for hyper- or hypo-stereo.
- STEREO-BASE**—Lens-separating distance between the two exposures of a stereo pair. Normally used with a 65mm to 70mm interocular.
- STEREO-PROJECTION**—Direct viewing by means of a photo-optical device which permits many people to see stereo at the same time. Polarization is the most popular method.
- STEREO-REFLECTOR**—Multiple-mirror reflecting device (Stereotach) which permits the taking of two separate views with a 65mm separation on one film frame. Requires a special viewer, or may be cut apart for mounting on a Realist mask.
- STEREOGRAM**—Mounted stereo ready for viewing.
- STEREOSCOPE**—Stereo viewer.
- TABLE-VIEWER, STEREO**—Small size stereo projector specifically designed for table viewing without the need of a darkened room.
- TILTING STAGE**—Special microscope stage used to hold microscopic slides and angle them between exposures.
- TOE-IN**—Inward movement of the eyes (convergence).
- TRANSPOSING**—The correct re-alignment of the right and left stereo view for its specific eye. Stereo must be changed from the order that the camera produces to prevent pseudoscopic stereo.
- TWISTER**—Stereo positive which is improperly aligned from the horizontal and vertical, and which rotates in addition. Generally unviewable.
- VECTOGRAPH**—Single-sheet, direct vision stereogram. Must be viewed directly with polarizing glasses, or by projection onto an aluminum screen.
- WHEATSTONE**—Angled-mirror viewing device which permits the use of large-size stereos.
- WINDOW-EFFECT**—Space placement of a window on a stereo at any desired distance position by definite mask cutting.
- X-RAY STEREO**—Produced by shifting the X-ray tube between two separate exposures on two pieces of film. When very large, requires a Wheatstone viewer. May be copied to a smaller size for Realist viewing.

CHAPTER 10 / **FILM FOR BLACK-AND-WHITE PHOTOGRAPHY**

Film consists of a layer of cellulose acetate, or other resin, acting as a base to support a complex gelatin emulsion composed of sensitized silver salts mixed with minute quantities of sensitive conditioning chemicals. Black-and-white film differs from color film in that the former generally has only one layer. While this one layer may be made sensitive to one or more colors at the same time, it is itself not color forming.

By the color response of black-and-white film, we mean the relative brightness in shades of gray that the film will show in recording the different colors of the spectrum, as compared to their true color visualization by the human eye. This is made clearer upon describing the three main black-and-white film types.

Panchromatic, Type B. Approximates the color sensitivity of the eye.

Blue sensitive. Activated fully only by blue light. Color blind to other true colors.

Infra-red. Sensitive to deep red and invisible red rays that the eye cannot see visually.

With this information you should be able to choose the right film for the right job. If you are copying newspapers, then only the blue-sensitive, fine grade positive film would be necessary. If you desire a mural from an outdoor architectural motif, then a fine grained (ASA25) or a micro-type emulsion (ASA8) would be the logical choice. For the beginner I suggest an ASA50 film such as Plus X because it combines speed, grain and color response.

As with any new field, you should first learn to use one film and one developer so that you may standardize your results for general picture taking. Later, you can use the special emulsions for the specific problems for which they were formulated. Here again, learn to use them under standardized conditions so that you may be always assured of a uniformity of result.

BLACK-AND-WHITE FILM

Film	Color Sensitivity	ASA		Kodak Developer	Time		Use
		D	T		Condenser	Diffuser	
Kodak Plus-X Supreme Superior 2	Pan B	50	40	D-76 Microdol Liquid/DK-20	11 12	13 14	All Around
Kodak Finopan, Superior 1	Pan B	25	20	D-76 Microdol Liquid/DK-20	9 10	11 12	Fine detail, contrast stereo
Kodak-XX; Superior 3; Ultra-Speed Pan	Pan B	100	80	D-76 Microdol Liquid/DK-20	13 15	15 17	Extra speed
Kodak Direct Positive	Pan B	64	50	Home Kit	--	--	One-step Slides, stereo
Bulk only Kodak Positive	Blue Sensitive	--	3		7	9	Black-and- White Copying
Kodak Micro-File Micropan, Minipan	Pan B	--	37	D-11	5 min.	6 min.	Finest grain
Kodak Infrared only with Kodak Wratten Filter No. 87 No. 25(A)	Infrared	--	4 3	D-76 Microdol Liquid or DK-20	9 10	11 12	

N.B. Pan B film with a Kodak Wratten Filter (2x) outdoors and a Kodak Wratten X-1 Filter (4x) indoors will duplicate in a gray scale the true color sensitivity of the eye.

CHAPTER 11 / FILTERS FOR BLACK-AND-WHITE PHOTOGRAPHY

A filter may be defined as a separating or screening device which permits only specific colors or light rays to enter the camera lens while preventing undesired colors or rays from reaching the film. Filters for black-and-white photography serve many purposes when used with the many black-and-white film emulsions.

1. *Corrective.* Since an emulsion can only approximate the speed or color reaction of the human eye, there will always be a need to correct the response of the film so that it will approach the relative visual brightness through shades of gray that we see with our eyes. If we saw our world only in shades of white, black, and gray instead of colors, we would then be able to approximate the same tone scale as black-and-white film when it is activated by different colors.

2. *Contrast.* Another function of the filter is to distort color rendition of an emulsion for a dramatic or spectacular effect. Most night effects can be made during the day by the proper selection of filters. Contrasts may be accentuated to any end of the gray scale so that the tonal range may be either compressed or expanded.

3. *Polarization.* The polarization filter, because it transmits light vibrating only at a certain definite angle, helps to eliminate glare, purify colors, increase contrast and darken skies.

4. *Neutral density.* Many other emulsions are manufactured to a very high speed so that some means is required for certain taking phases, to actually reduce the amount of light entering the lens. If a filter is used to reduce the number of rays which enter the lens, it is necessary that it will maintain the correct color rendition of the subject. This is accomplished by using gray-toned filters which are graduated in density to reduce the amount of transmitted light without distorting colors or light values. They merely reduce the total amount of light entering the lens so as to permit a desired exposure when a very narrow opening is not possible, or a very high shutter speed cannot serve your purpose.

There are four filter types:

1. *Gelatin.* Where a large number of filters is needed for experimental work, gelatin filters are excellent because of their low price and easy adaptability. However, they require great care in handling because they show fingerprints and dust specks which are difficult to remove. Also the gelatin will frequently warp in a humid atmosphere if the filters are not stored properly.

2. *Cemented*. These filters are the most popular as they are inexpensive, function well, store easily, and can be kept clean because of the protective outer sides of glass.

3. *Dyed-in-the-mass glass*. These are the most durable filters, but careful selection is necessary to assure full color uniformity, duplication, and matching in sets.

4. *Water Cell*. This type of filter can be made by dissolving certain color chemicals in distilled water, and then placing the solution in a glass water cell. They may be used in front of hot lights so that the cell will function, in addition, as a heat-absorbing medium.

Coating filters with a thin layer of magnesium fluoride is a recent development. While coated filters are desirable, it is well to remember that many great pictures were taken before the advent of coated lenses. A coated filter, in itself, will not automatically produce a masterpiece. Great effort will always be required to create something that will be more than a snapshot.

With the exposure latitude of present day black-and-white film, the actual exposure with a filter over the lens is not too critical. You may overexpose or underexpose two stops either way and still get an excellent picture. Therefore, there is no need to compute each filter factor to precisely two or more decimal points.

Since a filter will admit only light of its own color, the color that is the same as the filter will be darker on the negative. Where the filter has excluded or rejected any color rays, the negative will be light, because no rays of this color enter the lens and expose the film. When this negative is printed, the heavy tones (the same color as the filter) will be light on the positive print, while the clear portion of the negative will print a dark gray or black, producing areas of shadow. From this information you can gather that to lighten a color you should use a filter of the same color while to darken the color you should use a filter which prevents any of the color to be darkened from reaching the film.

The chart in this chapter will give you all the required information to lighten or darken a subject's color by means of the appropriate filter.

It is important in making exposures to understand filter factors. Every piece of glass in front of your lens will absorb and prevent some light, however small, from reaching the emulsion. Since light is absorbed and excluded, you must compensate in some way for the rejected light that does not reach your emulsion, or your developed film will be underexposed. The additional exposure that must be given



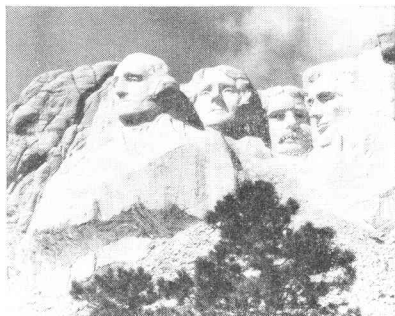
Yellow filter effect (2x)*



Orange filter (3x)*



Green filter (4x)*



Red filter (8x)*

*Courtesy Eastman Kodak Company.

for each filter is known as the filter factor. You know that a red filter will hold back so much light that eight times the normal exposure must be given. A one-second exposure without a filter becomes an eight-second exposure with a red filter. Some technical filters have exposures of thirty times or more. You can see that unless adequate exposure compensation has been made for the additional light that is needed, forgetting a filter factor may ruin your picture.

Know the effect you want, and then use the proper filter to secure it. Do not over-filter, else the extra exposure will eliminate the desired tone or fine detail. Properly used, filters can become a valuable aid in interpreting your subject. "Shoot" a landscape with various filters, and you will be amazed how different the same scene can appear.

The Safe-Set Method for filter use is simple in that your filter factor is corrected on your emulsion speed setting of your exposure meter, chart, etc. So that if your filter factor is two, divide the emul-

BLACK-AND-WHITE FILTER INFORMATION

<i>The Subject Color</i>	<i>To Lighten a Color</i>	<i>To Darken a Color</i>
VIB (violet, indigo, blue)	C-5	B
G (green)	B, G, or X-1	
Y (yellow)	K1, K2, G, or A	C-5
O (orange)	K1, K2, G, or A	C-5
R (red)	F, A, or G	C-5

FILTER FACTORS *for Panchromatic Emulsions, Type B*

<i>Kodak Wratten Filter</i>	<i>Sunlight</i>	<i>T-Tungsten</i>	<i>Uses</i>
K-2 (Yellow)	2	1 1/2	Produces normal skin tones, clouds (panchromatic film only)
G (Orange)	3	2	Darkens blues (sky tones, etc.), dramatizes outdoors
X-1 (Green)	4	3	Lightens foliage, separates different greens
A (Red)	8	4	(Panchromatic and Infra Red only) Blackens skies, night effects in daylight
Neutral Polarizing Screen	2	2	Reduces glare, increases contrast, darkens skies.

N.B. Remember 2, 3, 4, 5 factor numbers for the standard black-and-white filters. Never over-filter.

Black-and-White Filters recommended for photography *cannot* be used with color film. Of the Filters included in the above table, only the neutral polarizing screen may be used with color film.

sion speed by two and use this new number on your calculator. In this way you will not have to be concerned with new calculations for each exposure. With the same filter in place, your exposure readings are made in a one-step direct procedure. In this way the pre-setting method reduces your chance of error and makes photography easy.

CHAPTER 12 / PROCESSING FOR BLACK-AND-WHITE PHOTOGRAPHY

After your film has been exposed, you must re-wind it back into the original cartridge or continue winding until the end of the paper backing can be pasted to prevent the film from unraveling. The exposed film appears no different from the unexposed film, but it is not capable of yielding an image. The potential undeveloped image is called by the scientists a "latent image." The changing of the invisible latent image to a visible permanent form is development.

Development must be performed entirely in the dark because your film is always sensitive to any light until the emulsion has been developed and completely fixed. It can be done either in a completely darkened room or with a light-tight development tank provided with an opening for changing the different solutions.

The amateur will generally find that darkroom development is a tedious process because so much of the time is spent in the dark just waiting. To make waiting more pleasant under normal light surroundings, the modern light-tight development tank has come into use. The film must be loaded in a darkroom. For an amateur, this may be a closet or a special type of changing bag. Once the film has been loaded into the tank, every other processing operation may be performed with full safety in daylight or roomlight. In using a tank be sure that your film is placed smoothly on the reel to prevent film buckling. For if this happens, an uneven white streak will appear on the positive print where the buckle has taken place.

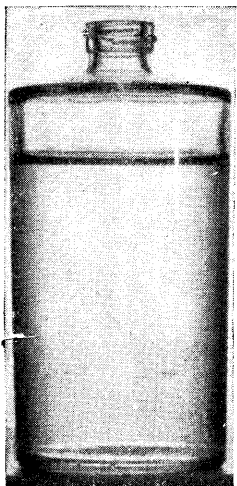
There are two types of daylight development tanks available:

1. *Apron type.* Your film is wound around an apron that has raised dimpled studs at both edges. The studs separate the film from the apron and at the same time allow your developing fluids to circulate. This apron type often does not assure adequate fluid circulation because of the narrow space between film and apron. However, by turning the tank on its side and shaking continuously, this difficulty can be overcome.

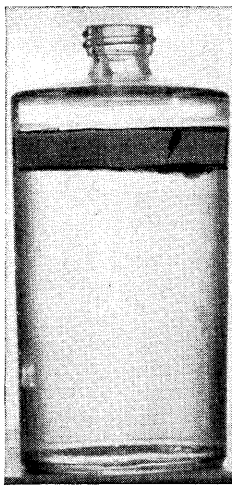
2. *Reel type.* The reel type must be carefully loaded to prevent any buckling of the film. It is the more popular type of development tank in use. Here, too, your agitation should include shaking and turning the tank in addition to moving the reel by the core rod. Core rod agitation is not sufficient because the fluid at the center of the reel cannot escape. However, if you shake and turn the tank, the central column of fluid will be agitated and you will get complete circulation.

FILM FORMULARY

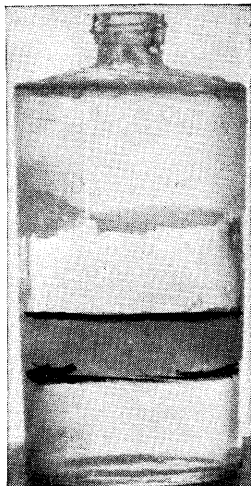
DEVELOPER	Chemical - Grams	Elon (Metol)	Sodium Thiosulfate	Sodium Sulfite	Hydroquinone	Borax	Kodalk	Sodium Thiocyanate	Potassium Bromide	Sod. Carb. Mono.	Acetic Acid 28%	Chrome Alum	Boric Acid Crystal	Potassium Alum	to Water	REMARKS:
DK-20		5.0	100				2.0	1.0	0.5						1000	Finest grain.
DK-20 R		7.5	100				20.0	5.0	1.0						1000	Replenisher - 1 oz. to a roll.
D-76		2.0	100	5.0	2.0										1000	Moderate grain.
D-76 R		3.0	100	7.5	20.0										1000	1 oz. to a roll.
D-76 F		2.0	100	5.0	20.0										1000	Existing light technique.
D-11		1.0	7.5	9.0					5.0	25.0					1000	High Contrast development.
SHORTSTOP	1.										120				1000	Neutralizes & stops development.
	2.														1000	Water alone may be used.
	3.											30			1000	Also hardens film.
FIXING BATH			240	15.0							48.0		7.5	15.0	1000	The ideal film fixer.



Solutions will oxidize.



Inside floating paraffin lid in place.



Inside lid sinks as liquid is poured out.

Once your film has been carefully loaded on to the film reel of your tank and the lid closed, you may then go into any light to start the development procedure. With black-and-white film, I would recommend that you do your own processing if you wish to bring out the full quality of the film. In addition to a developing tank, the other simple equipment for processing your own negative includes a thermometer and the developing solutions.

When you do not use these solutions for any length of time, the air affects them so that they lose their strength. When this happens, all your efforts as far as correct exposure, light control, etc. are concerned will be wasted. To minimize the possible spoilage through air oxidation, you can use the author's method for keeping your solutions fresh. Professionals use this device, the floating lid, to keep their solutions fresh for months at a time. The illustrations and directions below explain this easy method of protecting your processing solutions. Once you have made an inside floating lid for your bottles, you may be sure that your solutions will stay fresh for the maximum length of time, because your lid is a permanent addition. I would suggest that you prepare at least four or five bottles in this way so that you will have a couple of extra ones available at a moment's notice.

Materials: Paraffin (Parawax or any other brand of fruit preserve paraffin), bottles, water.

1. Fill your empty bottle with cold water up to where the shoulder starts to taper in.

2. Melt one half ounce (approximately $\frac{1}{4}$ bar) of paraffin in a double boiler, pot or heat proof glass dish. Melt carefully so that no open flame reaches the melting wax.

3. Pour the melted wax into the water-filled bottle. Let stand till completely cool. You will find that the wax has formed a thick layer on top of the water.

4. When you tilt the bottle the wax layer (floating lid) will move with the water. As you pour out water, the lid will sink to the lower water level.

5. Make up fresh processing solutions in properly labelled bottles with floating lids.

Make up at least four different floating lid bottles for:

(a) Developer, (b) Replenisher, (c) Chrome Alum Stop Bath, and (d) Fixer.

One question the amateur asks about developing is: Shall I fix my own formulae of individual chemicals, or should I purchase them ready for use? My advice would be to purchase your chemicals ready mixed. You will find that cheaper in the long run, because you are sure of the continued factory quality controls. With pre-weighed chemicals, all you have to do is dissolve the powder in the exact amount of water at a temperature the manufacturer recommends. Factory controls assure uniform quality, and the solutions will always be fresh and maintained at full strength if they are kept in the bottle with the floating lid described above. Should you, however, wish to mix your own chemicals, you will find two standard formulas listed in the table on page 69.

The second step in the development process is to rinse your film in order to halt film development. For this a stop bath of plain water, a solution of acetic acid (vinegar), or a solution of chrome alum may be used. The acetic acid solution can be used only once, while the chrome alum solution can be used again and again until a sediment forms. The chrome alum solution will also harden your emulsion so that reticulation (mottled film appearance) caused by uneven solution temperatures is kept to a minimum.

After the stop bath of chrome alum, another rinse with water is recommended to remove any chrome alum solution which may still be present on the film. After the water rinse has been poured out, the final step is to pour in your fixing solution. Fixing solution consists of a mixture of sodium or ammonium hypo-sulphite compound in

water. This mixture has the property of moving only undeveloped silver salts. All that can remain in the emulsion is the developed (reduced) form of silver which is black or gray where the reflected light from your subject has reached the emulsion. Since the emulsion has thickness, the depth of the emulsion will be dark in direct proportion to the amount of light that has affected it. Little light causes little darkening; more light, proportionately greater darkening.

Only after the fixer has been in the daylight tank for approximately ten minutes do you open the tank to look at the film. If there is any cloudiness or murkiness to the emulsion, replace the film in the fixing solution for another five minutes. Remember that if your clearing time is over twenty minutes, it is a good idea to change your solution.

When your development has been completed, be sure to pour each solution back into its own bottle. Each bottle should be distinctly marked to prevent your contaminating solutions.

The best results are obtained with fresh processing solutions at a temperature of 68 degrees Fahrenheit (A.S.A.). It is axiomatic that the least expensive part of photography is the processing. Consider the fact that you spend a great deal of money and time taking pictures and then foolishly lose the value of this expenditure by trying to squeeze an extra roll from old, oxidized solutions. A small expenditure of money for fresh solutions will insure uniform results in development.

When the negative has been removed from the fixing solution it is washed in clear running water for at least ten minutes and then hung up to dry. Be sure that the negative is free from spots or water marks. To remove the sediment that sometimes adheres to film, wet a large wad of absorbent cotton, squeeze until it is damp, and then gently slide it along the negative to remove all surface sediment. Even the slightest amount of pressure must be avoided to prevent any chance of microscopic scratches being caused by the movement of the dampened cotton. These scratches, if formed, may show on enlargement and will require corrective treatment on the negative or print.

Great care in processing will produce its own reward—a perfect negative. Processing in photography is easy when you form the habit of doing it correctly. With correct processing, you will always know what uniform results may be expected. The good results which are attained by simpler standard methods will be satisfying and will spur you to greater efforts.

But since there is no other process available at the moment, the manufacturers and processors take as much care as possible to maintain a high color standard.

6. Special table transparency frames (Lumax) are available. They reflect the room light from the ceiling onto the transparency by means of an aluminum surface which is placed behind the transparency at a light-catching angle. The picture size that you see is limited to the size of the transparency.

7. *Diaversal Prints*. With the Diaversal process, a direct positive may be made from the transparency without the need of an intermediate negative. With this process, wallet-size prints may be made and duplicated ad infinitum. Larger pictures can be made as easily as black-and-white enlargements.

SLIDE PRESENTATION

The presentation of your slides for viewing is very important in maintaining the interest of your audience. You must become a showman and make your pictures tell the story. Write a script which will co-ordinate your slides so that they have a unified effect. If the script is long and difficult to remember, then tape record it for your convenience. Once you have edited your slides and script, you can expect to receive many invitations to put on your show. When this happens you will know that, as a photographer, you have "arrived."

CHAPTER 22 / STEREO AND STEREO PROJECTION

Thirty-five millimeter stereo (three-dimensional photography) has been a continuing source of interest to photographers and has provided a field for a good deal of experimentation. The owner of a 35mm camera is fortunate in that his standardized taking and viewing equipment (Realist or Veriscope viewers; Leitz or Rolleiflex shift bar) is suitable for stereo photography.

Why do you see depth with stereo? This is the question most frequently asked about stereo photography by the beginner.

This is the explanation: You have two eyes. The separation of the eyes generally is 65mm ($2\frac{5}{8}$ inches). Because of this, each eye does not see exactly the same scene as the other. Since the eyes are separated by 65mm, the view of each eye is offset by this separating distance. This difference in viewpoint is known as parallax. If you

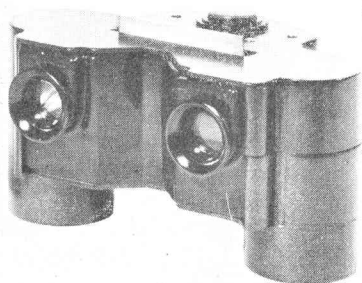
have ever fired a gun, you realize that you must correct for the difference between your line of sight and that of the bore of the gun muzzle. If you do not compensate for this difference, you will always miss your target if your eye cannot be made to see the same view of your target as the gun bore. It is precisely this difference in viewpoint (parallax), however, that makes depth perception possible with stereo. Because when each eye records and transmits a slightly different viewpoint to your brain, a fusion of the two images occurs. The result of the fusion and co-ordination of the different viewpoints into a continuous smooth picture is depth perception.

With one eye, you can see only a flat picture because there is only one viewpoint. If you take two pictures which are exactly alike without moving the camera at all and view them in the stereo viewer, the scene will still be flat. You must "triangulate"—that is, you must see each scene from two different points of view in order to be able to duplicate the depth effect of your eyes. Depth perception is possible only when the two images are taken from two different viewpoints. The difference in viewpoint may be minute, as little as one tenth of an inch apart for close distances. On the other hand for long distances, the separation for the two different exposures may be yards or even miles. There are formulas for calculating the taking separation distances. You will be shown how to calculate the distance between paired exposures so that you may be able to produce excellent depth perception for any distances.

You can take stereos with your 35mm camera by any of the following practical methods:

1. *1/50 Formula (Projection)*—1/25 (viewing) shift bar for still subjects only. The theoretically ideal stereo effect has been calculated to result from an inter-lens separation which is 1/50 of the camera-to-subject distance. As you come closer to the subject (24 inches or less) this formula number for the separation must become greater in order to secure a better modeling of the subject.

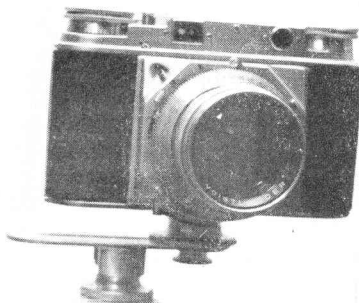
When the camera is used according to the shift-bar formula, the ideal method is by the use of a horizontal format because the border of the film is an excellent reference point for aligning your film when it is ready for mounting. However, a full frame is not recommended because the standard stereo size has become 24x24mm. Therefore, your composition must be calculated for this area. This is simply done by masking your viewfinder with clear scotch tape. $\frac{1}{4}$ the horizontal dimension in from each side. The central $\frac{2}{3}$ portion now will show the exact field for the 24x24mm size.



Stereotach Illuminated Viewer



For Stereo pictures.



For Stereo pictures.

After each frame has been cut, rule a line through the center of the edge only. This will give you a center point for aligning your positives.

In mounting your slide, it is important to separate your left and right views. They must be correctly placed on a mask else a condition known as a pseudo-stereo will result. A pseudo-stereo is unacceptable as it can cause eye fatigue.

You make your stereo pairs by using your camera on a sliding shift bar for two separate exposures. With this bar, the 1/50 formula is used in the following way. You measure your subject-to-lens distance. If the subject is 40 inches from your lens, the interocular distance between exposures will be $4/5$ of an inch. You focus and compose your picture and then ready the camera for the exposure. Then,

shift the camera to the left for half the needed distance ($2/5$ of an inch for this example), take your picture, rewind it and again cock your shutter, etc. Then shift your camera to the right for the full distance. In this way, your viewed image will be exact and the distance shifted will be correct. It is important to understand that only by shifting equally on both sides of your center point will your viewed image and your final stereo be alike.

If the subject-to-lens distance is 20 inches, then the separating point will be $2/5$ inch, etc. In using a shift bar you must remember the sequence of the exposures that are being made. You must also remember to change your supplementary lenses as you come closer in order to keep your subject in focus. In addition, you must correct for viewfinder parallax at close distances. If you intend to take many close-ups, then you may construct a permanent stand with markings for the exact focusing distance. Should the depth produced by the $1/50$ shift prove inadequate for your needs, then you may try a formula based on $1/25$ or $1/12.5$ distance. This will increase the separation of your two exposures. The increased separation will produce a greater amount of triangulation, and this in turn will produce the greater stereo effect.

2. *The Stereo-tach Reflector Method.* This unique device is the most practical method for the amateur. The Stereo-tach system consists of four front-surfaced mirrors which are so arranged that two separate images are formed from two differing viewpoints separated by the normal inter-eye distance of 65mm. Both of these different images are formed on only one full film frame (24x36mm). Each image size, half of the pair, is approximately 18x24mm. The use of the Stereo-tach is economical because both images are formed together on only one full frame. In order to view this Stereo-tach transparency, the special Stereo-tach viewer (which is a reverse of the taking mirror arrangement) must be used. However, each frame may be cut apart and the halves remounted in the standard Realist type mask. The recommended taking distance with the Stereo-tach is ten feet. At shorter distances, the angles of the subject reflection from the mirrors form images which are difficult to view. Since both pictures are taken at the same time, the Stereo-tach method is suitable for taking moving subjects.

If the camera lens mount rotates in focusing, the Stereo-tach will rotate with the lens and will produce a poor stereo. You can minimize lens rotation in focusing by the use of your hyper-focal distance or depth of field scales. Set the distance, etc., according to the Safe-Set

Method and be sure the Stereo-tach is perfectly level on the camera. You may use the Stereo-tach viewfinder, or you may mask your camera's viewfinder with two pieces of scotch tape so that each will cover $\frac{1}{4}$ the horizontal measurement of your viewfinder; the middle half in the center will be clear and is the only portion used for composing your stereo picture.

A limitation of viewing stereo with a hand viewer is that only one person at a time can view your transparency. The best method of mass viewing is by the use of polarizing materials and spectacles. These polarizers are placed over each separate view in the optical system, so that one eye will see its polarized view at one angle and the other eye will see the other polarized view at the opposite angle. Coordinating polarizing spectacles are worn over both eyes which permit each eye to see only its own respective view without any interference from the other eye's image. When each eye sees its specific view only, the brain fuses the two images so that you see the subject in depth.

There are three methods for stereo projection:

1. Using the Stereo Realist or TDC Stereo Projector. These are two-lens projectors. Each lens projects only one polarized image. Either projector will take up to the full 35mm 24x36mm size, and the resulting projection size may be as large as 5 feet by 5 feet.

2. Taylor Stereo Table Viewer. This is a small projector, conveniently designed for table use with regular room light.

3. Since you view the Stereo-tach transparency by reversing the taking device (the Stereo-tach viewer), projection is likewise possible by projecting your scene back through the Stereo-tach taking device. *But this image synthesis (re-forming) is possible only if the projector lens has the same focal length as the camera lens.* If the stereo was taken with a 2-inch lens, it must be projected with a 2-inch lens, so that the proportion of taking and viewing perspective are carefully maintained. If you try to use a projection lens of longer or shorter focal length than was used on the camera, your two screen images (from each stereo half) will be so far apart that your eyes cannot fuse the separated images to re-form the picture in depth.

Only the polarization method of projection will permit color to retain its true identity. Many people claim that color is the only thing that makes our everyday surroundings interesting. By using your 35mm camera for stereo, you are able to recapture this interest in a life-like form. No matter what taking method is used, stereo always is worthy of a trial. Its real-life quality and dramatic depth will enable you to realize another potentiality for pleasure with your camera.